

Name of Firm or Corporation  
Submitting Bid: KAMAR AUTOMATIONS, INC

ADDENDUM NO. 1

DATE: MAY 16, 2016

CONTRACT NO. EMA-03A  
ERIE COUNTY WATER AUTHORITIES  
SCADA PANEL REPLACEMENT  
E.C.W.A. Project No.: 201400160 EMA-03A

ENGINEER: EMA Engineering Services, PC  
2355 Highway 36 West, Suite 200  
Saint Paul, MN 55113-3819  
Telephone Number: (651) 639-5500  
Fax Number: (651) 639-5730

THE ATTENTION OF ALL BIDDERS IS DIRECTED TO THE FOLLOWING CHANGES  
TO THE CONTRACT DOCUMENTS:

Bidders must acknowledge receipt of Addendum on page 00410-2 of the Bid  
form/Proposal of the Bidding Package.

This addendum is hereby incorporated into the bid documents of the project referenced  
above. The following items are clarifications, corrections, additions, deletions and/or  
revisions to and shall take precedence over the original documents. Additions are  
indicated by underlining, deletions are indicated by ~~strikethrough~~.

NOTE WE HAVE NO CORPORATE SEAL FOR  
KAMAR AUTOMATIONS, INC

ECWA Project No. 201400160

Contract No. EMA-03A

Page 1 of 3

ADDENDUM NO.1

I. General

A. Minutes of the May 10, 2016 Pre-Bid Meeting Attendance sheet and Pre-Bid Meeting Presentation are included as a part of Addendum No. 1 and are attached hereto as attachment AD1-01 is NOT considered part of the Bidding Documents or part of the proposed Contract Documents.

II. PROJECT MANUAL

A. BIDDING REQUIREMENTS

NONE

B. SPECIFICATIONS

NONE

III. DRAWINGS

NONE

ATTACHMENTS INCLUDED:

GENERAL

AD1-01 May 10 2016 Pre-Bid Meeting Minutes Attendance and Sign-in Sheet and Pre-Bid Meeting Presentation.

DRAWINGS

NONE

**SPECIAL NOTICE:** This Addendum shall be inserted into the Project Manual submitted with the Bid and shall be signed by the Bidder in the space provided

Erie County Water Authority



JOSEPH T. BURNS  
Secretary of the Authority

**SIGNATURE OF THE PERSON, FIRM OR CORPORATION SUBMITTING BID:**



Signature

VP of Finance

Title

(SEAL, if by Corporation)



**ERIE COUNTY WATER AUTHORITY**

**Contract No. EMA-03A  
SCADA PANEL REPLACEMENT  
PROJECT NO. 201400160**

**PRE-BID MEETING-MINUTES  
Tuesday, May 10, 2016, 10:00 a.m.  
ECWA Service Center**

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**Agenda**

- I. Introduction
- II. Bidding Requirements
- III. Project Overview
- IV. Sequence of Construction
- V. Open Question & Answers
- VI. Site Visits

**I. Introduction**

**a. Purpose of the Meeting:**

- i. Familiarize Bidders with the scope of the project and the bidding requirements
- ii. This pre-bid meeting is NOT intended to answer specific questions regarding interpretation of the Contract Documents.
- iii. Nothing discussed during this meeting will be construed to have changed the intent of the Contract Documents.
- iv. All the Clarification or potential modifications will be addressed in Addendum (s).
- v. A copy of the minutes from this pre-bid meeting and attendance sheet will be included in an Addendum.

## II. Bidding Requirements

### a. Key Dates:

- i. Pre-Bid Notes: Friday, May 13<sup>th</sup>, 2016
- ii. Questions: Ten (10) days prior to bid opening (COB, Friday, May 13<sup>th</sup>, 2016)
- iii. Final Addendum: Three days prior to bid opening (COB, Friday, May 20<sup>th</sup>, 2016)
- iv. Sealed Bids Due: Tuesday, May 24, 2016 at 11:00 AM.

Location: Ellicott Square Building, Suite 310 (Front Desk)  
Downtown, Buffalo, NY

### b. Qualifications of Bidders:

#### i. Article 5.02

"The SCADA integrator (system integrator) shall have a minimum of 5 years' experience with the HMI software and RTUs as specified in Sections 409433 and 409513 and have configured SCADA systems for water distribution systems of similar size over a radio network."

#### ii. Article 5.03

"To demonstrate qualifications to perform the Work, Bidder shall complete and submit with its Bid the Bidder Qualifications Statement which is bound in the Project Manual. Bidders may be asked to furnish additional data to demonstrate their qualifications."

### c. Substitute and "Or Equal" Items:

#### i. Article 13.01

"The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or equal" items."

#### ii. Section 01630

Article 1.03 Substitutions

### d. Woman and Minority Business Enterprise Policy:

- i. There is a 10% WMBE participation goal on this project.
- ii. Comply with the WMBE requirements set forth in Appendix A.
- iii. Submit Part A of the Minority Enterprise Requirements within one week of the Bid Opening.

**e. Bid Submittals:**

- i. The entire proposal book shall be submitted.
- ii. Bid Bond or Certified Check in the amount of not less than 5%
- iii. Bids must also be accompanied by:
  - ✓ Non-Collusive Bidding Certification.
  - ✓ Grounds for Cancellation of Contract.
  - ✓ SECTION 139 of State Finance Law
  - ✓ Experience Information.
  - ✓ Financial References.
  - ✓ OSHA Information.
  - ✓ Equipment Information.
  - ✓ All Addenda issued and acknowledged on the Addenda and the Proposal.
- iv. The sealed envelope titled "BID ENCLOSED" along with the title of the bid project.
- v. Prospective Bidders are referred to the Notice to Bidders and Instructions for Bidders for all detailed bidding requirements.

**f. New York State Lobbying Law:**

- i. No Contractor shall contact any ECWA employee about the project.
- ii. For further information please visit ECWA and the New York State's websites.

**g. Questions:**

- i. All questions about meaning or intent of the bidding documents shall be submitted to:

Dean Foote, EMA, Inc., [dfoote@ema-inc.com](mailto:dfoote@ema-inc.com). (No phone calls please)

**III. Project Overview**

**a. Hardware: Section 409433**

- i. Servers, workstations, network equipment, and cabling will be provided by the Owner.
- ii. Servers will be located at the Van de Water Plant.
- iii. Development server, etc. will be shipped to Contractor for software Development.

**b. Software: Section 409434**

- i. Procurement of software
  1. Contractor shall provide the software through a Software Allowance, refer to bid form for cost to be included in bid.

2. The Owner will direct the Contractor what to purchase after award of the Contract.
- ii. Owner intends to use the following software products for the project.
    1. GE, Proficy iFIX & iPower
    2. GE, DNP3 Driver
    3. GE, iClient Thin-Terminal Services (10 clients)
    4. GE, Proficy iHistorian (mirrored)
    5. SyTech Inc., XLReporter
    6. ACP, Thin Manager
    7. Specter Instrument, WIN911 PRO and Etc.,
- c. Remote Sites
- i. Tank Sites
    - A total of twenty (20) tank sites will require:
      - ✓ New RTUs, back plates and associated equipment. The existing enclosure shall be reused.
      - ✓ Back plate assembly shall meet Section 409513 Quality Assurance Requirements to include assembly within 150 mile radius of the Owner's facility.
  - ii. Pump Stations and Pump Stations with Tanks
    - ✓ Owner has upgraded these sites in preparation for the project, but additional work is required by the Contractor for the project.
- d. Owner's suggested Sequence of Construction
1. Tonawanda Service Area
  2. Hamburg Service Area
  3. Lancaster Service Area
  4. Eden Service Area
  5. Main Service Area
  6. Orchard Park Service Area

#### IV. Questions

- Q. Can the software allowance be removed from the bonding requirements?
- A. NO
- Q. Are Servers set up for Virtualization?
- A. YES, the Owner will configure the servers for virtualization, but the Contractor shall coordinate with the Owner to ensure the server's virtualization configuration will work properly with the applications.

Q. How will the Owner furnished licensed radios, used during the Factory Acceptance Testing (FAT), be configured to ensure FCC rules are not violated.

A. This will be addressed in an Addendum.

Q. How will the Pump Station programs be tested during the FAT?

A. Some of the assembled back plates with RTUs for Tank sites will be temporarily configured as a Pump Station for the FAT. The specifications include additional analog output modules for this purpose.

Q. What are the security concerns for the employees working on the project? Do they require background check?

A. This will be addressed in an Addendum.

#### V. Site Visit

##### Visit #1: Pine Ridge Pump Station (PS): [Typical Pump Station site]

1. Reviewed some of the work associated with Pump Station site. This work included:

- Remove existing HSQ RTU and replace with panel LAN Switch.
- Install DNP3 Module and connect to panel LAN switch.
- Remove existing switch and connect existing Ethernet cables to panel LAN switch.
- Remove serial connection from HSQ RTU and connect radio to panel LAN switch.

##### Visit #2: Wehre Tank: [Typical Tank Site]

1. Reviewed some of the work associated with Tank site. This work included:

- Reuse existing enclosure
- Replace back plate and equipment with new back plate, RTU, OIT, etc.
- Reinstall existing Radio and Batteries
- Cut door for OIT and Disconnect switch
- Install OIT and Disconnect switch
- Enclosures and associated back plates are two different sizes.



# Women and Minority Owned Business Enterprise Contract Requirements

*It is the policy of the Authority to foster and encourage Minority Business Enterprise participation in the construction contracts of the Authority. Through the setting of Minority Business Enterprise goals and careful monitoring of contractor compliance, the Authority will ensure the fullest possible participation in construction activities by qualified minority and women-owned firms.*

- *The Authority has determined that a goal of ten percent (10%) of the total contract value represents a fair share of minority business utilization on each construction contract awarded.*
- *Each contractor bidding on an Erie County Water Authority contract is to contact MBE's and solicit bids for various aspects of each project. The Contractor is to supply the Authority with information regarding contracts for services and products with Minority Business Enterprises and the dollar amount of each contract on the Minority Business Utilization Report.*
- *The Successful Bidder shall submit to the Authority the **Minority Business Enterprise Utilization Report – Part A** within one week of the bid opening. Part A includes a list of MBE's from whom the contractor has solicited bids, or with whom the contractor has signed a binding contractual agreement. The Authority will not consider a contractor's bid where the contractor fails to submit this report or where an examination of the report evidences failure by the contractor to comply with the affirmative action requirements of the contract.*
- *The low bidder shall submit to the Authority the following WMBE items: **MBE Utilization Report – Part A** (listing each WMBE that will be used for the project) and a **Letter of Intent or Copy of Contract** for each WMBE listed on the report. The letters must be signed by both parties and include the agreed price and list the contracted items or services that will be utilized.*
- *MBE's must be approved by the Erie County Water Authority before their participation may be credited toward the 10% goal.*
- *Utilization Reports shall be submitted at 30% completion, 75% completion and 100% completion of the project.*
- *The successful bidder MUST submit copies of certified payroll every 30 days to the Erie County Water Authority. Please include the Project Number on each certified payroll to ensure that we can review and file into the appropriate contract folder.*

*Additional WMBE information can be found in the contract documents: **Appendix A: Women and Minority Business Enterprise Policy.***

*The ECWA website has a listing of Women and Minority Owned Business Enterprises that have been certified by New York State and Erie County - City of Buffalo.*

<http://www.ecwa.org/minoritybusiness>

ECWA Distribution SCADA Replacement  
 PreBid Meeting

May 10, 2016

List of Attendees

Name	Company	Phone #	email
Scott Swinert	Lantrac Control Systems	601-785-8167	fcs@lantrac.com
Dan Latta	ASG	601-5102	dlatta@asgrp.com
Lisa Loom	ASG	601-5100	lloom@asgrp.com
Ken Kowalski	ECWA	601-822-2200	kkowalski@ecwa.org
Philp Gaberdiel	EMA	704-71-5910	pgaberdiel@ema-inc.com



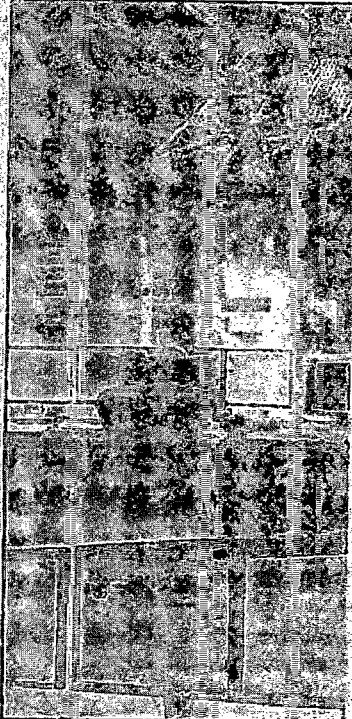


**ECWA Distribution SCADA Replacement  
Pre Bid Meeting**

May 10, 2016

**List of Attendees**

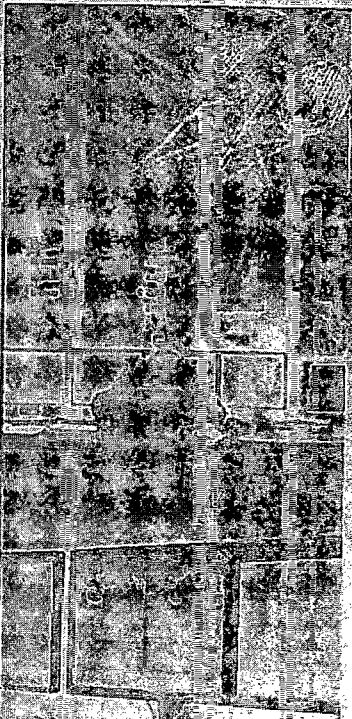

Name	Company	Phone	Email
Larry Copra	ECWA	716 685 8211	larry.copra@ecwa.org
John McLaughlin	ECWA	716 685 8323	jmcLaughlin@ecwa.org
John Morrison	ECWA	716 685 8254	j.morrison@ecwa.org
Pam Kestler	ECWA	685 8244	pkestler@ecwa.org
David Weisler	JTS	716 572 3583	aweisler@ecwa.org
Tina Schlieper	ECWA	716 685 8271	tschlieper@ecwa.org
Steve Noyes	ECWA	716 685 8220	snoyes@ecwa.org
Lorraine Jackson	ECWA	716 685 8220	ljackson@ecwa.org
Russell Saffell	ECWA	685 82216	rsaffell@ecwa.org



**EMA**

**Distribution SCADA Replacement  
Contract No. EMA-03A**

**Pre-Bid Meeting**



**Agenda**

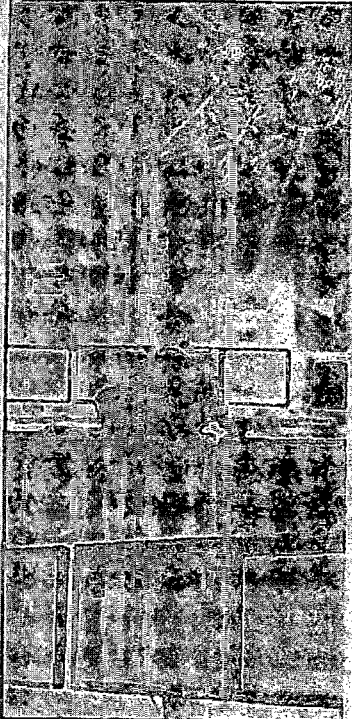
1. Introductions
2. Bidding Requirements
3. Project Overview
4. Sequence of Construction
5. Q & A
6. Site Visits

## Introduction

- ECWA (Owner)
  - Paul Riester: Director of Administration
  - John Matison: Instr. Elec. & Electronics Tech.
  - John Mogavero: Chemist/ Chief WTO
  - Russell Stoll: Executive Engineer
  - Leonard Kowalski: Sr. Distribution Engineer
  - Lavonya Lester: Director of EEO
- EMA Inc. (Engineer of Record)
  - Phil Gaberdiel: Program Manager
  - Dean Foote: Project Manager
  - Manoj Gopu: Engineer

## Introduction

- Purpose:
  - Familiarize Bidders with the scope and bidding requirements
  - Informal in nature
  - Not intended to answer specific questions regarding interpretation
  - Nothing discussed during this Conference will be construed to have changed the intent of the Contract Documents.
  - Clarification or potential modifications will be addressed in an Addendum
- A copy of the minutes from this conference and attendance sheet will be included in an Addendum.



## Agenda

1. Introductions
2. Bidding Requirements
3. Project Overview
4. Sequence of Construction
5. Q & A
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## Bidding Requirements

- Key Dates
  - Pre-Bid Notes: Friday, May 13th
  - Questions: Ten (10) days prior to bid opening (COB, Friday, May 13<sup>th</sup>)
  - Final Addendum: Three days prior to bid opening (COB, Friday, May 20<sup>th</sup>)
  - Sealed Bids Due: Tuesday, May 24, 2016 at 11:00 AM



## Bidding Requirements

- Qualifications of Bidders

- Article 5.02

- *The SCADA integrator (system integrator) shall have a minimum of 5 years' experience with the HMI software and RTUs as specified in Sections 409433 and 409513 and have configured SCADA systems for water distribution systems of similar size over a radio network.*

- Article 5.03

- *To demonstrate qualifications to perform the Work, Bidder shall complete and submit with its Bid the Bidder Qualifications Statement which is bound in the Project Manual. Bidders may be asked to furnish additional data to demonstrate their qualifications.*

## Bidding Requirements

- Substitute and "Or Equal" Items

- Article 13.01

- *The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or equal" items.*

- Section 01630

- Article 1.03 Substitutions

## ***Bidding Requirements***

- **Woman and Minority Business Enterprise Policy**
  - There is a 10% WMBE participation goal on this project.
  - Comply with the WMBE requirements set forth in Appendix A.
  - Submit Part A of the Minority Enterprise Requirements within one week of the Bid Opening.

## ***Bidding Requirements***

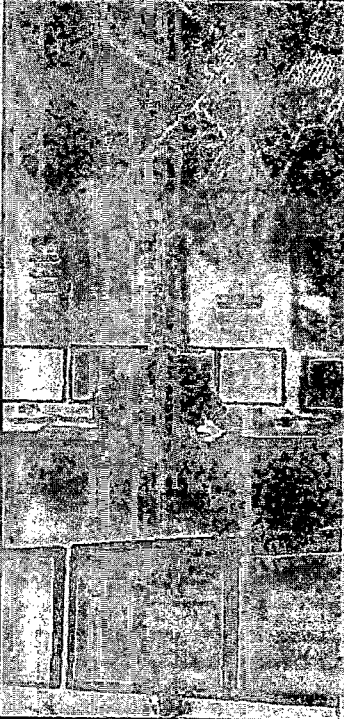
- The entire proposal book shall be submitted.
- Bid Bond or Certified Check in the amount of not less than 5%.
- Bids must also be accompanied by:
  - Non-Collusive Bidding Certification.
  - Grounds for Cancellation of Contract.
  - SECTION 139 of State Finance Law
  - Experience Information.
  - Financial References.
  - OSHA Information.
  - Equipment Information.
  - All Addenda issued and acknowledged on the Addenda and the Proposal.
- The sealed envelope with "BID ENCLOSED" along with the title of the bid project.
- Prospective Bidders are referred to the Notice to Bidders and Instructions for Bidders for all detailed bidding requirements.

## **Bidding Requirements**

- New York State Lobbying Law

## **Bidding Requirements**

- All questions about meaning or intent of the bidding documents shall be submitted to:  
— Dean Foote, EMA, Inc. [dfoote@ema-inc.com](mailto:dfoote@ema-inc.com)



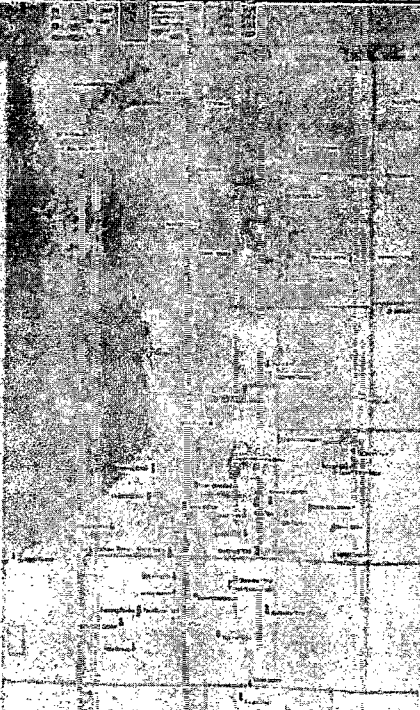
## Agenda

1. Introductions
2. Bidding Requirements
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## Project Description

Replacing ECWA's Distribution SCADA system

- Consist of
  - New SCADA HMI, Historian, Operator Workstations, etc.
  - New Schneider Electric M340 RTUs
  - Upgrades to existing M340 RTUs
  - Utilize an existing IP radio-based remote communication system with DNP3 protocol.

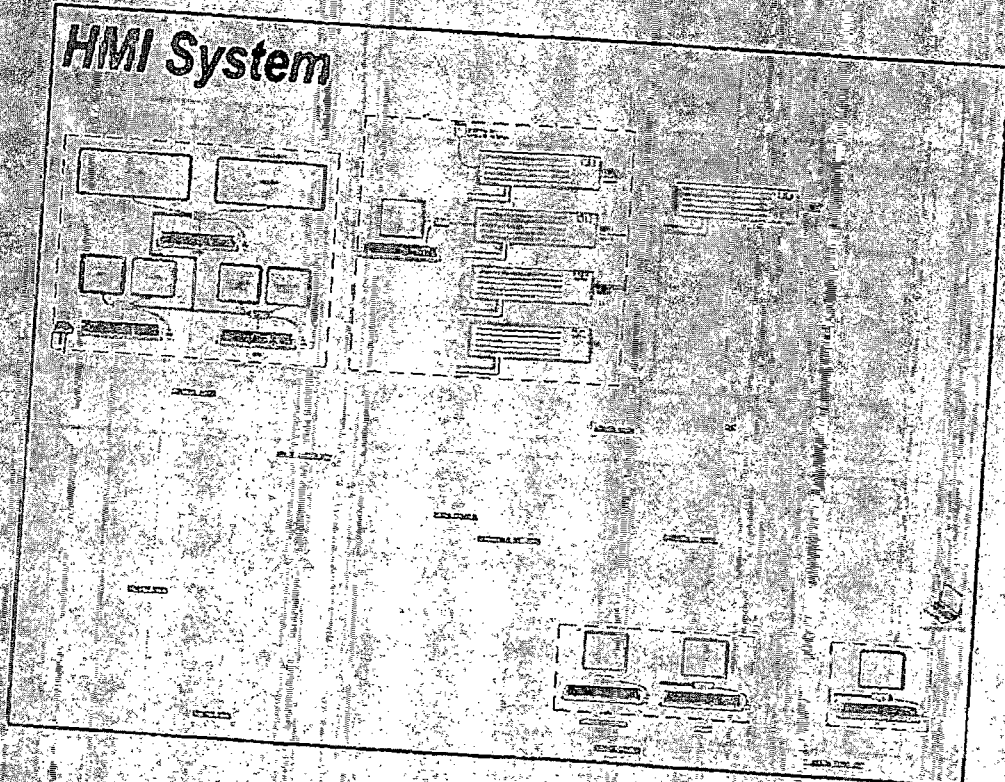


## Project Overview

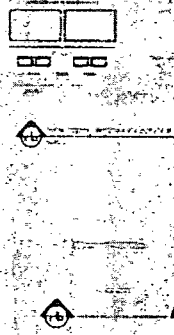
- HMI System
- RTU Replacement/Upgrade
- SCADA Remote Communications



## HMI System



## HMI System



VAN DE WATER

## HMI System

- Hardware: Section 409433
  - Servers, workstations, network equipment, and cabling will be provided by the Owner.
  - At the Van de Water Plant.
  - Development server will be shipped to Contractor for software Development.

## HMI System

- Software: Section 409434
- Contractor provided through Software Allowance

### ITEM: CASB ALLOWANCES

15A For HMI Software, specified in 409434

The FIXED PRICE

has a fixed base fee of \_\_\_\_\_ Dollars

and \_\_\_\_\_ Cents

Signature

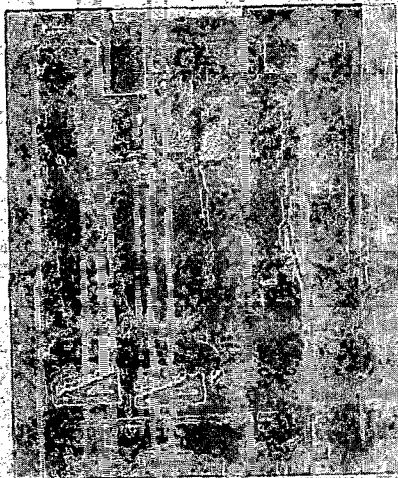
### – Products

- GE, Proficy iFIX & iPower
- GE, DNP3 Driver
- GE, iClient Thin-Terminal Services (10 clients)
- GE, Proficy iHistorian (mirrored)
- SyTech Inc., XLReporter
- ACP, ThinManager
- Specter Instrument, WIN911 PRO

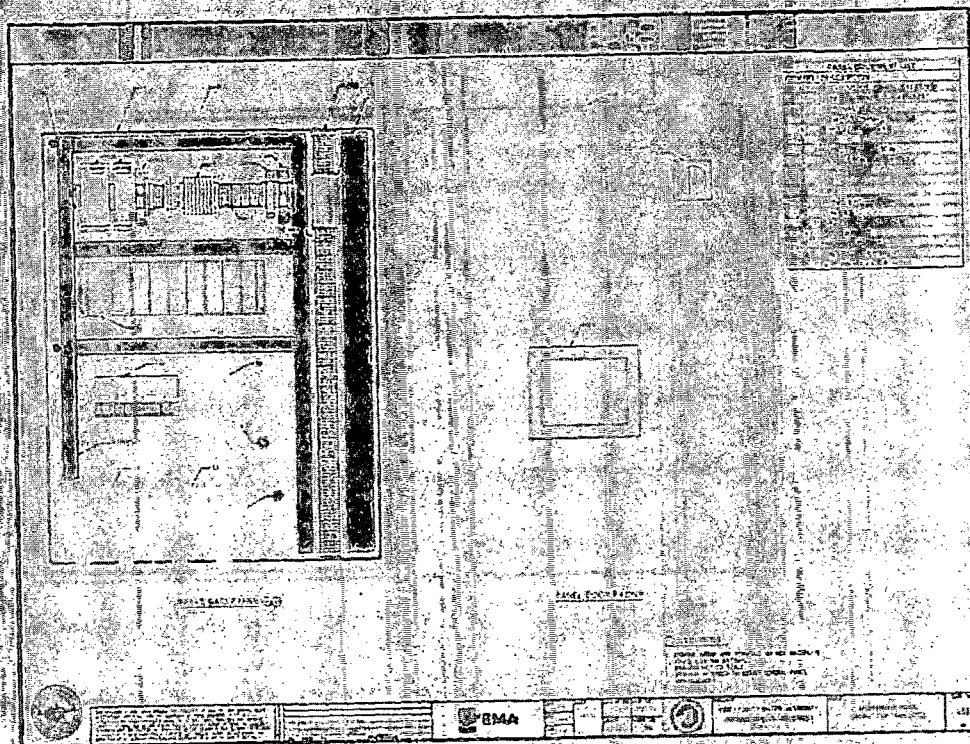
## RTU Replacement (Tank Site)

- Quantity 20
- Provide RTUs, backplates and associated equipment
- Key Components:
  - PLC
    - Schneider Electric M340
    - NOE Card for DNP3 communications
  - OIT
    - Preface HMI
  - Etc.

# RTU Replacement (Tank Site)



Aerial View



BMA



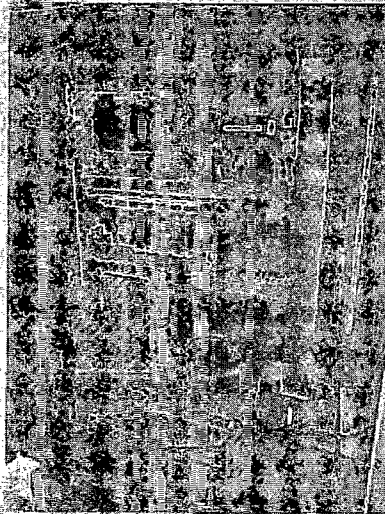
**SECTION 409513:  
SCADA CONTROL PANEL HARDWARE REQUIREMENTS**

1.05 QUALITY ASSURANCE

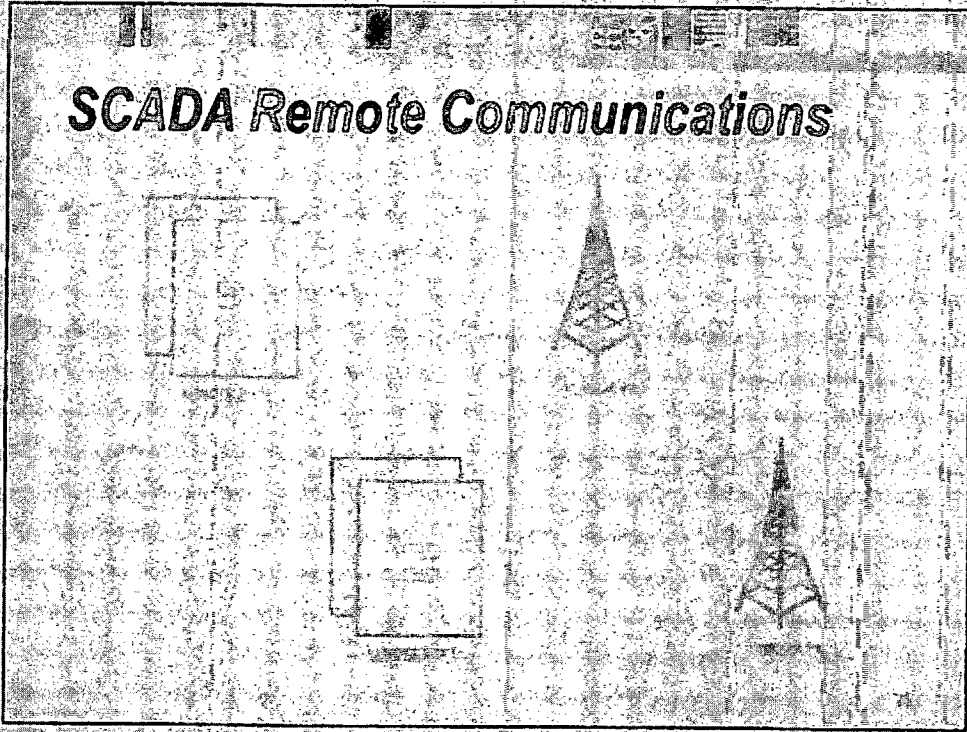
A. Manufacturer Qualifications

1. Manufacturer engaged in the assembly of control panels for not less than three (3) years and who has experience with the assembly of Schneider Electric PLC/RTUs model M340.
2. Control panels shall be assembled within a 150 mile radius of the Owner's facilities.

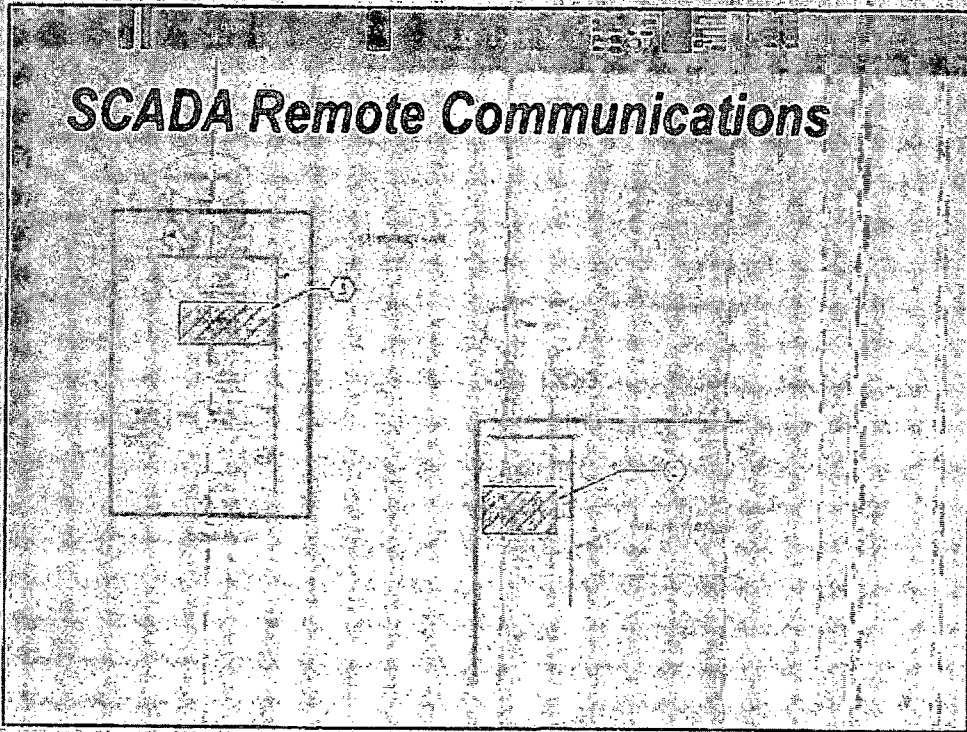
**RTU Replacement (PS or PS&TK)**

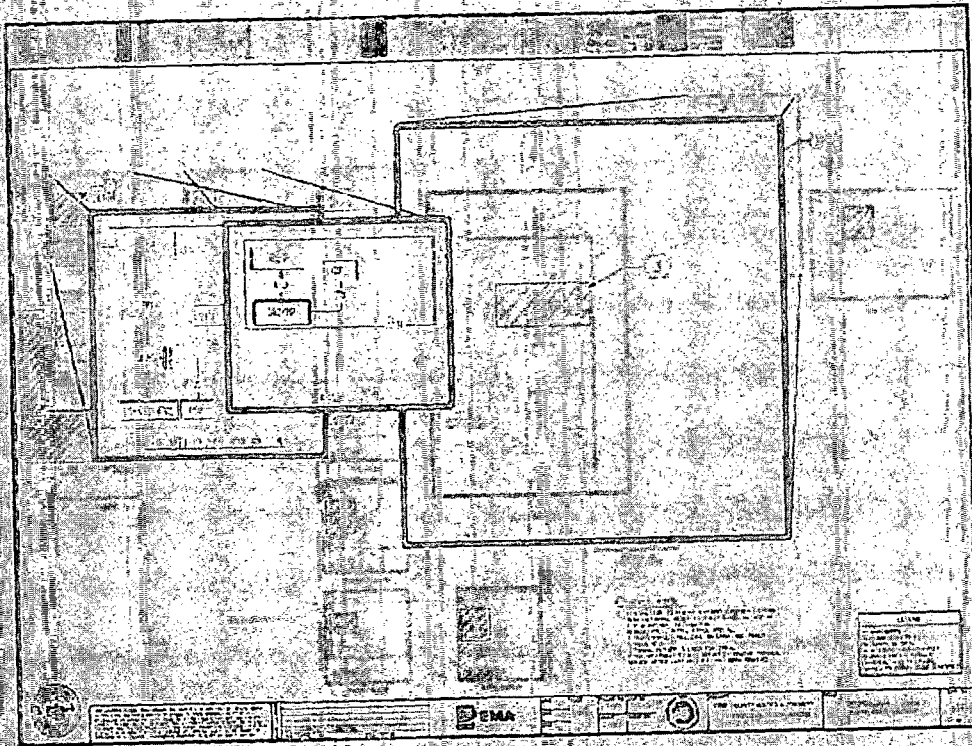


# SCADA Remote Communications



# SCADA Remote Communications

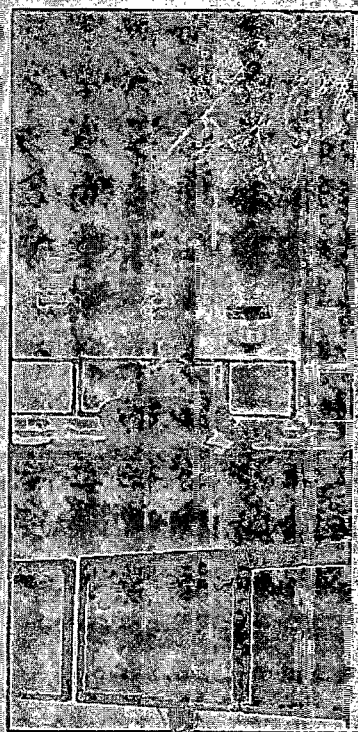




**SECTION 409635:  
SCADA Programming Requirements**

- HMI Screens
  - High Performance HMI
  - Appendix D: HMI Style Guide
- RTU Programming
  - Function Blocks
- Alarming

Priority Level	Response Time	Criteria
1	5 Minutes	Health and Safety critical Damage already done to system (levels over flowed) Requires emergency response
2	15 Minutes	Damage to system imminent Levels are near maximum
3	30 Minutes	Levels approaching maximum Action needs to be taken to avoid level 2
4	1 Day	Equipment in need of preventive maintenance or attention Not critical to system



## Agenda

1. Introductions
2. Bidding Requirements
3. Project Overview
4. Sequence of Construction
5. C & A
6. Site Visits

## Sequence of Construction

- Pre-installation activities
  - Site Surveys
  - System Development Workshops
    - Tag Naming Conventior
    - P&ID and FCNs
    - HMI Graphics/Alarming and OIT Graphics
    - RTU Programming
- Shop Drawings
- Factory Acceptance Testing
- HMI Site Acceptance Testing
- Site Acceptance Testing

## Suggested Sequence of Construction

1. Tonawanda Service Area
2. Hamburg Service Area
3. Lancaster Service Area
4. Eden Service Area
5. Main Service Areas
6. Orchard Park Service Areas



## Site Visit

- **Fine Hill Pump Station**
  - 99 Pennock Pl.
  - Cheeklowaga, NY 14225
  - 42°54'48.4"N 78°47'54.8"W
- **Wehrle Tank**
  - 472 Wehrle Dr
  - Buffalo, NY 14225
  - 42°56'59.0"N 78°46'00.6"W



Name of Firm or Corporation

Submitting Bid: KAMAN AUTOMATION, INC.

**ADDENDUM NO. 2**

**DATE: MAY 18, 2016**

**CONTRACT NO. EMA-03A  
ERIE COUNTY WATER AUTHORITY  
DISTRIBUTION SCADA REPLACEMENT  
E.C.W.A. Project No.: 201400160 EMA-03A**

**ENGINEER: EMA Engineering Services, PC  
2355 Highway 38 West, Suite 200  
Saint Paul, MN 55113-3819  
Telephone Number: (651) 639-5800  
Fax Number: (651) 639-5730**

**THE ATTENTION OF ALL BIDDERS IS DIRECTED TO THE FOLLOWING CHANGES  
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revisions to and shall take precedence over the original documents. Additions are  
indicated by REPLACE, deletions are indicated by DELETE**

I. General

NONE

II. PROJECT MANUAL

A. BIDDING REQUIREMENTS

NONE

B. SPECIFICATIONS

1. SECTION 00100 - NOTICE TO BIDDERS

- a) Page 00100-1: DELETE "Bids will be received by the Erie County Water Authority until 11:00 a.m. prevailing time, on Tuesday, May 24, 2016" and REPLACE with "Bids will be received by the Erie County Water Authority until 11:00 a.m. prevailing time, on Tuesday, June 7, 2016"

III. DRAWINGS

NONE



**SPECIAL NOTICE:** This Addendum shall be inserted into the Project Manual submitted with the Bid and shall be signed by the Bidder in the space provided

Erie County Water Authority



JOSEPH T. BURNS  
Secretary of the Authority

**SIGNATURE OF THE PERSON, FIRM OR CORPORATION SUBMITTING BID:**

  
\_\_\_\_\_  
Signature

VP of Finance  
\_\_\_\_\_  
Title

(SEAL, if by Corporation)

**(This Page Intentionally Left Blank)**

Name of Firm or Corporation

Submitting Bid: KAMAN AUTOMATION, INC.

**ADDENDUM NO. 3**

DATE: MAY 24, 2016

**CONTRACT NO. EMA-03A  
ERIE COUNTY WATER AUTHORITY  
DISTRIBUTION SCADA REPLACEMENT  
E.C.W.A. Project No.: 201400160 EMA-03A**

ENGINEER: EMA Engineering Services, PC  
2355 Highway 36 West, Suite 200  
Saint Paul, MN 55113-3819  
Telephone Number: (651) 639-5600  
Fax Number: (651) 639-5730

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I. General

NONE

II. PROJECT MANUAL

A. BIDDING REQUIREMENTS

NONE

B. SPECIFICATIONS

1. SECTION 00410: DELETE the Section in its entirety and REPLACE with ATTACHMENT AD3-02
2. SECTION 01100- SUMMARY OF WORK

a) Page 01100-5, Part 1.03:

ADD

C. The table below provides a list of the sites which are considered confined space areas.

1	39	Bending Road Tank
2	38	Cole Road Tank
3	37	Scherff Road Tank

b) Page 01100-6, Part 1.05.A.3:

ADD underlined text and DELETE strike through text.

### 1.05 SEQUENCE OF CONSTRUCTION

#### A. General

1. The Work generally shall be constructed without disruption to the normal operation of the Authority, except as noted in Section 01311, and as otherwise approved by the OWNER.
2. It is hereby understood that Time is of Essence in performing all work, but especially in the time that service is interrupted to the customer.
3. The Contractor shall comply with the following sequence for the construction and commissioning of sites:
  - a. Tonawanda Service Area
  - b. Hamburg Service Area
  - c. Lancaster Service Area
  - d. Eden Service Area
  - e. Main Service Areas
  - f. Orchard Park Service Areas
- ~~3.4. is responsible for the sequencing of activities as necessary to satisfactorily complete all project Work within the Contract period. The Contractor's sequencing, cutovers and shutdowns plans shall be presented in the Progress Schedule.~~

**3. SECTION 409513—SCADA CONTROL PANEL HARDWARE REQUIREMENTS**

a) Page 409513-8, Part 2.12 :

DELETE

~~2.12 RELAYS (24 VDC)~~

~~A. Description~~

- ~~1. Contact Form: SPDT~~
- ~~2. Current Rating: 6 A~~
- ~~3. Current Rating: 6 A~~
- ~~4. Function: PLC~~
- ~~5. Material Contact: Ag3SnO~~
- ~~6. Power Rating: 140 W~~
- ~~7. Relay Type: Electro Mechanical~~
- ~~8. Standards: cULus, UL, RoHS~~
- ~~9. Temperature, Operating, Maximum: 60 °C~~
- ~~10. Temperature, Operating, Minimum: 20 °C~~
- ~~11. Termination: Screw~~
- ~~12. Voltage, Control: 24 VDC~~
- ~~13. Voltage, Rating: 250 VAC/DC~~

~~B. Spares~~

- ~~1. Provide two (2) spares of each type.~~

~~C. Manufacturers:~~

- ~~1. Phoenix Part Number: PLC-RSC-24DC-21 model 2966171~~

REPLACE with

2.12 NOT USED

b) Page 409513-12, Part 2.18.C.1: DELETE "Proface HMI #PFXGP4303TADW" and REPLACE with " Proface HMI #PFXGP4301TADW"

c) Page 409513-13, Part 2.20.C.1 & 2:

ADD underlined text

C. Manufacturers:

1. 8 Port (Tank sites and sites with 2 pumps): Phoenix Contact, FL Switch SMCS 8TX, Model # 2989226.
2. 16 Port (Sites with 3 or more pumps): Phoenix Contact, FL Switch SMCS 16TX, Model # 2700996.

- d) Page 409513-14:  
ADD

2.23 SIGNAL ISOLATOR

A. General:

1. 3-way 4 to 20 ma isolating amplifier for electrical isolation

B. Manufacturer

1. Phoenix model MCR-C-I-I-DC, part number 2814508.

4. SECTION 409635- SCADA PROGRAMMING REQUIREMENTS

- a) Page 409635-11, Part 3.11:  
ADD

3.11 HISTORIAN

A. The Historian shall be configured to historize the following:

1. Events

- a. Operator login/logout  
b. Supervisory changes from the HMI  
1) Setpoint changes  
2) Start/Stop pump  
3) Mode of operation changes (Manual/Auto)  
4) Etc.

2. Process Alarms

3. System alarms and events

4. Equipment runtimes

5. Analog values:

- a. Flows  
b. Pressures  
c. Levels  
d. Etc.

**III. DRAWINGS**

**NONE**

**ATTACHMENTS INCLUDED:**

**GENERAL**

AD3-01: Responses to Contractor(s) questions.

**PROJECT MANUAL**

**BIDDING REQUIREMENTS**

**NONE**

**SPECIFICATIONS**

AD3-02: SECTION 00410- BID FORMS.

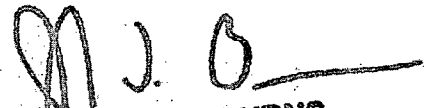
**DRAWINGS**

**NONE**



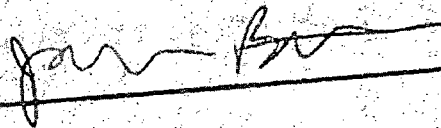
**SPECIAL NOTICE:** This Addendum shall be inserted into the Project Manual submitted with the Bid and shall be signed by the Bidder in the space provided

Erie County Water Authority



JOSEPH T. BURNS  
Secretary of the Authority

SIGNATURE OF THE PERSON, FIRM OR CORPORATION SUBMITTING BID:



Signature

VP of Finance

Title

(SEAL, if by Corporation)

ECWA Project No. 201400160

Contract No. EMA-03A

Page 7 of 7

ADDENDUM NO.3



ERIE COUNTY WATER AUTHORITY

Contract No.: EMA-03A  
SCADA PANEL REPLACEMENT  
PROJECT NO. 201400160

Response to Contractor(s) questions

(Reference: Section 409513, SCADA Control Panel Hardware Requirements, Part 2.08B, Terminal Blocks, Page 6)

1. Phoenix UT 4 series blocks and accessories are specified as the Terminal Blocks (TB) to be provided in this project. Specification drawing I-16, RTU Control Panel Layout for Tank Sites shows that Phoenix US 5 N series TBs and accessories are to be provided. Please clarify.

Response: Specification Drawing I-16, note 4 states that the drawing is intended to depict general panel arrangement. The library symbol used in creating the original drawing is a typical Phoenix library symbol. Provide UT4 series terminal blocks as specified.

(Reference: Section 409513, SCADA Control Panel Hardware Requirements, Part 2.12, Relays (24VDC), Page 8)

2. This section appears to be the only place that 24Vdc relays are mentioned. Only the PMCR (120Vac relay) is shown on the project drawings. Please provide the required part number and quantity.

Response: The 24Vdc relays are not required and have been removed from the specifications. Refer to this addendum for specifications changes.

(Reference: Section 409513, SCADA Control Panel Hardware Requirements, Part 2.20A.2.a, Panel LAN Switch, Page 12)

3. This paragraph specifies eight (8) and sixteen (16) port Phoenix Ethernet switches to be provided at the project RTUs. From project drawings I-16 and I-17, it appears that the 16 port switch is to be used for each of the twenty (20) new RTU panels. Which Ethernet switch is required in the case of the thirty-four (34) upgraded RTUs?

Response: The tank site RTUs require the 8 port model. Existing sites with 3 or more pumps require the 16 port switches. Refer to this addendum for specifications changes.

(Reference: Drawing I-16, RTU Control Panel Layout for Tank Sites, Sheet 23 of 25)

4. Item 17 on the Panel Equipment List is a 4-20mA Isolator. Although all other components in the Panel Equipment List are defined in the Specification, this component is not. Drawing I-18 shows a 25mA current isolator that is to be used at "Chlorine Sites Only". Please provide the part number and manufacturer for this component.

Response: Refer to this addendum for specification changes that add the signal isolator to the specifications.

(Reference: 01100-6, Section 1.04 B – "Owner will configure the radio network . . . with assistance from the Contractor")

5. Could you please define the level of "assistance" to be provided? We need to assign a budget value and need clarification of work scope in order to do so

Response: The radio network has been in operation for many years and we do not anticipate any configuration changes or problems with the radio network. However, if there are problems, the assistance may include verification that the RTUs have been properly configured for optimized DNP3 communications over the radios.

(Reference: 01270-5, Item 15, Cash Allowances)

6. Should the "Actual Cost" amount include cost + profit or invoice cost only?

Response: Cash Allowances are addressed in Section 00700, General Conditions, and Article 11.02 Cash Allowances.

7. Mandates and unstated requirements for cybersecurity and physical site access in the field during initial and final project phases. Since there is no NY State or Federal cybersecurity standards defined, what steps, if any, are required for the following conditions that we normally see mandated by similar state and federal specifications for SCADA work on critical infrastructure

Response: The Owner will address Cybersecurity as it relates to the network. The Contractor shall harden the system as specified in Section 409434, Human-Machine Interface Software Requirements, and paragraph 3.03, System Hardening.

8. Are background checks required for all contractor staff who will have access to the field facilities during site investigations, demolition, installation of new deliverables, and of course field testing and commissioning?

Response: The Owner does not currently have a policy addressing Contractor background checks. It is however the Contractor responsibility to take necessary steps to ensure the protection of ECWA's physical property and other assets. To this goal, the Contractor should have its own policies and procedures in place to screen employees working on the Owner's sites.

9. Same as above issue, except with respect to background and criminal investigation procedures for contractor staff who will have access to, or be responsible for, the actual software development, integration, configuration, and similar responsibilities on this project, both at vendor factory and during factory testing?

Response: The Owner does not currently have a policy addressing Contractor background checks. It is however the Contractor responsibility to take necessary steps to ensure the protection of ECWA's physical property and other assets. To this goal, the Contractor should have its own policies and procedures in place to screen employees working on the Owner's sites.

10. Are there any standards, for example NYS Cybersecurity, or DHS, or items analogous to NERC-CIP which are required to insure adequate measures are in place for the critical infrastructure software and SCADA platforms?

Response: The Owner will address Cybersecurity as it relates to the network. The Contractor shall harden the system as specified in Section 409434, Human-Machine Interface Software Requirements, and paragraph 3.03, System Hardening.

11. If possible please confirm the number of sites for the 20 New RTU panels which have doors that are NOT removable as discussed during the Wehrle Tank site visit. This impacts costs for modifications needed for the OIT and Disconnect switch.

Response: This will be determined by the Contractor during their sites visits after award of the contract.

12. As discussed during the Pine Hill Pump Station site visit, please confirm that the contractor responsibility for checkout of existing field conditions and field equipment functional verifications for signals and control is limited to the status of the EXISTING INTERNAL RTU connection terminal barrier strips, and that ECWA does not expect, nor require, the validation of sensor/control functionality as part of the background scope necessary for the site specific PCN's and site specific P&ID's and in particular the required site reports for field each location. In many past cases where a contractor is authoring the site specific P&ID's we are expected to chase signals to final source or sink equipment.

Response: The Intent of the I/O verification is for the Contractor to verify the I/O both connected to the RTU and connected over a serial or Ethernet connection to another field device (small machine control RTU, etc.). The Owner will provide the Contractor with a copy of the existing RTU programs, but it should be noted that the programs were developed with the functionality for larger sites and some logic has been disabled for the smaller sites. Field devices do not need to be surveyed for operability, but the Contractor is responsible for the development of accurate P&IDs which will require a complete inventory of process equipment, i.e. quantity and location of pressure transmitters, flow transmitters, valves, pumps, etc.

13. Confirm the verbal confirmation made during the pre-bid meeting that indeed ECWA will supply the contractor with a functional Server IN ADDITION TO AT LEAST ONE Thin Client Operator Workstation as will be used in the field. The specification is not consistent in that regard mainly stating that only one server will be supplied to the contractor.

Response: The Owner will provide the Contractor with the development server, an operator work station (including monitor, keyboard, mouse), and two (2) radios for offsite programming and testing.

14. Confirm that softcopy of the specification, bid documents, and drawing package will be supplied to the contractor after award and state a timeframe after award when that softcopy could be expected. It is assumed that the softcopy will be the source document (for example MS Word and an exchange format CAD drawing file) and not merely a scanned, non-searchable, and non-editable form of softcopy.

Response: The Owner will provide the Contractor with electronic copies of the bid documents after Award of the Contract.

15. Confirm the verbal statements during the pre-bid that the ECWA radio license(s) are of such a content that the two radios which the ECWA will supply to the contractor for development and testing will be legally operable with suitable RF attenuators installed in order to not violate any stated or implied FCC conditions present on the ECWA licenses for same

Response: The radios provided by the Owner for testing are licensed radios and licensed for the location and frequency used at the remote sites. We cannot comment on the legality of using the radios for testing, but recommend the testing be performed within the manufacturer's recommendation which includes RF attenuators or "dummy loads".

16. Please state, for costing purposes, WHICH SPECIFIC remote sites are the three which were verbally stated as being confined space environments; indicate if there are any special conditions and/or ECWA mandated training which are required for a contractor to work in that confined space. Also indicate if there are any specific ECWA C.S. procedures, processes, or contractor specialized equipment which is required, during prosecution of the contract scope in those confined spaces. Must an ECWA staff member be present during contracted work performance when in these conditions?

Response: The following sites are considered confined space areas and the Contractor shall have confined space trained staff working on these areas. Special equipment required to work in these areas is the Contractor's responsibility.

-#39, Benning Road Tank

-#38, Cole Road Tank

-#37, Scherff Road Tank

**Refer to this addendum for specifications changes.**

17. Your team indicated that the final amendment, or questions/answers would be sent "via certified mail" to the bidders on the Friday before proposals due. Since in our case certified mail usually takes an extra day for delivery (due to timing of PO route versus normal hours) will you be also EMAILING a backup copy of them to plan holders so that expedited review is possible? This is critical since the bid due date is the morning of the following Tuesday with an intervening weekend. That leaves little time for interaction should the answers mandate coordination with suppliers or other persons outside of the contractor's immediate control.

Response: An unofficial copy of Addendums will be sent to Plan Holders via email and an official copy will be sent to Plan Holders via certified USPS.

18. Please identify what data is planned for storage in the IHistorian configuration

Response: Refer to this addendum for specification changes that add the signal Isolator to the specifications.

19. Who is the POC responding to the questions?

Response: all questions about meaning or intent of the bidding documents shall be submitted to the designated contact person in writing. The designated contact is Dean Foote, EMA, Inc., [dfoote@ema-inc.com](mailto:dfoote@ema-inc.com)

20. We request ECWA to remove \$200,000 software cash allowance from the project total. If it remains in the sum, contractors need to include it in the bidding cost that ultimately reflects on the amount ECWA ends up paying.

Response: The software cash allowance cannot be removed from the project total cost.  
Refer to this addendum for cash allowance amount changes.

21. Please clarify the extent of the efforts required in verifying the P&I diagrams. Based on the pre-bid discussions, our understanding is the extent of verifications is limited to the control panels and contractor is not required to verify the process and piping configuration

Response: The intent of the I/O verification is for the Contractor to verify the I/O both connected to the RTU and connected over a serial or Ethernet connection to another field device (small machine control RTU, etc.). The Owner will provide the Contractor with a copy of the existing RTU programs, but it should be noted that the programs were developed with the functionality for larger sites and some logic has been

disabled for the smaller sites. Field devices do not need to be surveyed for operability, but the Contractor is responsible for the development of accurate P&IDs which will require a complete inventory of process equipment, i.e. quantity and location of pressure transmitters, flow transmitters, valves, pumps, etc.

**ERIE COUNTY WATER AUTHORITY  
BUFFALO, NEW YORK**

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**CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT**

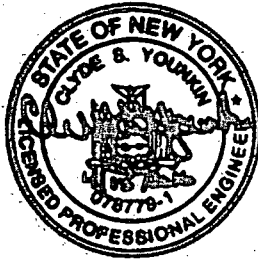
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**ECWA PROJECT NO: 201400160**

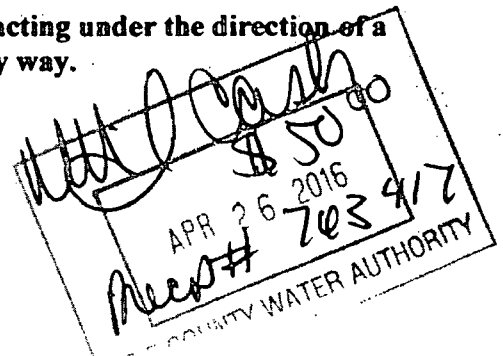
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**APRIL 15, 2016**

**This Project Manual and Contract Drawings were prepared under the direct supervision of a Professional Engineer by: EMA, Inc.**



**It is a violation of New York state law for any person, unless acting under the direction of a licensed professional engineer, to alter these documents in any way.**



**ERIE COUNTY WATER AUTHORITY  
295 Main Street, Room 350  
Buffalo, New York 14203**

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ERIE COUNTY WATER AUTHORITY  
BUFFALO, NEW YORK

CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT  
PROJECT No: 201400160

TABLE OF CONTENTS

<u>Section Number</u>	<u>Name or Description</u>	<u>Initial Page</u>
<u>BIDDING REQUIREMENTS</u>		
00100	Notice to Bidders .....	00100-1
00200	Instructions to Bidders .....	00200-1
00360	Permit Applications .....	00360-1
00410	Bid Forms.....	00410-1
00430	Bid Form Supplements .....	00430-1
00450	Bidders Qualification Statement.....	00450-1
<u>CONTRACTING REQUIREMENTS</u>		
00500	Agreement.....	00500-1
00611	Performance Bond .....	00611-1
00612	Payment Bond.....	00612-1
00700	General Conditions .....	00700-1
00800	Supplementary Conditions.....	00800-1
<u>DIVISION 1 -GENERAL REQUIREMENTS</u>		
01100	Summary of Work.....	01100-1
01270	Measurement and Payment.....	01270-1
01140	Use of Owner's Facilities.....	01140-1
01210	Allowances.....	01210-1
01290	Schedule of Values .....	01290-1
01310	Project Coordination .....	01310-1
01311	Coordination with Owner's Operations.....	01311-1
01312	Preconstruction Conference .....	01312-1
01313	Progress Meetings.....	01313-1
01320	Schedule of Completion.....	01320-1
01321	Construction Schedules.....	01321-1
01331	Shop Drawing Procedures.....	01331-1
01332	Samples.....	01332-1
01523	Emergency Telephone Numbers.....	01523-1
01562	Protection of the Work and Property .....	01562-1
01563	Temporary Controls .....	01563-1
01630	Substitutions.....	01630-1

01640	Transportation and Handling of Materials and Equipment.....	01640-1
01660	Storage of Material .....	01660-1
01780	Record Documents.....	01780-1
01783	Extended Warranty and Maintenance .....	01783-1

**TECHNICAL SPECIFICATIONS**

**DIVISION 40 – PROCESS INTEGRATION**

409000	Common Work Results for Process Controls .....	409000-1
409071	Demolition .....	409071-1
409433	Human-Machine Interface Hardware Requirements .....	409433-1
409434	Human-Machine Interface Software Requirements.....	409434-1
409513	SCADA Control Panel Hardware Requirements.....	409513-1
409635	SCADA Programming Requirements.....	409635-1
409650	Process Control Narratives .....	409650-1

**APPENDICES**

- A. Women and Minority Business Enterprise Policy
- B. Insurance Requirements
- C. Prevailing Wage Rate Schedule
- D. HMI Style Guide
- E. Existing HMI Graphics
- F. Site Inventory
- G. I/O List

## LIST OF DRAWINGS

SHT #	SHEET NAME
<u>GENERAL</u>	
G 1	COVER SHEET
G 2	INDEX OF DRAWINGS
G 3	SITE LOCATION MAP
<u>ELECTRICAL</u>	
E 1	STANDARD ELECTRICAL SYMBOL
E 2	TANK SITES (SHEET 1 OF 2)
E 3	TANK SITES (SHEET 2 OF 2)
E 4	TYPICAL PUMP STATION SITES
E 5	CONTROL ROOM AND SERVER ROOM LAYOUT
<u>INSTRUMENTATION</u>	
I 1	STANDARD P&ID SYMBOLS 1
I 2	STANDARD P&ID SYMBOLS 2
I 3	EXISTING SYSTEM ARCHITECTURE
I 4	EXISTING VUKELIC SCADA RADIO ARCHITECTURE
I 5	EXISTING WINDOM SCADA RADIO ARCHITECTURE (1 OF 2)
I 6	EXISTING WINDOM SCADA RADIO ARCHITECTURE (2 OF 2)
I 7	NEW SYSTEM ARCHITECTURE
I 8	NEW VUKELIC SCADA RADIO ARCHITECTURE
I 9	NEW WINDOM SCADA RADIO ARCHITECTURE (1 OF 2)
I 10	NEW WINDOM SCADA RADIO ARCHITECTURE (2 OF 2)
I 11	TRANSMISSION SYSTEM SITE SCHEMATIC
I 12	PUMP STATION AND TANK ASSOCIATION
I 13	TYPICAL P&ID MAJOR PROCESS EQUIPMENT (1 OF 2)
I 14	TYPICAL P&ID MAJOR PROCESS EQUIPMENT (2 OF 2)
I 15	TYPICAL P&ID MINOR PROCESS EQUIPMENT
I 16	RTU CONTROL PANEL LAYOUT FOR TANK SITES
I 17	RTU CONTROL PANEL WIRING SCHEMATIC 1 FOR TANK SITES
I 18	RTU CONTROL PANEL WIRING SCHEMATIC 2 FOR TANK SITES

END OF TABLE OF CONTENTS

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ERIE COUNTY WATER AUTHORITY  
295 MAIN STREET, ROOM 350  
BUFFALO, NEW YORK 14203

CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT  
PROJECT No: 201400160

NOTICE TO BIDDERS

The Erie County Water Authority will receive separate, sealed bids for the furnishing of all labor, plant, tools, equipment and specified materials, etc. for ERIE COUNTY WATER AUTHORITY, Distribution SCADA Replacement. The Work consists of a single contract for the replacement of the existing Water Distribution SCADA System.

Bids will be received by the Erie County Water Authority until 11:00 a.m. prevailing time, on **Tuesday, May 24, 2016**, at the Cashier's Office of the Authority, 295 Main Street, Room 350, Buffalo, New York 14203, and then at that time and place will be publicly opened and read.

All bids being mailed (including FedEx, UPS, Priority Mail, etc.) or hand-delivered to the Erie County Water Authority shall be directed to the "CASHIER'S OFFICE" at the address listed above in a sealed envelope and be clearly marked on the outside of the mailing or hand-delivered envelope "BID ENCLOSED-ECWA Distribution SCADA Replacement". Failure to follow the above instructions could result in rejection of the bid.

Beginning at 9:00 a.m., on Monday, April 25, 2016, the Instruction to Bidders, Form of Bid and form of Contract, Specifications, and Security Bonds may be examined at the above address and may be obtained by writing the Cashier's Office at the above address or calling (716) 849-8484, between the hours of 9:00 a.m. and 5:00 p.m. upon payment of a deposit of Fifty Dollars (\$50.00). Check for documents shall be made payable to Erie County Water Authority.

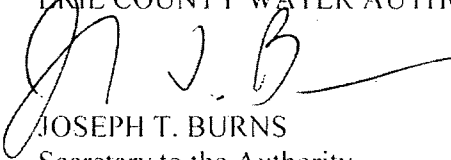
A pre-bid meeting will be held at 10:00 a.m., prevailing time, on **Tuesday, May 10, 2016**, at the ECWA Service Center. A tour of selected remote sites will be conducted at the conclusion of the pre-bid meeting. Attendance at the pre-bid meeting and site tour is recommended but is not mandatory.

Each bid shall be accompanied by a certified check or bid bond in the amount of five percent (5%) of the amount of the bid.

In accordance with State Finance Law §§139-j and 139-k, all questions about meaning or intent of the bidding documents shall be submitted to the designated contact person in writing. The designated contact is Dean Foote, EMA, Inc., [dfoote@ema-inc.com](mailto:dfoote@ema-inc.com), (717) 592-9917.

The Erie County Water Authority reserves the right to reject any and all bids or to accept any bid deemed to be for the best interest of the Water Authority even though the proposal chosen may result in the award of the contract to a bidder whose bid is not mathematically lowest.

ERIE COUNTY WATER AUTHORITY



JOSEPH T. BURNS  
Secretary to the Authority

Engineer:

EMA Engineering Services, PC  
2355 Highway 36 West  
Suite 200  
Saint Paul, MN 55113-3819  
Telephone Number (651) 639-5600  
Fax Number (651) 639-5730

ERIE COUNTY WATER AUTHORITY  
BUFFALO, NEW YORK

CONTRACT NO.: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT  
PROJECT NO.: 201400160

SECTION 00200

INSTRUCTIONS TO BIDDERS

TABLE OF ARTICLES

1. Defined Terms
2. Bids Received
3. Location and Scope of Work
4. Copies of Bidding Documents
5. Qualifications of Bidders
6. Examination of Bidding Documents, other Related Data and Site
7. Pre-Bid Conference
8. Site and Other Areas
9. Interpretations and Addenda
10. Bid Security
11. Contract Times
12. Liquidated and Special Damages
13. Substitute and "Or Equal" Items
14. Subcontractors, Suppliers, and Others
15. Preparation of Bid
16. Basis of Bids; Comparison of Bids
17. Submittal of Bid
18. Modification or Withdrawal of Bid
19. Opening of Bids
20. Disqualification of Bidders
21. Bids to Remain Subject to Acceptance
22. Award of Contract
23. Contract Securities
24. Contractor's Insurance
25. Signing of Agreement
26. Notice to Proceed
27. Partnering - Not Used
28. Sales and Use Taxes
29. Additional Requirements

## ARTICLE 1 - DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders will have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof.
- 1.02 Additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof.
- A. Bidder: The individual or entity who submits a Bid directly to OWNER.
  - B. Issuing Office: The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.
  - C. Successful Bidder: The Bidder submitting a responsive Bid to whom OWNER (on the basis of OWNER'S evaluation as hereinafter provided) makes an award. Also known as CONTRACTOR.
  - D. ENGINEER: As defined in the Agreement, Section 00500, under Article 2.

## ARTICLE 2 - BIDS RECEIVED

- 2.01 Refer to Notice to Bidders for information on receipt of Bids.

## ARTICLE 3 - LOCATION AND SCOPE OF WORK

- 3.01 Refer to Section 01100 of the General Requirements for the location and scope of the Work.

## ARTICLE 4 - COPIES OF BIDDING DOCUMENTS

- 4.01 Refer to Notice to Bidders for information on examination and procurement of Bidding Documents.
- 4.02 The Issuing Office is the Cashier Office of the Erie County Water Authority, 350 Ellicott Square Building, 295 Main Street, Buffalo, New York 14203.
- 4.03 Complete sets of Bidding Documents must be used in preparing Bids; neither OWNER, nor ENGINEER assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 4.04 OWNER and ENGINEER in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant permission for any other use.



## ARTICLE 5 - QUALIFICATIONS OF BIDDERS

- 5.01 Bidders shall be experienced in the kind of Work to be performed, shall have the necessary equipment therefore, and shall possess sufficient capital to properly execute the Work within the time allowed. Bids received from Bidders who have previously failed to complete work within the time required, or who have previously performed similar work in an unsatisfactory manner, may be rejected. A Bid may be rejected if Bidder cannot show that Bidder has the necessary ability, plant and equipment to commence the Work at the time prescribed and thereafter to prosecute and complete the Work at the rate or within the time specified. A Bid may be rejected if Bidder is already obligated for the performance of other work which would delay the commencement, prosecution or completion of the Work.
- 5.02 The SCADA integrator (system integrator) shall have a minimum of 5 years' experience with the HMI software and RTUs as specified in Sections 409433 and 409513 and have configured SCADA systems for water distribution systems of similar size over a radio network.
- 5.03 To demonstrate qualifications to perform the Work, Bidder shall complete and submit with its Bid the Bidder Qualifications Statement which is bound in the Project Manual. Bidders may be asked to furnish additional data to demonstrate their qualifications.
- 5.04 Bidders shall be qualified to do business in the state where the Project is located or covenant to obtain such qualification prior to signing the Agreement.

## ARTICLE 6 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

- 6.01 Hazardous Environmental Condition
- A. OWNER has no actual knowledge of a hazardous environmental condition at the Site.
  - B. Three tank sites are underground and are designated as Confined Spaces.
- 6.02 OWNER will conduct site visits to a number of representative sites at the conclusion of the pre-bid meeting to allow Bidders to conduct such examinations, investigations, explorations, tests and studies as each Bidder deems necessary for submission of a Bid.
- 6.04 Reference is made to the Supplementary Conditions for identification of the general nature of other work that is to be performed at the Site by OWNER or others (such as utilities and other prime contractors) that relates to the Work for which a Bid is to be submitted. On request, and if available, OWNER will provide to Bidder, for examination, access to or copies of the contract documents for such other work.

6.05 It is the responsibility of Bidder, before submitting a Bid to:

- A. Examine and carefully study the Bidding Documents, including any Addenda and the other related data identified in the Bidding Documents;
- B. Visit the Site and become familiar with and satisfy Bidder as to the general, local and Site conditions that may affect cost, progress and performance of the Work;
- C. Become familiar with and satisfy Bidder as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work;
- D. Obtain and carefully study (or assume responsibility for having done so) all examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by Bidder, including any specific means, methods, techniques, sequences and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;
- E. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for the performance of the Work at the price bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;
- F. Become aware of the general nature of work (if any) to be performed by OWNER and others at the Site that relates to the Work as indicated in the Bidding Documents;
- G. Correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies and data with the Bidding Documents;
- H. Promptly give ENGINEER written notice of all conflicts, errors, ambiguities or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by ENGINEER is acceptable to Bidder; and
- I. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

6.06 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 6, that without exception the Bid is premised upon performing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences or procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given ENGINEER written notice of all conflicts, errors, ambiguities and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by ENGINEER are acceptable to Bidder, and that the

Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing the Work.

#### ARTICLE 7 - PRE-BID CONFERENCE

- 7.01 A pre-bid conference will be held if so indicated in the Notice to Bidders, and will be as follows. Representatives of the OWNER and ENGINEER will be present to discuss the Project. Bidders are encouraged to attend and participate at the conference. ENGINEER will transmit to all prospective Bidders of record such Addenda as ENGINEER considers necessary in response to questions raised at the conference. Oral statements may not be relied upon and will not be binding or legally effective.
- 7.02 At the conclusion of the pre-bid conference, the OWNER will conduct site visits to a number of representative remote sites.

#### ARTICLE 8 - SITE AND OTHER AREAS

- 8.01 The Site is identified in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment, to be incorporated into the Work are to be obtained and paid for by CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by OWNER unless otherwise provided in the Bidding Documents.

#### ARTICLE 9 - INTERPRETATIONS AND ADDENDA

- 9.01 All questions about the meaning or intent of the Bidding Documents shall be submitted to ENGINEER in writing. In order to receive consideration, questions must be received by ENGINEER at least ten (10) days prior to the date for the opening of Bids. Interpretations, clarifications, and/or supplemental instructions considered necessary by ENGINEER in response to such questions will be issued by Addenda, mailed either by Registered or Certified mail, with return receipt requested, to all parties recorded by ENGINEER as having received the Bidding Documents, for receipt not later than three (3) days prior to the date for the opening of Bids. Failure of any Bidder to receive such Addendum or interpretation shall not relieve any bidder from any obligation under his bid submitted. All Addenda so issued shall become part of the Contract Documents. All Addenda must be submitted with the bid proposal and be properly signed by the Bidder as part of the Bid Documents. Only questions answered by Addenda will be binding. The OWNER will not be responsible for any other explanations or interpretation of such documents which anyone presumes to make on behalf of the OWNER before expiration of the time set for the receipt of Bids. No interpretation of the meaning of the plans, specifications or other Contract Documents will be made to any bidder orally. Oral and other interpretations or clarifications will be without legal effect.

9.02 Addenda may also be issued to clarify, correct or change the Bidding Documents as deemed advisable by OWNER or ENGINEER. Such Addenda, if any, will be issued in the manner and within the time period stated in paragraph 9.01.

#### ARTICLE 10 - BID SECURITY

- 10.01 A Bid must be accompanied by Bid security made payable to the OWNER in the amount of five percent of Bidder's maximum Bid price and in the form of certified check or Bid Bond.
- 10.02 Bid Bond shall be on the form bound in the Project Manual. Bid Bond shall be issued by a surety meeting the requirements of paragraphs 5.01 and 5.02 of the General Conditions. The Bid Bond must contain original signatures in ink. Pencil, stamped, thermal faxed, Xeroxed, or any other copies of the signature shall be grounds for voiding the Bid.
- 10.03 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to sign and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, OWNER may annul the Notice of Award and the Bid security of that Bidder will be forfeited to the OWNER as liquidated damages for such failure.
- 10.04 The Bid security of the three lowest bidders may be retained by OWNER until the earlier of the seventh day after the Effective Date of the Agreement or the forty-first day after the Bid opening whereupon the Bid security furnished by such Bidders will be returned. The Bid security of Bidders whom OWNER believes do not have a reasonable chance of receiving an award will be returned within seven days of the Bid opening.

#### ARTICLE 11 - CONTRACT TIMES

- 11.01 The number of days within which the Work is to be substantially completed and also completed and ready for final payment (the Contract Times) are set forth in the Agreement.

## ARTICLE 12 - LIQUIDATED AND SPECIAL DAMAGES

12.01 Provisions for liquidated and special damages, if any, are set forth in the Agreement.

## ARTICLE 13 - SUBSTITUTE AND "OR EQUAL" ITEMS

13.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by CONTRACTOR if acceptable to ENGINEER, application for such acceptance will not be considered by ENGINEER until after the Effective Date of the Agreement. The procedure for submittal of any such application by CONTRACTOR and consideration by ENGINEER is set forth in the General Conditions which may be supplemented in the General Requirements.

13.02 Refer to Section 01630 of the General Requirements for the period of time after the Effective Date of the Agreement during which the ENGINEER will accept applications for substitute or "or-equal" items of material or equipment.

## ARTICLE 14 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

14.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals or entities to be submitted to OWNER in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening submit to OWNER a list of all such Subcontractors, Suppliers, other individuals or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualifications for each such Subcontractor, Supplier, individual or entity if requested by OWNER. If OWNER or ENGINEER, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual or entity, OWNER may, before the Notice of Award is given, request the apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price.

14.02 If apparent Successful Bidder declines to make any such substitution, OWNER may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers and other individuals or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual or entity so listed and against which OWNER or ENGINEER makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to OWNER and ENGINEER subject to revocation of such acceptance after the Effective Date of the Agreement as provided in paragraph 6.06 of the General Conditions.

14.03 CONTRACTOR shall not be required to employ any Subcontractor, Supplier, individual or entity against whom CONTRACTOR has reasonable objection.

## ARTICLE 15 - PREPARATION OF BID

- 15.01 A Bid must be made on the Bid form bound in the Project Manual. The Bid form shall not be separated from the Project Manual nor shall it be altered in any way.
- 15.02 All blanks in the Bid Form shall be completed by printing in black ink or by typewriter. A Bid price shall be indicated in both words and numbers for each Bid item listed therein or the words "No Bid", or "Not Applicable" entered. In case of discrepancy between the words and the numerals, the words shall govern. Ditto marks are not considered writing or printing and shall not be used.
- 15.03 A Bid shall be executed as stated below.
- A. A Bid by an individual shall show the Bidder's name and official address.
  - B. A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title shall appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.
  - C. A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid form. The official address of the joint venture shall be shown below the signature.
  - D. A Bid by a corporation shall be executed in the corporate name by an officer of the corporation and shall be accompanied by a certified copy of a resolution of the board of directors authorizing the person signing the Bid to do so on behalf of the corporation. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The state of incorporation and the official corporate address shall be shown below the signature.
  - E. A Bid by a limited liability company shall be executed in the name of the firm and signed by a member accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown below the signature.
  - F. All names shall be typed or printed in black ink below the signature.
  - G. Evidence of authority to conduct business as an out-of-state corporation in the state where the Work is to be performed shall be provided, if applicable.
- 15.04 The Bid shall contain an acknowledgment of the receipt of all Addenda in the space provided on the Bid form.
- 15.05 The address and telephone number for communications regarding the Bid shall be shown.

15.06 In addition to the Bid Form, the following listed documents, which are bound in the Project Manual in Section 00430 - Bid Form Supplements and Section 00450 – Bidder's Qualification Statement, shall be submitted with the Bid. Each document shall be executed in the manner described in paragraph 15.03 unless another manner is indicated.

- A. Bid Security Form.
- B. Section 2875 of the Public Authorities Law.
- C. Section 2876 of the Public Authorities Law.
- D. Section 2878 of the Public Authorities Law, Non-collusive Bidding Certification.
- E. Section 139 of State Finance Law.
- F. Bidder's Qualification Statement, including Attachments A, B, and C.
- G. All Addenda.

#### ARTICLE 16 - BASIS OF BIDS; COMPARISON OF BIDS

##### 16.01 Lump Sum and Unit Price

- A. Bidder shall submit its Bid on the basis of each lump sum item and unit price item as set forth in the Bid Form. For each unit price item on the Bid form, Bidder shall enter the unit price Bid, and shall enter the computation of the respective quantity times the Bidder's unit price for that item. Bidder shall compute and enter in the space provided on the Bid form, the total of all lump sum items and the total of the products of quantity and unit price Bid for each unit price item.
- B. For determination of the apparent low Bidder, Bids will be evaluated on the basis of the total of all lump sum items and the total of the products of the estimated quantity of each item and unit price Bid for that item.
- C. The quantities for the unit price items are unpredictable and the ENGINEER has inserted certain quantities in the Bid Form to be used solely for purpose of comparison bids.

16.02 Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

## ARTICLE 17 - SUBMITTAL OF BID

- 17.01 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Notice to Bidders. The entire Project Manual must be submitted with all proper forms completed and signed as required.
- 17.02 Bid shall be enclosed in an opaque sealed envelope plainly marked on the outside with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted) the name and address of the Bidder and its license or registration number, if applicable. Bid shall be accompanied by Bid security and other required documents.
- 17.03 All bids being mailed (including FedEx, UPS, Priority Mail, etc.) or hand-delivered to the Erie County Water Authority shall follow the procedure as defined in Section 00100, Notice To Bidders.

## ARTICLE 18 - MODIFICATION OR WITHDRAWAL OF BID

- 18.01 Withdrawal Prior to Bid Opening:
- A. A Bid may be withdrawn by an appropriate document duly executed, in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time fixed for the opening of Bids. Upon receipt of such written notice, the unopened Bid will be returned to the Bidder.
- 18.02 Modification Prior to Bid Opening:
- A. If a Bidder wishes to modify its Bid, Bidder must withdraw its initial Bid in the manner specified in paragraph 18.01.A and submit a new Bid.
- 18.03 No Bids may be withdrawn after the time set for the Bid Opening.

## ARTICLE 19 - OPENING OF BIDS

- 19.01 Bids will be opened at the time and place where Bids are to be submitted and, unless obviously non-responsive, read aloud publicly. An abstract of the Bids will be made available to Bidders after the opening.
- 19.02 Bids received by mail or otherwise after the date and time specified for the opening of Bids will not be accepted and will be returned to the Bidder unopened.
- 19.03 Bid results are available on the Erie County Water Authority website, [www.ecwa.org](http://www.ecwa.org) (under Doing Business tab, select option Business Opportunities). No bid results will be given over the telephone.



## ARTICLE 20 - DISQUALIFICATION OF BIDDERS

- 20.01 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

## ARTICLE 21 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

- 21.01 All Bids shall remain subject to acceptance for forty five days after the day of the Bid opening, but OWNER may, in its sole discretion, release any Bid and return the Bid security prior to that date.
- 21.02 In the event that the OWNER requires more than 45 calendar days after the actual date of the Bid Opening to award the contract, Bidders shall, when requested, provide to ENGINEER a written extension of time for OWNER to award the contract. Bidders shall also provide, to ENGINEER, written Consent of Surety for extension of the bid bond.
- 21.03 In the event that the OWNER requires more than 45 calendar days after the actual date of the Bid Opening to award the contract, and the lowest qualified bidder does not grant an extension of time for the OWNER to award the contract, the OWNER reserves the right to award to the second lowest qualified bidder.

## ARTICLE 22 - AWARD OF CONTRACT

- 22.01 OWNER reserves the right to reject any or all Bids, including without limitation the right to reject any or all nonconforming, non-responsive or conditional Bids. Bids may be rejected if they show any omissions, alterations of form, additions not called for, conditional or alternate bids other than are provided for in the Bid Form, bids containing escalation clauses or irregularities of any kind. OWNER further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to be non-responsible. OWNER also reserves the right to waive any informality not involving price, time or changes in the Work, if it is deemed to be in the best interest of the OWNER. The Bidder will not be allowed to take advantage of any error or omission.
- 22.02 OWNER reserves the right to reject any Bid not accompanied by specified documentation and Bid security. In the event that OWNER requires more than 45 calendar days after the actual Bid opening date to award the contract, Bidders shall provide to ENGINEER written Consent of Surety of the Bid Bond.
- 22.03 OWNER reserves the right to reject any Bid that, in its sole discretion, is considered to be unbalanced or unreasonable as to the amount bid for any lump sum or unit price item.
- 22.04 In evaluating Bidders, OWNER will consider their qualifications whether or not their Bids comply with the prescribed requirements, the alternatives, if any, the lump sum and unit prices, and other data as may be requested in the Bid Form or prior to the Notice of Award.

- 22.05 OWNER may consider the qualifications and experience of Subcontractors, Suppliers and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers and other individuals or entities must be submitted as provided in the Supplementary Conditions.
- 22.06 OWNER may conduct such investigations as OWNER deems necessary to establish the responsibility, qualifications and financial ability of the Bidders to perform the Work in accordance with the Contract Documents. OWNER reserves the right to reject the Bid of any Bidder who does not pass any such evaluation to OWNER'S satisfaction.
- 22.07 OWNER reserves the right to accept any Bid deemed to be in its best interests even though the Bid chosen may result in the award of the Contract to a Bidder whose Bid is not, on a mathematical basis alone, the low Bid.
- 22.08 The OWNER may elect not to award a contract at this time due to budgetary or other considerations. OWNER reserves the right to reject any or all proposals and to re-bid the contract if the OWNER deems it in the public interest to do so.
- 22.09 Contracts shall be awarded only pursuant to resolution.
- 22.10 OWNER reserves the right to reject any bids from Bidders who are in arrears to, or in litigation with, the Erie County Water Authority or the County of Erie upon any debt or contract, or in default as surety or otherwise upon any obligation of the Erie County Water Authority or the County of Erie.

#### ARTICLE 23 - CONTRACT SECURITIES

- 23.01 Performance Bond shall be in the form of Engineers Joint Contract Documents Committee (EJCDC) "Construction Performance Bond", 1910-28-A. Payment Bond shall be in the form of EJCDC "Construction Payment Bond", 1910-28-B. The amounts of and other requirements for Performance and Payment Bonds are stated in paragraph 5.01 of the General Conditions. The requirements for delivery of Bonds are stated in paragraph 2.01 of the General Conditions. Additional requirements may be stated in the Supplementary Conditions.
- 23.02 Successful Bidder shall within five days from the date of the Notice of Award deliver to OWNER, for OWNER'S review and approval, the Performance Bond and the Payment Bond CONTRACTOR proposes to furnish at the time of the execution of the Agreement.

#### ARTICLE 24 – CONTRACTOR'S INSURANCE

- 24.01 The requirements for CONTRACTOR'S insurance and delivery of insurance certificates are stated in Article 5 of the General Conditions and in the Supplementary Conditions.

ARTICLE 25 - SIGNING OF AGREEMENT

25.01 When OWNER gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents, which are identified in the Agreement as attached thereto. Within five days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to OWNER.

ARTICLE 26 - NOTICE TO PROCEED

26.01 Issuance of the Notice to Proceed shall be as stated in Article 2 of the General Conditions.

ARTICLE 27 - PARTNERING (NOT USED)

ARTICLE 28 - SALES AND USE TAXES

28.01 Refer to Supplementary Conditions paragraph SC-6.10 for information on OWNER'S exemption from sales and use taxes on materials and equipment to be incorporated into the Work. Do not include said taxes in Bid.

ARTICLE 29 - ADDITIONAL REQUIREMENTS

29.01 Refer to Supplementary Conditions Paragraph SC-18.03 for information on OWNER'S Women and Minority Business Enterprise requirements.

END OF SECTION

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ERIE COUNTY WATER AUTHORITY  
BUFFALO, NEW YORK

CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT  
PROJECT No: 201400160

SECTION 00360

PERMIT APPLICATIONS

ARTICLE 1 - GENERAL

- 1.01 CONTRACTOR shall apply for and is responsible for complying with all required permits.
- 1.02 CONTRACTOR shall include all permit fees and permit requirements in his unit bid prices for the project and will not receive separate payment for any permit fees, including all associated permit conditions.

END OF SECTION

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ERIE COUNTY WATER AUTHORITY  
BUFFALO, NEW YORK

CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT  
PROJECT NO: 201400160

(This Bid Form shall not be detached from the Project Manual. The entire Project Manual shall be returned with the executed Bid.)

SECTION 00410

BID FORMS

BID FOR:

Erie County Water Authority  
Contract No: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT  
Project No. 201400160

BID TO:

Erie County Water Authority  
295 Main Street, Room 350  
Buffalo, New York 14203

BID FROM:

KAMAN AUTOMATION, INC.

(Print or Type Name of Bidder)

(/A Corporation/A Partnership/A Limited Liability Company/An  
Individual/A Joint Venture/[Bidder to strike out inapplicable terms.]

Gentlemen:

- 1.01 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with OWNER in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the price(s) and within the times indicated in this Bid and in accordance with the Bidding Documents.

ERIE COUNTY WATER AUTHORITY  
 CONTRACT NO: EMA-03A  
 DISTRIBUTION SCADA REPLACEMENT

2.01 Bidder accepts all of the terms and conditions of the Notice to Bidders and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain open subject to acceptance for the time period set forth in the Instruction to Bidders. Bidder will sign the Agreement and will furnish the required contract security, and other required documents within the time periods set forth in the Bidding Documents.

3.01 In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, if any, and the following Addenda receipt of all of which is hereby acknowledged.

<u>Addendum No.</u>	<u>Date Received</u>	<u>Addendum No.</u>	<u>Date Received</u>
1	5/17/2016		
2	5/19/2016		
3	5/26/2016		

B. Bidder has visited representative Sites and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance for the Work.

C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

E. Bidder does not consider that any further examinations, investigations, explorations, tests, studies or data are necessary for the determination of this Bid for performance of the Work at the price(s) and within the times and in accordance with the other terms and conditions of the Bidding Documents.

F. Bidder is aware of the general nature of work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Bidding Documents.

G. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents and all additional examinations, investigations, explorations, tests, studies and data with the Bidding Documents.



**ERIE COUNTY WATER AUTHORITY  
CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT**

- H. Bidder has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by ENGINEER is acceptable to Bidder.
  - I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.
- 4.01 Bidder further represents that this Bid is genuine and is not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any individual or entity to refrain from bidding; Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER; and that no person or persons acting in any official capacity for the OWNER are directly or indirectly interested in this Bid, or in any portion of the profit thereof.

ERIE COUNTY WATER AUTHORITY  
CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT

5.01 Bidder will complete the Work in accordance with the Contract Documents for:

ITEM 1: For HMI Programming in accordance with HMI Style Guide,

The FIXED PRICE of:

*One hundred thousand and eight hundred*  
Dollars  
and *zero* Cents

\$ 100,800

ITEM 2: For Replacement of twenty (20) RTU Control Panel, including back plate, PLC, power supply, UPS, Ethernet switch, OIT, and all required appurtenances,

The FIXED PRICE of:

*Two hundred and forty six thousand and three hundred and eighty six*  
Dollars  
and *zero* Cents

\$ 246,386

ITEM 3: For Installation of twenty (20) Replacement RTU Control Panel, including field testing, startup, and cutover,

The FIXED PRICE of:

*Sixty three thousand seven hundred and fifty*  
Dollars  
and *zero* Cents

\$ 63,750

ITEM 4: For Upgrades to thirty-four (34) existing RTUs, as described on Drawing E-04, including field testing and documentation,

The FIXED PRICE of:

*Eighty nine thousand and three hundred and forty*  
Dollars  
and *zero* Cents

\$ 89,340

ITEM 5: For Conducting workshops and meetings as described in Section 409000,

The FIXED PRICE of:

*Twenty three thousand eight hundred*  
Dollars  
and *zero* Cents

\$ 23,800

ITEM 6: For PLC Programming in accordance with Section 409650, including field testing and documentation,

The FIXED PRICE of:

*One hundred and fourteen thousand and two hundred*  
Dollars  
and *zero* Cents

\$ 114,200

ITEM 7: For Training per Section 409000,

The FIXED PRICE of:

*thirty one thousand and two hundred and thirteen*  
Dollars  
and *zero* Cents

\$ 31,213

ERIE COUNTY WATER AUTHORITY  
CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT

ITEM 8: For System documentation per Section 409000,  
The FIXED PRICE of:

Nineteen thousand and two hundred Dollars  
and zero Cents \$ 19,200

ITEM 9: For Factory Acceptance Test,  
The FIXED PRICE of:

Forty thousand one hundred sixty nine Dollars  
and zero Cents \$ 40,169

ITEM 10: For Site Acceptance Test,  
The FIXED PRICE of:

Forty one thousand seven hundred and twenty Dollars  
and zero Cents \$ 41,720

ITEM 11: For Spares per Section 409513,  
The FIXED PRICE of:

Fifteen thousand two hundred and thirty-two Dollars  
and zero Cents \$ 15,232

ITEM 12: For Warranty,  
The FIXED PRICE of:

Sixteen thousand nine hundred and fifty Dollars  
and zero Cents \$ 16,950

ITEM 13: For Bonds, Insurance, Permits,  
The FIXED PRICE of:

nine thousand Dollars  
and zero Cents \$ 9,000

ITEM 14: OTHER ITEMS

14A For \_\_\_\_\_,

The FIXED PRICE of:

zero Dollars  
and zero Cents \$ 0

14B For \_\_\_\_\_,

The FIXED PRICE of:

zero Dollars  
and zero Cents \$ 0

ERIE COUNTY WATER AUTHORITY  
CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT

14C For \_\_\_\_\_  
The FIXED PRICE of:  
zero Dollars  
and zero Cents \$ 0

ITEM 15: CASH ALLOWANCES

15A For HMI Software as specified in 409434,  
The FIXED PRICE of:  
Three hundred fifty thousand Dollars  
and no Cents \$ 350,000.00

15B For Vendor Training as specified in 409000,  
The FIXED PRICE of:  
Ten thousand Dollars  
and no Cents \$ 10,000.00

ITEM 16: For Contingency Allowance,  
The FIXED PRICE of:  
Fifty thousand Dollars  
and no Cents \$ 50,000.00

TOTAL BID AMOUNT (This total is for convenience in  
comparing Bids and is not an official part of this Bid.) \$ 1,221,760  
(Figures)

One million two hundred and twenty one thousand,  
seven hundred and sixty Dollars and zero Cents  
(Written Amount)

ERIE COUNTY WATER AUTHORITY  
CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT

- 6.01 Bidder agrees that the Work will be substantially complete and completed and ready for final payment in accordance with Paragraph 14.07.B of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 6.02 Bidder accepts the provisions of the Agreement as to liquidated and special damages in the event of failure to complete the Work within the times specified above.
- 7.01 The following documents are attached to and made a condition of this Bid:
- A. Required Bid security in the amount of five percent of Bidder's Total Bid Amount. *see 430-2*
  - B. Section 2875 of the Public Authorities Law, Ground for Cancellation of Contract by Public Authority.
  - C. Section 2876 of the Public Authorities Law, Disqualification to Contract with Public Authority.
  - D. Section 2878 of the Public Authorities Law, Non-Collusive Bidding Certification.
  - E. Section 139 of State Finance Law, Lobbying.
  - F. Required Bidder Qualifications Statement with supporting data.
  - G. All addenda.
- 8.01 The terms used in this Bid will have the meanings indicated in the Instructions to Bidders and the General Conditions and Supplementary Conditions.

Respectfully submitted on JUNE 7, 2016

ERIE COUNTY WATER AUTHORITY  
CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT

If Bidder is:

~~An Individual~~

By \_\_\_\_\_  
(Individual's Signature)

\_\_\_\_\_  
(Printed or Typed Name of Individual)

Doing business as \_\_\_\_\_

License or Registration Number: \_\_\_\_\_

Business Address: \_\_\_\_\_

Phone No.: \_\_\_\_\_ FAX No.: \_\_\_\_\_

~~A Partnership~~

By \_\_\_\_\_  
(Firm Name)

\_\_\_\_\_  
(General Partner's Signature)

\_\_\_\_\_  
(Printed or Typed Name of General Partner)  
(Attach evidence of authority to sign.)

License or Registration Number: \_\_\_\_\_

Business Address: \_\_\_\_\_

Phone No.: \_\_\_\_\_ FAX No.: \_\_\_\_\_

ERIE COUNTY WATER AUTHORITY  
CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT

A Corporation

By Kaman Automation, Inc

(Corporation Name)

Delaware

(State of Incorporation)

By Joseph Bertall

(Signature of Officer Authorized to Sign)

Joseph Bertall, VP of Finance

(Printed or Typed Name and Title of Officer Authorized to Sign)

(Attach evidence of authority to sign.)

(CORPORATE

SEAL)

STELLA MARIE NOZZI  
Notary Public, State of New York  
Qualified in Monroe County  
Reg. No. 01NO6004540  
Commission Expires: 3/23/18

Attest

Stella Marie Nozzi

(Secretary) Notary

License or Registration Number: NA

Business Address: 1000 UNIVERSITY AVE SUITE 800

ROCHESTER, NY 14607

Phone No.: 585 254 8840

FAX No.: 585 254 0982

ERIE COUNTY WATER AUTHORITY  
CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT

~~Limited Liability Company~~

By \_\_\_\_\_  
(Firm Name)

\_\_\_\_\_  
(State of Formation)

By \_\_\_\_\_  
(Signature of Member/Authorized to Sign)

\_\_\_\_\_  
(Printed or Typed Name and Title of Member Authorized to Sign)  
(Attach evidence of authority to sign.)

License or Registration Number: \_\_\_\_\_

Business Address: \_\_\_\_\_

Phone No.: \_\_\_\_\_ FAX No.: \_\_\_\_\_



ERIE COUNTY WATER AUTHORITY  
CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT

~~A Joint Venture~~

Joint Venture Name: \_\_\_\_\_

By \_\_\_\_\_

(Signature)

\_\_\_\_\_  
(Printed or Typed Name)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Address)

By \_\_\_\_\_

(Signature)

\_\_\_\_\_  
(Printed or Typed Name)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Address)

Phone and FAX number and address for receipt of communications to joint venture:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(Each joint venturer must sign. The manner of signing for each individual, partnership, corporation or limited liability company that is a party to the joint venture shall be in the manner indicated above).

END OF BID FORM

ERIE COUNTY WATER AUTHORITY  
CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT

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ERIE COUNTY WATER AUTHORITY  
BUFFALO, NEW YORK

CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT  
PROJECT NO: 201400160

SECTION 00430  
BID FORM SUPPLEMENTS

Bid Security Form

Section 2875 of the Public Authorities Law

Section 2876 of the Public Authorities Law

Section 2878 of the Public Authorities Law

Section 139 of State Finance Law

BID SECURITY FORM

BIDDER (Name and Address):

Kaman Automation, Inc.

1000 University Ave., Suite 800

Rochester, NY 14607

SURETY (Name and Address of Principal Place of Business):

Travelers Casualty and Surety Company of America

One Tower Square, Hartford, CT 06183

OWNER:

Erie County Water Authority

295 Main Street, Room 350

Buffalo, New York 14203

BID

BID DUE DATE: 5/24/2016

PROJECT:

Contract No: EMA-03A

DISTRIBUTION SCADA REPLACEMENT

Project No: 201400160

BOND

BOND NUMBER: 53082-TRAV-005

DATE: (Not later than Bid due date): 5/24/16

PENAL SUM: Five Percent of Amount Bid

(Words)

5%

(Figures)

IN WITNESS WHEREOF, Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER

Kaman Automation, Inc.

(Seal)

Bidder's Name and Corporate Seal

By: [Signature]

Signature and Title

VP. Tax

Attest: [Signature]

Signature and Title

SURETY

Travelers Casualty and Surety Company of America

(Seal)

Surety's Name and Corporate Seal

By: [Signature]

Signature and Title

Joanne Czapinski, Attorney-in-Fact

(Attach Power of Attorney)

Attest: [Signature]

**CORPORATE FORM OF ACKNOWLEDGMENT**

STATE OF Connecticut )  
 )  
:SS Bloomfield  
COUNTY OF Hartford )

On the 24th day of May 2016, before me came Michael J. Lyon to me known, who being by me duly sworn, did depose and say that (s)he resides at Springfield, Massachusetts that (s)he is the Vice President - Tax of Kaman Automation, Inc. the corporation described in and who executed the above (attached) instrument; that (s)he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; and that it was so affixed by order of the Board of Directors of said corporation and that (s)he signed his/her name thereto by like order.

*Annette M. Tamalis*

Notary  
Annette M. Tamalis  
My Commission Expires April 30, 2020

**CORPORATE FORM OF ACKNOWLEDGEMENT**

STATE OF Connecticut )  
 )  
:SS  
COUNTY OF Hartford )

On the 24th day of May 2016, before me came Joanne Czlapski to me known, who being by me duly sworn, did depose and say that (s)he resides at Bristol, CT that (s)he is the Attorney-in-Fact of Travelers Casualty and Surety Company of America the corporation described in and who executed the above (attached) instrument; that (s)he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; and that it was so affixed by order of the Board of Directors of said corporation and that (s)he signed his/her name thereto by like order.

Notary

*Cynthia L. Lawson*

Cynthia L. Lawson  
My Commission Expires 8/31/19



POWER OF ATTORNEY

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company

Attorney-In Fact No. 229946

Certificate No. 006722084

KNOW ALL MEN BY THESE PRESENTS: That Farmington Casualty Company, St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company are corporations duly organized under the laws of the State of Connecticut, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

John B. O'Keefe, Victoria P. Parkerson, Cynthia L. Lawson, Christopher R. Kelly, and Joanne Czapinski

of the City of Hartford, State of Connecticut, their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this 18th day of March, 2016.

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company



State of Connecticut
City of Hartford ss.

By: [Signature]
Robert L. Raney, Senior Vice President

On this the 18th day of March, 2016, before me personally appeared Robert L. Raney, who acknowledged himself to be the Senior Vice President of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.
My Commission expires the 30th day of June, 2016.



[Signature]
Marie C. Tetreault, Notary Public

TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA

HARTFORD, CONNECTICUT 06183

FINANCIAL STATEMENT AS OF DECEMBER 31, 2015

CAPITAL STOCK \$ 6,480,000

ASSETS		LIABILITIES & SURPLUS	
CASH AND INVESTED CASH	\$ 54,550,881	UNEARNED PREMIUMS	\$ 682,633,464
BONDS	3,500,572,638	LOSSES	735,725,171
STOCKS	245,801,111	LOSS ADJUSTMENT EXPENSES	278,800,108
INVESTMENT INCOME DUE AND ACCRUED	43,905,720	COMMISSIONS	35,388,814
OTHER INVESTED ASSETS	3,580,975	TAXES, LICENSES AND FEES	11,351,717
PREMIUM BALANCES	200,990,913	OTHER EXPENSES	39,488,887
NET DEFERRED TAX ASSET	65,751,188	CURRENT FEDERAL AND FOREIGN INCOME TAXES	15,158,820
REINSURANCE RECOVERABLE	22,532,888	REMITTANCES AND ITEMS NOT ALLOCATED	4,995,722
SECURITIES LENDING REINVESTED COLLATERAL ASSETS	11,772,178	AMOUNTS WITHHELD / RETAINED BY COMPANY FOR OTHERS	33,959,553
RECEIVABLES FROM PARENT, SUBSIDIARIES AND AFFILIATES	28,858,492	RETROACTIVE REINSURANCE RESERVE ASSUMED	898,144
OTHER ASSETS	5,885,897	POLICYHOLDER DIVIDENDS	9,080,181
		PROVISION FOR REINSURANCE	3,834,904
		ADVANCE PREMIUM	1,572,635
		PAYABLE FOR SECURITIES	8,000,000
		PAYABLE FOR SECURITIES LENDING	11,772,178
		CEDED REINSURANCE NET PREMIUMS PAYABLE	28,038,328
		ESCHEAT LIABILITY	684,927
		OTHER ACCRUED EXPENSES AND LIABILITIES	1,858,650
		<b>TOTAL LIABILITIES</b>	<b>\$ 2,081,307,881</b>
		CAPITAL STOCK	\$ 6,480,000
		PAID IN SURPLUS	433,803,760
		OTHER SURPLUS	1,893,312,026
		<b>TOTAL SURPLUS TO POLICYHOLDERS</b>	<b>\$ 2,103,595,786</b>
<b>TOTAL ASSETS</b>	<b>\$ 4,184,903,789</b>	<b>TOTAL LIABILITIES &amp; SURPLUS</b>	<b>\$ 4,184,903,789</b>

STATE OF CONNECTICUT )  
 COUNTY OF HARTFORD ) SS.  
 CITY OF HARTFORD )

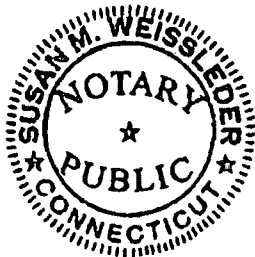
MICHAEL J. DOODY, BEING DULY SWORN, SAYS THAT HE IS SECOND VICE PRESIDENT, OF TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA, AND THAT TO THE BEST OF HIS KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT STATEMENT OF THE FINANCIAL CONDITION OF SAID COMPANY AS OF THE 31ST DAY OF DECEMBER, 2015.

*Michael J. Doody*  
 SECOND VICE PRESIDENT

*Susan M. Weissleder*  
 NOTARY PUBLIC

SUBSCRIBED AND SWORN TO BEFORE ME THIS  
 18TH DAY OF MARCH, 2016

SUSAN M. WEISSELER  
 Notary Public  
 My Commission Expires November 30, 2017



1.01 Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to OWNER upon default of Bidder the penal sum set forth on the face of this Bond.

2.01 Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by OWNER) the executed Agreement required by the Bidding Documents and any performance and payment Bonds required by the Bidding Documents

3.01 This obligation shall be null and void if

- A. OWNER accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by OWNER) the executed Agreement required by the Bidding Documents and any performance and payment Bonds required by the Bidding Documents, or
- B. All Bids are rejected by OWNER, or
- C. OWNER fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by paragraph 5.01 hereof)

4.01 Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from OWNER, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5.01 Surety waives notice of and any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by OWNER and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6.01 No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in paragraph 4.01 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7.01 Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8.01 Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9.01 Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent or representative, who executed this Bond on behalf of Surety to execute, seal and deliver such Bond and bind the Surety thereby

10.01 This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11.01 The term "Bid" as used herein includes a Bid, offer or proposal as applicable.

## END OF BID BOND



SECTION 2875 OF THE PUBLIC AUTHORITIES LAW

§2875. GROUND FOR CANCELLATION OF CONTRACT BY PUBLIC AUTHORITY.

A clause shall be inserted in all specifications or contracts hereafter made or awarded by any public authority or by any official of any public authority created by the state or any political subdivision, for work or services performed or to be performed or goods sold or to be sold, to provide that upon the refusal of a person, when called before a grand jury, head of a state department, temporary state commission, or other state agency, the organized crime task force in the department of law, head of a city department, or other city agency, which is empowered to compel the attendance of witnesses and examine them under oath, to testify in an investigation concerning any transaction or contract had with the state, any political subdivision thereof or of a public authority, to sign a waiver of immunity against subsequent criminal prosecution or to answer any relevant question concerning such transaction or contract.

(a) Such person, and any firm, partnership or corporation of which he is a member, partner, director or officer shall be disqualified from thereafter selling to or submitting bids to or receiving awards from or entering into any contracts with any public authority or official thereof, for goods, work or services, for a period of five years after such refusal, and to provide also that;

(b) any and all contracts made with any public authority or official thereof, since the effective date of this law, by such person and by any firm, partnership or corporation of which he is a member, partner, director or officer may be canceled or terminated by the public authority without incurring any penalty or damages on account of such cancellation or termination, but any monies owing by the public authority for goods delivered or work done prior to the cancellation termination shall be paid.

This is to CERTIFY that neither the undersigned nor any member, partner, director, or officer of the firm has refused to sign a waiver of immunity against subsequent criminal prosecution or to answer any relevant question concerning a transaction or contract with the state, any political subdivision thereof, a public authority or with a public department, agency or official of the state or of any political subdivision thereof or of a public authority, when called before a grand jury, head of a state department, temporary state commission, or other state agency, the organized crime task force in the department of law, head of a city department, or other city agency, which is empowered to compel the attendance of witnesses and examine them under oath.

Kaman Automation

(Name of Individual, Partnership or Corporation)

By John B...

(Person authorized to sign)

(SEAL)

SECTION 2876 OF THE PUBLIC AUTHORITIES LAW

§2876. DISQUALIFICATION TO CONTRACT WITH PUBLIC AUTHORITY

Any person who, when called before a grand jury, head of a state department, temporary state commission or other state agency, the organized crime task force in the department of law, head of a city department or other city agency, which is empowered to compel the attendance of witnesses and examine them under oath to testify in an investigation concerning any transaction or contract had with the state, any political subdivision thereof, a public authority or with a public department, agency or official of the state or of any political subdivision thereof or of a public authority, refuses to sign a waiver of immunity against subsequent criminal prosecution or to answer any relevant questions concerning such transaction or contract, and any firm, partnership or corporation of which he is a member, partner, director or officer shall be disqualified from thereafter selling to or submitting bids to or receiving awards from or entering into any contracts with any public authority or any official of any public authority created by the state or any political subdivision, for goods, work or services, for a period of five years after such refusal or until a disqualification shall be removed pursuant to the provisions of section twenty-six hundred three of this article.

It shall be the duty of the officer conducting the investigation before the grand jury, the head of a state department, the chairman of the temporary state commission or other state agency, the organized crime task force in the department of law, the head of a city department or other city agency before which the refusal occurs to send notice of such refusal, together with the names of any firm, partnership or corporation of which the person so refusing is known to be a member, partner, officer or director, to the commissioner of transportation of the state of New York, or the commissioner of general services as the case may be, and the appropriate departments, agencies and officials of the state, political subdivisions thereof or public authorities with whom the persons so refusing and any firm, partnership or corporation of which he is a member, partner, director or officer, is known to have a contract. However, when such refusal occurs before a body other than a grand jury, notice of refusal shall not be sent for a period of ten days after such refusal occurs. Prior to the expiration of this ten day period, any person, firm, partnership or corporation which has become liable to the cancellation or termination of a contract or disqualification to contract on account of such refusal may commence a special proceeding at a special term of the supreme court, held within the judicial district in which the refusal occurred, for an order determining whether the questions in response to which the refusal occurred were relevant and material to the inquiry. Upon the commencement of such proceeding, the sending of such notice of refusal to answer shall be subject to order of the court in which the proceeding was brought in a manner and on such terms as the court may deem just. If a proceeding is not brought within ten days, notice of refusal shall thereupon be sent as provided herein.

SECTION 2878 OF THE PUBLIC AUTHORITIES LAW

§2878. STATEMENT OF NON-COLLUSION IN BIDS OR PROPOSALS TO PUBLIC AUTHORITY.

(1) Every bid or proposal hereafter made to a public authority or to any official of any public authority created by the state or any political subdivision, where competitive bidding is required by statute, rule, regulation or local law, for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury:

NON-COLLUSIVE BIDDING CERTIFICATION

(a) By submission of this bid, EACH BIDDER AND EACH PERSON SIGNING ON BEHALF OF ANY BIDDER CERTIFIES, AND IN THE CASE OF A JOINT BID EACH PARTY THERETO CERTIFIES AS TO ITS OWN ORGANIZATION, under penalty of perjury, that to the best of his knowledge and belief: (1) the prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor; (2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and (3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

(b) A bid shall not be considered for award nor shall any award be made where (a) (1) (2) and (3) above have not been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefore. Where (a) (1) (2) and (3) above have not been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the state, public department or agency to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

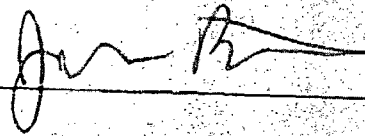
The fact that a bidder (a) has published price lists, rates, or tariffs covering items to be procured, (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning of subparagraph one (a).

The undersigned CERTIFIES, under penalty of perjury, that he is authorized to make this bid and execute this statement of non-collusion; that each of the statements contained in (1), (2) and (3) of paragraph (a) are true; that he is familiar with the statements and restrictions contained in paragraph (b) and the paragraph regarding the publication of price lists, etc. and such statements and restrictions are true and have been complied with by the bidder.

Kamran Automation

(Name of Individual, Partnership, or Corporation)

By



(SEAL)

**FORMS A, B, and C**

**SECTION 139 OF STATE FINANCE LAW**

Pursuant to State Finance Law §§139-j and 139-k, this Invitation to Bid includes and imposes certain restrictions on communications between a Governmental Entity and an Offerer/bidder during the procurement process. An Offerer/bidder is restricted from making contacts from the earliest notice of intent to solicit offers, through final award and approval of the Procurement Contract by the Governmental Entity. The designated contact is identified in the Notice to Bidders. Governmental Entity employees are also required to obtain certain information when contacted during the restricted period and make a determination of the responsibility of the Offerer/bidder pursuant to these two statutes. Certain findings of non-responsibility can result in rejection for contract award and in the event of two findings within a 4-year period, the Offerer/bidder is debarred from obtaining governmental Procurement Contracts. Further information about these requirements can be found in §§139-j and 139-k of the New York State Finance Law and the Erie County Water Authority's Procurement Disclosure Policy.

Form A - Offerer's Affirmation of Understanding of and Agreement pursuant to State Finance Law.

Form B - Offerer's Certification of Compliance with State Finance Law.

Form C - Offerer's Disclosure of Prior Non-Responsibility Determinations.

Contract Termination Provision.

FORM A

**Offerer's Affirmation of Understanding of and Agreement Pursuant to State Finance Law §139-j(3) and §139-j(6)(b)**

**Instructions:**

A Governmental Entity must obtain the required affirmation of understanding and agreement to comply with procedures on procurement lobbying restrictions regarding permissible contacts in the restricted period for a procurement contract in accordance with State Finance Law §139-j and §139-k. It is required that this affirmation be obtained as early as possible in the procurement process, but no later than when the Offerer submits its proposal.

Offerer affirms that it understands and agrees to comply with the procedures of the Government Entity relative to permissible contacts as required by State Finance Law §139-j(3) and §139-j(6)(b).

By:  Date: 6/6/16

Name: Joseph Bertalli

Title: VP of Finance

Contractor Name: KAMAN AUTOMATION, INC

Contractor Address: 1000 University Ave, Suite 800  
Rochester, NY 14607

**FORM B**

**Offerer's Certification of Compliance  
With State Finance Law §139-k(5)**

**Instructions:**

A Governmental Entity must obtain the required Certification that the information is complete, true, and accurate regarding any prior findings of non-responsibility, such as non-responsibility pursuant to State Finance Law §139-j. The Offerer must agree to the Certification and provide it to the procuring Governmental Entity. It is required that the Certification be obtained as early as possible in the process, but no later than when an Offerer submits its proposal.

**Offerer Certification:**

*I certify that all information provided to the Governmental Entity with respect to State Finance Law §139-k is complete, true, and accurate.*

By: Joseph Bertalk Date: 6/6/16

Name: Joseph Bertalk

Title: VP of Finance

Contractor Name: Kannan Automation

Contractor Address: 1000 University Ave, Suite 700  
Rochester, NY 14607

**FORM C****Offerer's Disclosure of Prior  
Non-Responsibility Determinations****Background:**

New York State Finance Law §139-k(2) obligates a Governmental Entity to obtain specific information regarding prior non-responsibility determinations with respect to State Finance Law §139-j. In accordance with State Finance Law §139-k, an Offerer must be asked to disclose whether there has been a finding of non-responsibility made within the previous four (4) years by any Governmental Entity due to: (a) a violation of State Finance Law §139-j; or (b) the intentional provision of false or incomplete information to a Government Entity.

The terms "Offerer" and "Governmental Entity" are defined in State Finance Law §139-k(1). State Finance Law §139-j sets forth detailed requirements about the restrictions on contacts during the procurement process. A violation of State Finance Law §139-j includes, but is not limited to, an impermissible contact during the restricted period (for example, contacting a person or entity other than the designated contact person, when such contact does not fall within one of the exemptions).

As part of its responsibility determination, State Finance Law §139-k(3) mandates consideration of whether an Offerer fails to timely disclose accurate or complete information regarding the above non-responsibility determination. In accordance with law, no Procurement Contract shall be awarded to any Offerer that fails to timely disclose accurate or complete information under this section, unless a finding is made that the award of the Procurement Contract to the Offerer is necessary to protect public property or public health safety, and the Offerer is the only source capable of supplying the required Article of Procurement within the necessary timeframe. See State Finance Law §139-j(10)(b) and §139-k(3).

**Instructions:**

A Governmental Entity must include a disclosure request regarding prior non-responsibility determinations in accordance with State Finance Law §139-k in its solicitation of proposals or bid documents or specifications or contract documents, as applicable, for procurement contracts. The attached form is to be completed and submitted by the individual or entity seeking to enter into a Procurement Contract. It shall be submitted to the Governmental Entity conducting the Governmental Procurement no later than when the Offerer submits its proposal.



**FORM C (Continued)**

**Offerer's Disclosure of Prior Non-Responsibility Determinations**

Name of Individual or Entity Seeking to Enter into the Procurement Contract:

Kumar Automation

Address:

1000 University Ave, Suite 800  
Rochester, NY 14607

Name and Title of Person Submitting this Form:

Joseph Bertali  
VP of Finance

Contract Procurement Number:

201400160 EMA-03A

Date:

6/6/16

1. Has any Governmental Entity made a finding of non-responsibility regarding the individual or entity seeking to enter into the Procurement Contract in the previous four years? (Please circle): No Yes

If yes, please answer the next questions:

2. Was the basis for the finding of non-responsibility due to a violation of State Finance Law §139-j (Please circle): No Yes

3. Was the basis for the finding of non-responsibility due to the intentional provision of false or incomplete information to a Governmental Entity? (Please circle) No Yes

4. If you answered yes to any of the above questions, please provide details regarding the finding of non-responsibility below.

Governmental Entity: \_\_\_\_\_

Date of Finding of Non-Responsibility: \_\_\_\_\_

Basis of Finding of Non-Responsibility: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(Add additional pages as necessary)

**FORM C (Continued)**

5. Has any Governmental Entity or other governmental agency terminated or withheld a Procurement Contract with the above-named individual or entity due to the intentional provision of false or incomplete information? (Please circle):  No  Yes

6. If yes, please provide details below.

Governmental Entity: \_\_\_\_\_

Date of Termination or Withholding of Contract: \_\_\_\_\_

Basis of Termination or Withholding:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(Add additional pages as necessary)

Offerer certifies that all information provided to the Governmental Entity with respect to State Finance Law §139-k is complete, true, and accurate.

By: Joseph Bertall Signature Date: 6/6/16

Name: Joseph Bertall

Title: VP of Finance

## Contract Termination Provision

### Instructions:

A Contract Termination Provision will be included in each Procurement Contract governed by State Finance Law §139-k. New York State Finance Law §139-k(5) provides that every procurement contract award subject to the provisions of State Finance Law §§139-k and 139-j shall contain a provision authorizing the Governmental Entity to terminate the contract in the event that the certification is found to be intentionally false or intentionally incomplete. This statutory contract language authorizes, but does not mandate, termination. "Government Entity" and "procurement contract" are defined in State Finance Law §139-k(l).

This required clause will be included in a covered procurement contract.

A sample of the Termination Provision is included below. If a contract is terminated in accordance with State Finance Law §139-k(5), the Governmental Entity is required to include a statement in the procurement record describing the basis for any action taken under the termination provision.

### Sample Contract Termination Provision

The Governmental Entity reserves the right to terminate this contract in the event it is found that the certification filed by the Offerer in accordance with New York State Finance Law §139-k was intentionally false or intentionally incomplete. Upon such finding, the Governmental Entity may exercise its termination right by providing written notification to the Offerer in accordance with the written notification terms of this contract.

END OF BID FORM SUPPLEMENTS

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ERIE COUNTY WATER AUTHORITY  
BUFFALO, NEW YORK

CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT  
PROJECT NO: 201400160

SECTION 00450

BIDDER'S QUALIFICATION STATEMENT

(Completion of this statement is required in advance of  
consideration for award of Contract.)

SUBMITTED TO:

Erie County Water Authority  
295 Main Street, Room 350  
Buffalo, New York 14203

SUBMITTED FOR:

Erie County Water Authority  
Contract No: EMA-03A  
Distribution SCADA Replacement  
ECWA Project No. 201400160

SUBMITTED BY:

Name of Organization: Kaman Automation, Inc.  
(Print or Type Name of Bidder)

Name of Individual: Joseph Bertalli

Title: VP of Finance

Business Address: 1000 University Ave, Suite 800  
Rochester, NY 14607

Telephone No.: 585-254-8840

Fax No.: 585-254-0992

Gentlemen:

The undersigned certifies under oath the truth and correctness of all statements and of all answers to questions made hereinafter.

(Note: Attach additional sheets as required.)

1.0 Bidder's General Business Information

1.1 Check if:

Corporation  Partnership  Joint Venture  Sole Proprietorship

If Corporation:

A. Date and State of Incorporation:

January 1, 2016, Delaware

B. List of Executive Officers: (SEE ATTACHED COMPLETE LIST) →

Name	Title
<u>STEVEN T. SMIDLER</u>	<u>PRESIDENT</u>
<u>ROBERT D. STARR</u>	<u>EXECUTIVE VP AND CFO</u>
<u>PATRICIA W. WARFIELD</u>	<u>SENIOR VP AND GM</u>

If Partnership:

A. Date and State of Organization:

B. Names of Current General Partners:

C. Type of Partnership

General  Publicly Traded  
 Limited  Other (described): \_\_\_\_\_

**Kaman Automation, Inc.**

**Executive Officers**

- Steven J. Smidler..... President**
- Robert D. Starr..... Executive Vice President & Chief Financial Officer**
- Patricia W. Warfield ("Tribby")..... Senior Vice President & General Manager**
- Jairaj Chetnani..... Vice President & Treasurer**
- Carl A. Conlon ..... Vice President & Controller**
- Joseph P. Bertalli..... Vice President - Finance**
- Michael J. Lyon..... Vice President - Tax**
- J. Louis McCord..... Vice President - Sales**

If Joint Venture:

A. Date and State of Organization:

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B. Name, Address and Form of Organization of Joint Venture Partners: (Indicate managing partner by an asterisk \*):

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If Sole Proprietorship:

A. Date and State of Organization:

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B. Name and Address of Owner or Owners:

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2.0 How many years has your organization been in business as a SCADA System Integrator? 10+ YEARS

3.0 If your organizational structure has changed within the past five years, provide data as listed above in Item 1.0 for your previous organization. ZELLER CORPORATION WAS ACQUIRED BY KAMAN INDUSTRIAL TECHNOLOGIES 8/31/2012.

4.0 We normally perform > 90% percent of the work with our own forces. List work normally subcontracted. ELECTRICAL OR HVAC WORK (RARELY).

5.0 Has any contract to which you have been a party been terminated by the owner; have you ever terminated work on a project prior to its completion for any reason; has any surety which issued a performance bond on your behalf ever completed the work in its own name or financed such completion on your behalf; has any surety expended any monies in connection with a contract for which they furnished a bond on your behalf? If the answer to any portion of this question is "yes", furnish details of all such occurrences including name of owner, architect or engineer, and surety, and name and date of project. NO

6.0 Has any officer or partner of your organization ever been an officer or partner of another organization that had any contract terminated by the owner; terminated work on a project



prior to its completion for any reason; had any surety which issued a performance bond complete the work in its own name or financed such completion; or had any surety expend any monies in connection with a contract for which they furnished a bond? If the answer to any portion of this question is "yes", furnish details of all such occurrences including name of owner, architect or engineer, and surety, and name and date of project. NO

7.0 In the last five years, has your organization, or any predecessor organization, failed to substantially complete a project in a timely manner? If the answer to this question is "yes", furnish details of all such occurrences including name of owner, architect or engineer, and surety, and name and date of project. NO

8.0 On Schedule A, attached, list name, location and description of project, owner, architect or engineer, contract price, percent complete and scheduled completion of the major SCADA System projects your organization has in progress on this date. Provide name, address and telephone number of a reference for each project listed.

9.0 On Schedule B, attached, list name, location and description of project, owner, architect or engineer, contract price, date of completion and percent of work with your own forces of major projects of the same general nature as this project which your organization has completed in the past five years. Provide name, address and telephone number of a reference for each project listed.

10.0 On Schedule C, attached, list name and experience of the principal individuals of your organization directly involved in operations.

11.0 On Schedule D, attached, list OSHA Information requested.

12.0 List the states and categories of contracting in which your organization is legally qualified to do business. SCADA INTEGRATOR    AZ IA NJ UT FL  
CA IN NY WA

13.0 Provide the following for your surety:    MA MN OH TX  
NY NC OK VA

13.1 Surety Company: TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA

13.2 Agent: MARSH USA, INC

A. Address: 20 CHURCH STREET, HARTFORD, CT 06103

B. Telephone No.: 860-723-5645

13.3 What is your approximate total bonding capacity?

\$500,000 to \$2,000,000

\$2,000,000 to \$5,000,000

\$5,000,000 to \$10,000,000    SINGULAR

\$10,000,000 or more

14.0 Provide the following with respect to an accredited banking institution familiar with your organization.

14.1 Name of Bank: BANK OF AMERICA

14.2 Address: 70 PATTERSON PARK ROAD FARMINGTON, CT 06032

14.3 Account Manager: OLGA DEWEY

14.4 Telephone No.: 866-222-1948 x2749

15.0 Provide the name, address and telephone number of an individual who represents a major equipment/material supplier whom the Owner may contact for a financial reference:

JOHN MACDOUGALL PHOENIX CONTACT 585 442 9847

16.0 Attach a financial statement, prepared on an accrual basis, in a form which clearly indicates Bidder's assets, liabilities and net worth.

REFER TO WWW.KAMAN.COM

16.1 Date of financial statement: 12/2015 →

- INVESTORS  
- FINANCIALS  
- PUBLICLY TRADED

16.2 Name of firm preparing statement: PRICE WATERHOUSE COOPERS LLC

17.0 Dated at 2:20pm this 6th day of June, 2016.

Bidder: Kaman Automation, Inc.

(Print or Type Name of Bidder)

By: Joseph Bertall

Joseph Bertall

Title: VP of Finance

Schedules A, B, C, and D

(Seal, if corporation)

Stella Marie Nozzi

**STELLA MARIE NOZZI**  
Notary Public, State of New York  
Qualified in Monroe County  
Reg. No. 01NO6004540  
Commission Expires: 7/23/18

------(Affidavit for Individual)-----

\_\_\_\_\_ being duly sworn, deposes and says that:  
a) the financial statement, taken from his/her books, is a true and accurate statement of his/her financial condition as of the date thereof; and b) all of the foregoing qualification information is true, complete, and accurate.

------(Affidavit for Partnership)-----

\_\_\_\_\_ being duly sworn, deposes and says that:  
a) he/she is a member of the partnership of \_\_\_\_\_;  
b) he/she is familiar with the books of said partnership showing its financial condition; c) the financial statement, taken from the books of said partnership, is a true and accurate statement of the financial condition of the partnership as of the date thereof; and d) all of the foregoing qualification information is true, complete, and accurate.

------(Affidavit for Corporation)-----

Joseph Bertalli being duly sworn, deposes and says that:  
a) he/she is VP of Finance of Kaman Automation, Inc.;  
(Full name of Corporation)

b) he/she is familiar with the books of said corporation showing its financial condition; c) the financial statement, taken from the books of said corporation, is a true and accurate statement of the financial condition of said corporation as of the date thereof; and d) that all of the foregoing qualification information is true, complete, and accurate.

------(Acknowledgment)-----

Joseph Bertalli being duly sworn, deposes and says  
that he/she is VP of Finance of Kaman Automation, Inc.;  
(Name of Bidder)

that he/she is duly authorized to make the foregoing affidavit and that he/she makes it on behalf of  
( ) himself/herself; ( ) said partnership;  said corporation.

Sworn to before me this 6th day of June, 2016, in the  
County of Monroe, State of New York.

Stella Marie Nozzi  
(Notary Public)

My commission expires 3/23/18

(Seal)

**STELLA MARIE NOZZI**  
Notary Public, State of New York  
Qualified in Monroe County  
Reg. No. 01NO6004540  
Commission Expires: 3/23/18

END OF BIDDER QUALIFICATIONS STATEMENT

**SCHEDULE A  
PROJECTS IN PROGRESS**

Name, Location and Description of Project	Owner	Architect or Engineer	Contract Price	Percent Complete	Scheduled Completion	Reference/Contract Include Address and Phone
1.) CUDJOE KEY, FL PHASE II DEEP WELL TELEMETRY SITE	FRAA	CHEM HILL	\$85K	75%	08/2016	WHARTON - SMITH JEFF WILEY (561) 748-5956 SUITE 201 JUPITER, FL 33458
2.) MONTICELLO WTP WTP UPGRADE PLC CONTROLS + SCADA	MONI, NY BARTON LOGUDICE →		\$355K	90%	07/2016	ERIC SOEHNER (315) 689-6482 4289 BONTA BRIDGE RD. JORDAN, NY 13080
3.) AMHERST WTP DEWATERING PLC + SCADA UPGRADES	AMHERST, NY AECOM →		\$150K	25%	11/2016	ERIC SOEHNER (315) 689-6482
4.) MLK FOUNTAIN PLC + HMI CONTROLS	ROCHESTER, NY STANBACH		\$95K	70%	07/2016	KEVIN RYAN (585) 229-7922 SIEWERT EQUIPMENT 175 AKRON ST ROCHESTER, NY 14609
5.) NYPA DACS UPGRADE SCADA + PLC UPGRADE	NYPA	NYPA	\$120K	90%	07/2016	WALT ETZEN (716) 286-6505 5777 LEWISTON RD LEWISTON, NY 14092
6.) AMHERST OXYGEN PLANT UPGRADES PLC + SCADA	AMHERST, NY	WENDEL	\$313K	80%	07/2016	TOM JACHIMOWICZ 716 362 - 5001 CIR ELECTRIC 400 INGHAM AVE LACKAWANNA, NY 14218

MORE AVAILABLE ON REQUEST

**SCHEDULE B  
PROJECTS COMPLETED**

<u>Name, Location and Description of Project</u>	<u>Owner</u>	<u>Architect or Engineer</u>	<u>Date Completed</u>	<u>Contract Price</u>	<u>Percent with Own Forces</u>	<u>Reference/Contract Include Address and Phone</u>
1.) CUDDEE KEY, FL WWT? PLC + SCADA UPGRADE	FKAA CUDDEE KEY, FL	CHEM HILL	12/2015	\$497K	100%	PHILIP MINTZER 772-283-2944 WHARTON-SMITH CONSTRUCTION 3577 SW CORPORATE PKWY PAAMI CITY, FL 34990
2.) VILLAGE OF CANAJOHARIE WWTY UPGRADES PLC + SCADA	CANAJOHARIE	DELAWARE ENGINEERING CANAJOHARIE, NY	2/2016	\$269K	100%	ERIC SOEHNER 315689-6482 BLUJE HERON CONSTRUCTION 9289 BONTA BRIBBERD JORDAN, NY 13080
3.) MONROE COUNTY WATER PLC + SCADA	WATER ROCHESTER, NY	O'BRIENT GERE	3/2014	\$720K	100%	KYLE KRICK 585-325-1060 SCHULER-HAAS ELECTRIC CORP 240 COMMERCE DRIVE ROCHESTER, NY 14623
4.) COLLINS CORRECTIONAL FACILITY	COLLINS, NY	OSS	5/2015	\$337K	100%	→ JASON GAC - 5184740331 OBS PO BOX 490 BADDLE RD. COLLINS, NY 14034
5.) STURGEON PT PECANIT	ECWA	GHD	1/2016	\$110K	100%	→ DAN ELIA 716 759-2842 NICHOLS LONG + MOORE 149 GUNNVILLE RD. LANCASTER, NY 14086
6.) YDWT + BALL SWITCHGEAR SCADA	ECWA	GHD	3/2016	\$40K	100%	↘ Bidder's Qualification Statement FRANK PAGEL 716 874 1710 FREY ELECTRIC 100 PEARSON AVE

00450.8

Distribution SCADA Replacement

MOE AVAILABLE ON REQUEST

**SCHEDULE C  
PERSONNEL**

<u>Name</u>	<u>Position</u>	<u>Date Started With This Organization</u>	<u>Date Started In Industry</u>	<u>Prior Positions and Experience</u>
MATKANE	ENGINEERING MANAGER	9/2004 ACS FEELER, KAMAILI AUTOMATION	09/1989	CONTROLS ENGINEERING + PROJECT MANAGEMENT
GREG MERRIAM P.E.	PROJECT MANAGER	8/2014	PRIOR TO 1983	CONTROLS ENGINEERING + PROJECT MGMT
TOM KOZUTA	CONTROLS ENGINEER SCADA	5/2016	6/1989	(CHEMICAL ENGINEER, SCADA PROGRAMMER, TRAINING, I/FIX TECH SUPPORT
LUKASZ PANEK	CONTROLS ENGINEER PLC	11/2011	9/2005	CONTROLS ENGINEER
ALAN KRAUS, PHD	DNP3 NETWORK SOLUTIONS ARCHITECT	3/2003 SCHNEIDER ELECTRIC PARTNER		BARNEY KEETON WILL ALSO BE AN ADVISOR ON DNP3 ALONG WITH ALAN'S WORK
MARK JOCK	CONTROLS DESIGNER	2002	2002	MANAGER PANEL MANUFACTURING CONTROLS DESIGNER ELECTRICAL INSTALLER (IMS)
DAVID LANE	CONTROLS DESIGN MANAGER	4/2011	8/1983	CONTROLS HARDWARE DESIGNER AND PROJECT MANAGEMENT

Distribution SCADA Replacement

00450.9

Bidder's Qualification Statement

MORE DETAILS AVAILABLE ON REQUEST

SCHEDULE D  
OSHA INFORMATION

List all Occupational Safety and Health Administration Citations for the last three years, including date, subject matter, and penalty.

— NO CITATIONS —

Attach copies of all determined Citations and Notification of Penalty, Form OSHA 2. N/A NONE

Describe all pending cases, giving pertinent information such as apparent violations, location of project, type of project, and present status. N/A NONE

List any additional information on the back or attach a separate sheet if necessary.

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ERIE COUNTY WATER AUTHORITY  
BUFFALO, NEW YORK

CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT  
PROJECT NO: 201400160

SECTION 00500

AGREEMENT

THIS AGREEMENT is dated as of the 13<sup>th</sup> day of July in the year 2016, by and between the ERIE COUNTY WATER AUTHORITY (hereinafter called OWNER) and Kaman Automation, Inc. (hereinafter called CONTRACTOR).

WITNESSETH: OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 - WORK

1.01 CONTRACTOR shall at its own cost and expense furnish all labor, services, tools, materials, equipment and incidentals necessary to complete all Work as specified or indicated in the Contract Documents to perform all specified work required for replacement of the Distribution SCADA System. The Work includes equipment and services as shown on the drawings and described in the specifications. The Work is generally described in Section 01100 of the General Requirements.

ARTICLE 2 - ENGINEER

2.01 The Project has been designed by EMA Engineering Services, PC. (EMA), 2355 Highway 36 West, Suite 200; Saint Paul, MN 55113-3819, who is hereinafter called the ENGINEER. EMA will assume all duties and responsibilities and have the rights and authority assigned to ENGINEER in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 3 - CONTRACT TIMES

3.01 Time of the Essence

A. All time limits for Milestones, if any, Substantial Completion, Final Completion and readiness for final payment as stated in the Contract Documents are of the essence.

3.02 Days to Achieve Substantial Completion and Final Payment

- A. The Work shall be substantially completed within **470 days** after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with paragraph 14.07 of the General Conditions within **500 days** from the date when the Contract Times commence to run.

ARTICLE 4 - LIQUIDATED AND SPECIAL DAMAGES

4.01 Liquidated Damages

- A. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and OWNER will suffer financial loss, apart from the costs described in paragraph 4.02.A, if the Work is not substantially completed within the time specified in Article 3 for Substantial Completion, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. OWNER and CONTRACTOR also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by OWNER if the Work is not substantially completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER **two hundred and fifty dollars (\$250.00)** for each day that expires after the time specified in Article 3 for Substantial Completion (adjusted for any changes thereof made in accordance with Article 12 of the General Conditions) until the Work is substantially complete.

4.02 Special Damages:

- A. In addition to the amount provided for liquidated damages, CONTRACTOR shall pay OWNER the actual costs reasonably incurred by OWNER for engineering and inspection forces employed for the Work for each day that expires after the days specified in Article 3 for Substantial Completion (adjusted for any changes thereof made in accordance with Article 12 of the General Conditions) until the Work is substantially complete.
- B. After Substantial Completion, if CONTRACTOR shall neglect, refuse or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER the actual costs reasonably incurred by OWNER for engineering and inspection forces employed for the Work for each day that expires after the time specified in Article 3 for Work to be completed and ready for final payment (adjusted for any extensions thereof made in accordance with Article 12 of the General Conditions) until the Work is completed and ready for final payment.

- 4.03 OWNER may deduct liquidated damages and special damages as determined by the provisions of this Article 4 from progress payments due CONTRACTOR under this Agreement.

## ARTICLE 5 - CONTRACT PRICE

5.01 OWNER shall pay CONTRACTOR, in current funds, for completion of the Work in accordance with the Contract Documents the prices stated in CONTRACTOR'S Bid, which Bid is attached hereto and identified as Exhibit 1 of this Agreement. As provided in paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by ENGINEER as provided in paragraph 9.08 of the General Conditions. Unit prices have been computed as provided in paragraph 11.03 of the General Conditions.

## ARTICLE 6 - PAYMENT PROCEDURES

### 6.01 Submittal and Processing of Payments

A. CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed as provided in the General Conditions.

### 6.02 Progress Payments; Retainage

A. OWNER shall make monthly progress payments on account of the Contract Price on the basis of CONTRACTOR'S Applications for Payment as recommended by ENGINEER. CONTRACTOR'S Applications for Payment will be due on the last day of the month. All progress payments will be on the basis of the progress of the Work measured by the schedule of values provided for in paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work, based on the number of units completed and accepted) or, in the event there is no schedule of values, as provided in the General Requirements. A progress payment will not be made whenever the value of the Work completed since the last previous progress payment is less than ten thousand dollars (\$10,000).

#### 1. Prior to Substantial Completion

- a. Progress payments will be made in the amount of 95 percent of the Work completed, (with the balance being retainage), less the aggregate of payments previously made and less such amounts as ENGINEER shall determine, or OWNER may withhold, in accordance with paragraph 14.02 of the General Conditions; and
- b. 95 percent of the cost of materials and equipment not incorporated in the Work but suitably stored (with the balance being retainage).

2. Upon Substantial Completion, OWNER shall pay an amount sufficient to increase total payments to CONTRACTOR to 100 percent of the Work completed, less such amounts as ENGINEER shall determine in accordance with paragraph 14.02.B.5 of the General Conditions and less 200 percent of ENGINEER'S estimate of the value of Work to be completed or corrected as

shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 Final Payment:

- A. Upon final completion and acceptance of the Work in accordance with paragraph 14.07 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER as provided in said paragraph 14.07.

ARTICLE 7 - INTEREST

- 7.01 All moneys not paid when due hereunder shall bear interest at the maximum rate allowed by law at the place of the Project.

ARTICLE 8 – CONTRACTOR’S REPRESENTATIONS

- 8.01 As part of the inducement for OWNER to enter into this Agreement CONTRACTOR makes the following representations:

- A. CONTRACTOR has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
- B. CONTRACTOR has visited representative Sites and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress; and performance for the Work.
- C. CONTRACTOR is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.
- D. CONTRACTOR does not consider that any further examinations, investigations, explorations, tests, studies or data are necessary for the performance of the Work at the Contract Price, within the Contract Times and in accordance with the other terms and conditions of the Contract Documents.
- E. CONTRACTOR is aware of the general nature of work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Contract Documents.
- F. CONTRACTOR has correlated the information known to CONTRACTOR, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.
- G. CONTRACTOR has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that CONTRACTOR has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

- H. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

## ARTICLE 9 - CONTRACT DOCUMENTS

9.01 The Contract Documents consist of the following:

- A. This Agreement (8 pages).
- B. Performance Bond (2 pages).
- C. Payment Bond (2 pages).
- D. General Conditions (42 pages).
- E. Supplementary Conditions (8 pages).
- F. Specifications, as listed in the table of contents of the Project Manual.
- G. Appendix A - Women and Minority Business Enterprise Policy.
- H. Appendix B - Insurance Requirements.
- I. Appendix C - Prevailing Wage Rate Schedule.
- J. The Drawings comprising a set entitled: Contract No: EMA-04, Distribution SCADA Replacement
- K. Addenda consisting of Numbers 1 to 3, inclusive.
- L. Exhibits to the Agreement enumerated as follows:
  - 1. Exhibit 1, Bid Form (10 pages).
- M. The following, which may be delivered or issued on or after the Effective Date of the Agreement, and are not attached hereto:
  - 1. Notice to Proceed
  - 2. Written Amendments
  - 3. Work Change Directives
  - 4. Change Order(s)

9.02 The documents listed in paragraph 9.01 above are attached to this Agreement (except as expressly noted otherwise above). Documents not attached are incorporated by reference. There are no Contract Documents other than those listed in this Article 9.

9.03 The Contract Documents may only be amended, modified or supplemented as provided in paragraph 3.04 of the General Conditions.

## ARTICLE 10 - MISCELLANEOUS

### 10.01 Terms

- A. Terms used in this Agreement will have the meanings indicated in the General Conditions.

### 10.02 Assignment of Contract

- A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

### 10.03 Successors and Assigns

- A. OWNER and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

### 10.04 Severability

- A. Any provision or part of the Contract Document, held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon OWNER and CONTRACTOR, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

### 10.05 Waiver

- A. The waiver by the OWNER of any breach or violation of any term, covenant, or condition of this Agreement or of any Law or Regulation shall not be deemed to be a waiver of any other term, covenant, condition, or Law or Regulation or of any subsequent breach or violation of the same or of any other term, covenant, condition, or Law or Regulation. The subsequent payment of any monies or fee by the OWNER which may become due hereunder shall not be deemed to be a waiver of any preceding breach or violation by CONTRACTOR of any term, covenant, condition of this Agreement or of any applicable Law or Regulation.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the day and year first written above.

This Agreement will be effective on JUN 14, 2016.

OWNER: Erie County Water Authority

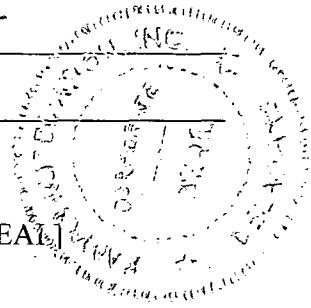
CONTRACTOR: Kaman Automation, Inc.

By: Earl Zjann

By: Joseph Bortolotto

Title: Chairman

Title: VP of Finance



[CORPORATE SEAL]

[CORPORATE SEAL]

Attest Patricia Falony

Attest Matthew Kane  
MATTHEW KANE

Address for giving notices  
\_\_\_\_\_

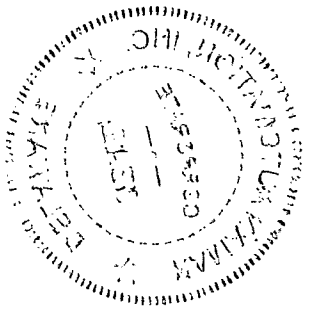
Address for giving notices  
1000 University Ave, Suite 700  
Rochester, NY 14607

(If OWNER is a corporation, partnership, or limited liability company, attach evidence of authority to sign) (If OWNER is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Agreement.)

License No. \_\_\_\_\_  
(where applicable)

Agent for service of process: \_\_\_\_\_

(If CONTRACTOR is a corporation, partnership, or limited liability company, attach evidence of authority to sign.)





Designated Representative:

Name: Earl L. Jann

Title: Chairman

Address: 295 Main St, Rm 350

Phone No.: 849-8484  
SFA NY 14203

Fax No.: 849-8463

Designated Representative:

Name: MATTHEW KANE

Title: ENGINEERING MANAGER

Address: 245 COOPER AVE SUITE 100

Phone No.: 716 206 0858  
TOWN ANDA, NY 14150

Fax No.: 716 206 0934

END OF AGREEMENT

### Performance Bond

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

**CONTRACTOR (Name and Address):**

Kaman Automation, Inc.  
1000 University Ave, Ste 800  
Rochester, NY 14607

**SURETY (Name and Address of Principal Place of Business):**

Travelers Casualty and Surety Company of America  
Construction Services  
One Tower Square  
Hartford, CT 06183

**OWNER (Name and Address):**

Erie County Water Authority  
295 Main Street, Room 350  
Buffalo New York 14203

**CONTRACT**

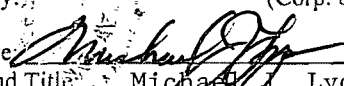
Date: 6/29/2016  
Amount: \$1,221,760.00  
Description: ERIE COUNTY WATER AUTHORITY  
CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT  
PROJECT No. 201400160

**BOND**

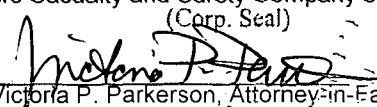
Date (Not earlier than Contract Date): 6/30/2016  
Amount: \$1,221,760.00  
Modifications to this Bond Form: None

Surety and CONTRACTOR, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative:

CONTRACTOR AS PRINCIPAL  
Company: Kaman Automation, Inc. (Corp. Seal)

Signature:   
Name and Title: Michael J. Lyon  
Vice President - Tax

SURETY Travelers Casualty and Surety Company of America  
Company: (Corp. Seal)

Signature:   
Name and Title: Victoria P. Parkerson, Attorney-in-Fact  
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL  
Company: (Corp. Seal)

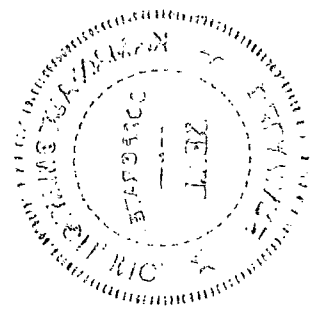
Signature: \_\_\_\_\_  
Name and Title:

SURETY  
Company: (Corp. Seal)

Signature: \_\_\_\_\_  
Name and Title:

EJCDC No. 1910-28-A (1996 Edition)

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.



1. The CONTRACTOR and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the OWNER for the performance of the Contract, which is incorporated herein by reference.
2. If the CONTRACTOR performs the Contract, the Surety and the CONTRACTOR have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.
3. If there is no OWNER Default, the Surety's obligation under this Bond shall arise after:
  - 3.1. The OWNER has notified the CONTRACTOR and the Surety at the addresses described in paragraph 10 below, that the OWNER is considering declaring a CONTRACTOR Default and has requested and attempted to arrange a conference with the CONTRACTOR and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Contract. If the OWNER, the CONTRACTOR and the Surety agree, the CONTRACTOR shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the OWNER'S right, if any, subsequently to declare a CONTRACTOR Default; and
  - 3.2. The OWNER has declared a CONTRACTOR Default and formally terminated the CONTRACTOR'S right to complete the Contract. Such CONTRACTOR Default shall not be declared earlier than twenty days after the CONTRACTOR and the Surety have received notice as provided in paragraph 3.1; and
  - 3.3. The OWNER has agreed to pay the Balance of the Contract Price to:
    - 3.3.1. The Surety in accordance with the terms of the Contract; or
    - 3.3.2. Another contractor selected pursuant to paragraph 4.3 to perform the Contract.
4. When the OWNER has satisfied the conditions of paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
  - 4.1. Arrange for the CONTRACTOR, with consent of the OWNER, to perform and complete the Contract; or
  - 4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
  - 4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the OWNER for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the OWNER and the contractor selected with the OWNER'S concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the OWNER the amount of damages as described in paragraph 6 in excess of the Balance of the Contract Price incurred by the OWNER resulting from the CONTRACTOR Default; or
  - 4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:
    - 4.4.1 After investigation, determine the amount for which it may be liable to the OWNER and, as soon as practicable after the amount is determined, tender payment therefor to the OWNER; or
    - 4.4.2 Deny liability in whole or in part and notify the OWNER citing reasons therefor.
5. If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the OWNER to the Surety demanding that the Surety perform its obligations under this Bond, and the OWNER shall be entitled to enforce any remedy available to the OWNER. If the Surety proceeds as provided in paragraph 4.4, and the OWNER refuses the payment tendered or the Surety has denied p liability, in whole or in part, without

further notice the OWNER shall be entitled to enforce any remedy available to the OWNER.

6. After the OWNER has terminated the CONTRACTOR'S right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the OWNER shall not be greater than those of the CONTRACTOR under the Contract, and the responsibilities of the OWNER to the Surety shall not be greater than those of the OWNER under the Contract. To a limit of the amount of this Bond, but subject to commitment by the OWNER of the Balance of the Contract Price to mitigation of costs and damages on the Contract, the Surety is obligated without duplication for:
  - 6.1. The responsibilities of the CONTRACTOR for correction of defective Work and completion of the Contract;
  - 6.2. Additional legal, design professional and delay costs resulting from the CONTRACTOR'S Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and
  - 6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the CONTRACTOR.
7. The Surety shall not be liable to the OWNER or others for obligations of the CONTRACTOR that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the OWNER or its heirs, executors, administrators, or successors.
8. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders and other obligations.
9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after CONTRACTOR Default or within two years after the CONTRACTOR ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
10. Notice to the Surety, the OWNER or the CONTRACTOR shall be mailed or delivered to the address shown on the signature page.
11. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the Contract was performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted here-from and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
12. Definitions.
  - 12.1 Balance of the Contract Price: The total amount payable by the OWNER to the CONTRACTOR under the Contract after all proper adjustments have been made, including allowance to the CONTRACTOR of any amounts received or to be received by the OWNER in settlement of insurance or other Claims for damages to which the CONTRACTOR is entitled, reduced by all valid and proper payments made to or on behalf of the CONTRACTOR under the Contract.
  - 12.2 Contract: The agreement between the OWNER and the CONTRACTOR identified on the signature page, including all Contract Documents and changes thereto.
  - 12.3 CONTRACTOR Default: Failure of the CONTRACTOR, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
  - 12.4 OWNER Default: Failure of the OWNER, which has neither been remedied nor waived, to pay the CONTRACTOR as required by the Contract or to perform and complete or comply with the other terms thereof.

(FOR INFORMATION ONLY - Name, Address and Telephone)  
AGENT or BROKER: OWNER'S REPRESENTATIVE (Engineer):

# Payment Bond

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):  
Kaman Automation, Inc.  
1000 University Ave, Ste 800  
Rochester, NY 14607  
OWNER (Name and Address):

Erie County Water Authority  
295 Main Street, Room 350  
Buffalo New York 14203

SURETY (Name and Address of Principal Place of Business):  
Travelers Casualty and Surety Company of America  
Construction Services  
One Tower Square  
Hartford, CT 06183

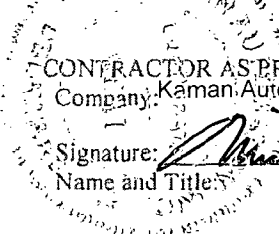
### CONTRACT

Date: 6/29/2016  
Amount: \$1,221,760.00  
Description: ERIE COUNTY WATER AUTHORITY  
CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT  
PROJECT No. 201400160

### BOND

Date (Not earlier than Contract Date): 6/30/2016  
Amount: \$1,221,760.00  
Modifications to this Bond Form: None

Surety and CONTRACTOR, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.



CONTRACTOR AS PRINCIPAL  
Company: Kaman Automation, Inc. (Corp. Seal)  
Signature: [Signature]  
Name and Title: Michael J. Lyon  
Vice President -Tax

SURETY Travelers Casualty and Surety Company of America  
Company: \_\_\_\_\_ (Corp. Seal)  
Signature: [Signature]  
Name and Title: Victoria P. Parkerson, Attorney-in-Fact  
(Attach Power of Attorney)

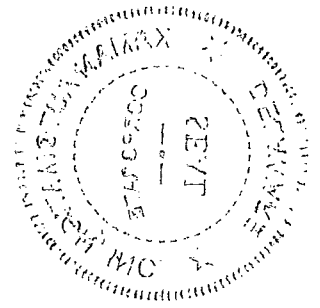
(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL  
Company: \_\_\_\_\_ (Corp. Seal)  
Signature: \_\_\_\_\_  
Name and Title: \_\_\_\_\_

SURETY  
Company: \_\_\_\_\_ (Corp. Seal)  
Signature: \_\_\_\_\_  
Name and Title: \_\_\_\_\_

### EJCDC No. 1910-28-B (1996 Edition)

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, the American Institute of Architects, the American Subcontractors Association, and the Associated Specialty Contractors.



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1. The CONTRACTOR and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the OWNER to pay for labor, materials and equipment furnished for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to the OWNER, this obligation shall be null and void if the CONTRACTOR:

2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2. Defends, indemnifies and holds harmless the OWNER from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract, provided the OWNER has promptly notified the CONTRACTOR and the Surety (at the addresses described in paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the CONTRACTOR and the Surety, and provided there is no OWNER Default

3. With respect to Claimants, this obligation shall be null and void if the CONTRACTOR promptly makes payment, directly or indirectly, for all sums due.

4. The Surety shall have no obligation to Claimants under this Bond until:

4.1. Claimants who are employed by or have a direct contract with the CONTRACTOR have given notice to the Surety (at the addresses described in paragraph 12) and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with the CONTRACTOR:

4.2.1 Have furnished written notice to the CONTRACTOR and sent a copy, or notice thereof, to the OWNER, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and

4.2.2 Have either received a rejection in whole or in part from the CONTRACTOR, or not received within 30 days of furnishing the above notice any communication from the CONTRACTOR by which the CONTRACTOR had indicated the claim will be paid directly or indirectly; and

4.2.3 Not having been paid within the above 30 days, have sent a written notice to the Surety and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the CONTRACTOR.

5. If a notice required by paragraph 4 is given by the OWNER to the CONTRACTOR or to the Surety, that is sufficient compliance.

6. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

6.1. Send an answer to the Claimant, with a copy to the OWNER, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2. Pay or arrange for payment of any undisputed amounts.

7. The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

8. Amounts owed by the OWNER to the CONTRACTOR under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the CONTRACTOR furnishing and the OWNER accepting this Bond, they agree that all funds earned by the CONTRACTOR in the performance of the Contract are dedicated to satisfy obligations of the CONTRACTOR and the Surety under this Bond, subject to the OWNER'S priority to use the funds for the completion of the Work.

9. The Surety shall not be liable to the OWNER, Claimants or others for obligations of the CONTRACTOR that are unrelated to the Contract. The OWNER shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by paragraph 4.1 or paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the OWNER or the CONTRACTOR shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the OWNER or the CONTRACTOR, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is, that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, the CONTRACTOR shall promptly furnish a copy of this Bond or shall permit a copy to be made.

## 15. DEFINITIONS

15.1 Claimant: An individual or entity having a direct contract with the CONTRACTOR or with a Subcontractor of the CONTRACTOR to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of the CONTRACTOR and the CONTRACTOR'S Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

15.2 Contract: The agreement between the OWNER and the CONTRACTOR identified on the signature page, including all Contract Documents and changes thereto.

15.3 OWNER Default: Failure of the OWNER, which has neither been remedied nor waived, to pay the CONTRACTOR as required by the Contract or to perform and complete or comply with the other terms thereof.

(FOR INFORMATION ONLY - Name, Address and Telephone)  
AGENT or BROKER: OWNER'S REPRESENTATIVE (Engineer):

**CORPORATE FORM OF ACKNOWLEDGMENT**

STATE OF CONNECTICUT )  
 )  
 ) :SS BLOOMFIELD  
 )  
COUNTY OF HARTFORD )

On the 29TH day of JUNE, 2016, before me came Michael J. Lyon to me known, who being by me duly sworn, did depose and say that (s)he resides at Springfield, Massachusetts that (s)he is the Vice President - Tax of Kaman Automation, Inc. the corporation described in and who executed the above (attached) instrument; that (s)he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; and that it was so affixed by order of the Board of Directors of said corporation and that (s)he signed his/her name thereto by like order.

  
Annette M. Tamalis  
Notary

Annette M. Tamalis  
My Commission Expires April 30, 2020

**CORPORATE FORM OF ACKNOWLEDGEMENT**

STATE OF CT )  
 )  
 ) :SS  
 )  
COUNTY OF Hartford )

On the 30th day of June, 2016, before me came Victoria P. Parkerson to me known, who being by me duly sworn, did depose and say that (s)he resides at 20 Church Street, Hartford, CT 06103 that (s)he is the Attorney-in-Fact of Travelers Casualty and Surety Company of America the corporation described in and who executed the above (attached) instrument; that (s)he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; and that it was so affixed by order of the Board of Directors of said corporation and that (s)he signed his/her name thereto by like order.

Cynthia L. Lawson  
Notary

Cynthia L. Lawson  
My commission expires:  
8/31/2019



# TRAVELERS



## POWER OF ATTORNEY

Farmington Casualty Company  
 Fidelity and Guaranty Insurance Company  
 Fidelity and Guaranty Insurance Underwriters, Inc.  
 St. Paul Fire and Marine Insurance Company  
 St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company  
 Travelers Casualty and Surety Company  
 Travelers Casualty and Surety Company of America  
 United States Fidelity and Guaranty Company

Attorney-In-Fact No. **226117**

Surety Bond No. or Project Description: Principal: Kaman Automation, Inc.  
 106445752

Obligee: Erie County Water Authority

**KNOW ALL MEN BY THESE PRESENTS:** That St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company and St. Paul Mercury Insurance Company are corporations duly organized under the laws of the State of Minnesota, that Farmington Casualty Company, Travelers Casualty and Surety Company, and Travelers Casualty and Surety Company of America are corporations duly organized under the laws of the State of Connecticut, that United States Fidelity and Guaranty Company is a corporation duly organized under the laws of the State of Maryland, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc. is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint Victoria P. Parkerson of the City of Hartford, State of Connecticut, their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

**IN WITNESS WHEREOF**, the Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this **4th** day of **March, 2013**.

Farmington Casualty Company  
 Fidelity and Guaranty Insurance Company  
 Fidelity and Guaranty Insurance Underwriters, Inc.  
 St. Paul Fire and Marine Insurance Company  
 St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company  
 Travelers Casualty and Surety Company  
 Travelers Casualty and Surety Company of America  
 United States Fidelity and Guaranty Company



State of Connecticut

City of Hartford ss.

By:

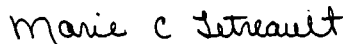
  
 Robert L. Raney, Senior Vice President

On this the **4th** day of **March, 2013**, before me personally appeared **Robert L. Raney**, who acknowledged himself to be the Senior Vice President of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

**In Witness Whereof**, I hereunto set my hand and official seal.

My Commission expires the **30th** day of **June, 2016**.



  
 Marie C. Tetreault, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full force and effect, reading as follows:

**RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

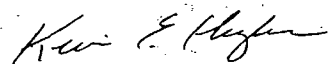
**FURTHER RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

**FURTHER RESOLVED**, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

**FURTHER RESOLVED**, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary, of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

**IN TESTIMONY WHEREOF**, I have hereunto set my hand and affixed the seals of said Companies this 30th day of June, 2016.

  
\_\_\_\_\_  
Kevin E. Hughes, Assistant Secretary



**To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at [www.travelersbond.com](http://www.travelersbond.com). Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.**

TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA

HARTFORD, CONNECTICUT 06183

FINANCIAL STATEMENT AS OF DECEMBER 31, 2015

CAPITAL STOCK \$ 6,480,000

ASSETS		LIABILITIES & SURPLUS	
CASH AND INVESTED CASH	\$ 54,550,881	UNEARNED PREMIUMS	\$ 862,633,464
BONDS	3,500,572,638	LOSSES	735,725,171
STOCKS	245,801,111	LOSS ADJUSTMENT EXPENSES	278,900,106
INVESTMENT INCOME DUE AND ACCRUED	43,905,720	COMMISSIONS	35,398,814
OTHER INVESTED ASSETS	3,580,975	TAXES, LICENSES AND FEES	11,351,717
PREMIUM BALANCES	200,990,913	OTHER EXPENSES	39,466,867
NET DEFERRED TAX ASSET	65,751,196	CURRENT FEDERAL AND FOREIGN INCOME TAXES	15,158,620
REINSURANCE RECOVERABLE	22,532,968	REMITTANCES AND ITEMS NOT ALLOCATED	4,995,722
SECURITIES LENDING REINVESTED COLLATERAL ASSETS	11,772,178	AMOUNTS WITHHELD / RETAINED BY COMPANY FOR OTHERS	33,959,553
RECEIVABLES FROM PARENT, SUBSIDIARIES AND AFFILIATES	29,659,492	RETROACTIVE REINSURANCE RESERVE ASSUMED	898,144
OTHER ASSETS	5,685,697	POLICYHOLDER DIVIDENDS	9,080,181
		PROVISION FOR REINSURANCE	3,834,904
		ADVANCE PREMIUM	1,572,635
		PAYABLE FOR SECURITIES	8,000,000
		PAYABLE FOR SECURITIES LENDING	11,772,178
		CEDED REINSURANCE NET PREMIUMS PAYABLE	26,036,328
		ESCHEAT LIABILITY	664,927
		OTHER ACCRUED EXPENSES AND LIABILITIES	1,858,650
		TOTAL LIABILITIES	\$ 2,081,307,981
		CAPITAL STOCK	\$ 6,480,000
		PAID IN SURPLUS	433,803,760
		OTHER SURPLUS	1,663,312,028
		TOTAL SURPLUS TO POLICYHOLDERS	\$ 2,103,595,788
TOTAL ASSETS	\$ 4,184,903,769	TOTAL LIABILITIES & SURPLUS	\$ 4,184,903,769

STATE OF CONNECTICUT )  
 COUNTY OF HARTFORD ) SS.  
 CITY OF HARTFORD )

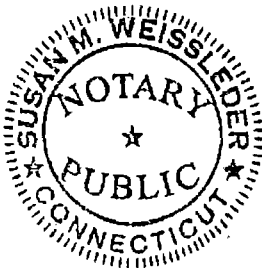
MICHAEL J. DOODY, BEING DULY SWORN, SAYS THAT HE IS SECOND VICE PRESIDENT, OF TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA, AND THAT TO THE BEST OF HIS KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT STATEMENT OF THE FINANCIAL CONDITION OF SAID COMPANY AS OF THE 31ST DAY OF DECEMBER, 2015.

*Michael J. Doody*  
 SECOND VICE PRESIDENT

*Susan M. Weissleder*  
 NOTARY PUBLIC

SUSAN M. WEISSLEDER  
 Notary Public  
 My Commission Expires November 30, 2017

SUBSCRIBED AND SWORN TO BEFORE ME THIS  
 18TH DAY OF MARCH, 2016



ERIE COUNTY WATER AUTHORITY  
BUFFALO, NEW YORK

CONTRACT No: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT  
PROJECT No: 201400160

SECTION 00700

GENERAL CONDITIONS

Adapted with permission from Standard General Conditions of the  
Construction Contract, EJCDC No. 1910-8 (1996 Edition).

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# TABLE OF CONTENTS

	<u>Page</u>
ARTICLE 1 - DEFINITIONS AND TERMINOLOGY.....	00700 - 7
1.01 <i>Defined Terms</i> .....	00700 - 7
1.02 <i>Terminology</i> .....	00700 - 10
ARTICLE 2 - PRELIMINARY MATTERS.....	00700 - 10
2.01 <i>Delivery of Bonds</i> .....	00700 - 10
2.02 <i>Copies of Documents</i> .....	00700 - 10
2.03 <i>Commencement of Contract Times; Notice to Proceed</i> .....	00700 - 10
2.04 <i>Starting the Work</i> .....	00700 - 11
2.05 <i>Before Starting Construction</i> .....	00700 - 11
2.06 <i>Preconstruction Conference</i> .....	00700 - 11
2.07 <i>Initial Acceptance of Schedules</i> .....	00700 - 11
ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE.....	00700 - 12
3.01 <i>Intent</i> .....	00700 - 12
3.02 <i>Reference Standards</i> .....	00700 - 12
3.03 <i>Reporting and Resolving Discrepancies</i> .....	00700 - 12
3.04 <i>Amending and Supplementing Contract Documents</i> .....	00700 - 12
3.05 <i>Reuse of Documents</i> .....	00700 - 13
ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS.....	00700 - 13
4.01 <i>Availability of Lands</i> .....	00700 - 13
4.02 <i>Subsurface and Physical Conditions</i> .....	00700 - 13
4.03 <i>Differing Subsurface or Physical Conditions</i> .....	00700 - 13
4.04 <i>Underground Facilities</i> .....	00700 - 14
4.05 <i>Reference Points</i> .....	00700 - 15
4.06 <i>Hazardous Environmental Condition at Site</i> .....	00700 - 15
ARTICLE 5 - BONDS AND INSURANCE.....	00700 - 16
5.01 <i>Performance, Payment, and Other Bonds</i> .....	00700 - 16
5.02 <i>Licensed Sureties and Insurers</i> .....	00700 - 16
5.03 <i>Certificates of Insurance</i> .....	00700 - 17
5.04 <i>CONTRACTOR's Liability Insurance</i> .....	00700 - 17
5.05 <i>OWNER's Liability Insurance</i> .....	00700 - 18
5.06 <i>Property Insurance (See Supplementary Conditions)</i> .....	00700 - 18
5.07 <i>(Not Used)</i> .....	00700 - 18
5.08 <i>(Not Used)</i> .....	00700 - 18
5.09 <i>(Not Used)</i> .....	00700 - 18
5.10 <i>Acceptance of Bonds and Insurance; Option to Replace</i> .....	00700 - 18
ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES.....	00700 - 18
6.01 <i>Supervision and Superintendence</i> .....	00700 - 18
6.02 <i>Labor; Working Hours</i> .....	00700 - 18
6.03 <i>Services, Materials, and Equipment</i> .....	00700 - 18
6.04 <i>Progress Schedule</i> .....	00700 - 19
6.05 <i>Substitutes and Or-Equals</i> .....	00700 - 19

## TABLE OF CONTENTS (CONT'D.)

Page

6.06	Concerning Subcontractors, Suppliers, and Others.....	00700 - 20
6.07	Patent Fees and Royalties.....	00700 - 21
6.08	Permits.....	00700 - 21
6.09	Laws and Regulations.....	00700 - 21
6.10	Taxes.....	00700 - 22
6.11	Use of Site and Other Areas.....	00700 - 22
6.12	Record Documents.....	00700 - 22
6.13	Safety and Protection.....	00700 - 22
6.14	Safety Representative.....	00700 - 23
6.15	Hazard Communication Programs.....	00700 - 23
6.16	Emergencies.....	00700 - 23
6.17	Shop Drawings and Samples.....	00700 - 23
6.18	Continuing the Work.....	00700 - 24
6.19	CONTRACTOR's General Warranty and Guarantee.....	00700 - 24
6.20	Indemnification.....	00700 - 25
ARTICLE 7 - OTHER WORK.....		00700 - 25
7.01	Related Work at Site.....	00700 - 25
ARTICLE 8 - OWNER'S RESPONSIBILITIES.....		00700 - 26
8.01	Communications to Contractor.....	00700 - 26
8.02	Furnish Data.....	00700 - 26
8.03	Pay Promptly When Due.....	00700 - 26
8.04	Lands and Easements; Reports and Tests.....	00700 - 26
8.05	Insurance.....	00700 - 26
8.06	Change Orders.....	00700 - 26
8.07	Inspections, Tests, and Approvals.....	00700 - 26
8.08	Limitations on OWNER's Responsibilities.....	00700 - 26
8.09	Undisclosed Hazardous Environmental Condition.....	00700 - 27
8.10	Evidence of Financial Arrangements.....	00700 - 27
ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION.....		00700 - 27
9.01	OWNER's Representative.....	00700 - 27
9.02	Visits to Site.....	00700 - 27
9.03	Project Representative.....	00700 - 27
9.04	Clarifications and Interpretations.....	00700 - 27
9.05	Authorized Variations in Work.....	00700 - 27
9.06	Rejecting Defective Work.....	00700 - 28
9.07	Shop Drawings, Change Orders and Payments.....	00700 - 28
9.08	Determinations for Unit Price Work.....	00700 - 28
9.09	Decisions on Requirements of Contract Documents and Acceptability of Work.....	00700 - 28
9.10	Limitations on ENGINEER's Authority and Responsibilities.....	00700 - 28
ARTICLE 10 - CHANGES IN THE WORK; CLAIMS.....		00700 - 29
10.01	Authorized Changes in the Work.....	00700 - 29
10.02	Unauthorized Changes in the Work.....	00700 - 29
10.03	Execution of Change Orders.....	00700 - 29
10.04	Notification to Surety.....	00700 - 29
10.05	Claims and Disputes.....	00700 - 29

# TABLE OF CONTENTS (CONT'D.)

Page

ARTICLE 11 - COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK .....	00700 - 30
11.01 <i>Cost of the Work</i> .....	00700 - 30
11.02 <i>Cash Allowances</i> .....	00700 - 32
11.03 <i>Unit Price Work</i> .....	00700 - 32
ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES .....	00700 - 32
12.01 <i>Change of Contract Price</i> .....	00700 - 32
12.02 <i>Change of Contract Times</i> .....	00700 - 33
12.03 <i>Delays Beyond CONTRACTOR's Control</i> .....	00700 - 33
12.04 <i>Delays Within CONTRACTOR's Control</i> .....	00700 - 33
12.05 <i>Delays Beyond OWNER's and CONTRACTOR's Control</i> .....	00700 - 33
12.06 <i>Delay Damages</i> .....	00700 - 34
ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK .....	00700 - 34
13.01 <i>Notice of Defects</i> .....	00700 - 34
13.02 <i>Access to Work</i> .....	00700 - 34
13.03 <i>Tests and Inspections</i> .....	00700 - 34
13.04 <i>Uncovering Work</i> .....	00700 - 34
13.05 <i>OWNER May Stop the Work</i> .....	00700 - 35
13.06 <i>Correction or Removal of Defective Work</i> .....	00700 - 35
13.07 <i>Correction Period</i> .....	00700 - 35
13.08 <i>Acceptance of Defective Work</i> .....	00700 - 36
13.09 <i>OWNER May Correct Defective Work</i> .....	00700 - 36
ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION .....	00700 - 36
14.01 <i>Schedule of Values</i> .....	00700 - 36
14.02 <i>Progress Payments</i> .....	00700 - 36
14.03 <i>CONTRACTOR's Warranty of Title</i> .....	00700 - 38
14.04 <i>Substantial Completion</i> .....	00700 - 38
14.05 <i>Partial Utilization</i> .....	00700 - 39
14.06 <i>Final Inspection</i> .....	00700 - 39
14.07 <i>Final Payment</i> .....	00700 - 39
14.08 <i>(Not Used)</i> .....	00700 - 40
14.09 <i>Waiver of Claims</i> .....	00700 - 40
ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION .....	00700 - 40
15.01 <i>OWNER May Suspend Work</i> .....	00700 - 40
15.02 <i>OWNER May Terminate for Cause</i> .....	00700 - 40
15.03 <i>OWNER May Terminate For Convenience</i> .....	00700 - 41
15.04 <i>CONTRACTOR May Stop Work or Terminate</i> .....	00700 - 41
ARTICLE 16 - DISPUTE RESOLUTION .....	00700 - 42
16.01 <i>Methods and Procedures</i> .....	00700 - 42
ARTICLE 17 - MISCELLANEOUS .....	00700 - 42
17.01 <i>Giving Notice</i> .....	00700 - 42
17.02 <i>Computation of Times</i> .....	00700 - 42
17.03 <i>Cumulative Remedies</i> .....	00700 - 42
17.04 <i>Survival of Obligations</i> .....	00700 - 42
17.05 <i>Controlling Law</i> .....	00700 - 42
17.06 <i>Headings</i> .....	00700 - 42



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## GENERAL CONDITIONS

### ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

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#### 1.01 *Defined Terms*

A. Wherever used in the Contract Documents and printed with initial or all capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the Contract Documents.

2. *Agreement*--The written instrument which is evidence of the agreement between OWNER and CONTRACTOR covering the Work.

3. *Application for Payment*--The form acceptable to ENGINEER which is to be used by CONTRACTOR during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*--The offer or proposal of a bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

7. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, Bid security form, if any, and the Bid form with any supplements.

8. *Bonds*--Performance and payment bonds and other instruments of security.

9. *Change Order*--A document recommended by ENGINEER which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract

Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by OWNER or CONTRACTOR seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the OWNER and CONTRACTOR concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*--The Contract Documents establish the rights and obligations of the parties and include the Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR'S Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders, and ENGINEER'S written interpretations and clarifications issued on or after the Effective Date of the Agreement. Approved Shop Drawings and the reports and drawings of subsurface and physical conditions are not Contract Documents. Only printed or hard copies of the items listed in this paragraph are Contract Documents. Files in electronic media format of text, data, graphics, and the like that may be furnished by OWNER to CONTRACTOR are not Contract Documents.

13. *Contract Price*--The moneys payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Substantial Completion; and (ii) complete the Work so that it is ready for final payment as evidenced by ENGINEER'S written recommendation of final payment.

15. *CONTRACTOR*--The individual or entity with whom OWNER has entered into the Agreement.

16. *Cost of the Work*--See paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by ENGINEER which graphically shows the scope, extent, and character of the Work to be performed by CONTRACTOR. Shop Drawings and other CONTRACTOR submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*--The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *ENGINEER*--The individual or entity named as such in the Agreement.

20. *ENGINEER'S Consultant*--An individual or entity having a contract with ENGINEER to furnish services as ENGINEER's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.

21. *Field Order*--A written order issued by ENGINEER which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

22. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

23. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

24. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

25. *Laws and Regulations; Laws or Regulations*--Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

26. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

27. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

28. *Notice of Award*--The written notice by OWNER to the apparent successful bidder stating that upon timely compliance by the apparent successful bidder with the conditions precedent listed therein, OWNER will sign and deliver the Agreement.

29. *Notice to Proceed*--A written notice given by OWNER to CONTRACTOR fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform the Work under the Contract Documents.

30. *OWNER*--The individual, entity, public body, or authority with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be performed.

31. *Partial Utilization*--Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

32. *PCBs*--Polychlorinated biphenyls.

33. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

34. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part as may be indicated elsewhere in the Contract Documents.

35. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

36. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

37. *Resident Project Representative*--The authorized representative of ENGINEER who may be assigned to the Site or any part thereof.

38. *Samples*--Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

39. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work.

40. *Site*--Lands or areas indicated in the Contract Documents as being furnished by OWNER upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by OWNER which are designated for the use of CONTRACTOR.

41. *Specifications*--That part of the Contract Documents consisting of written technical descriptions of materials, equipment, systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

42. *Subcontractor*--An individual or entity having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the Site.

43. *Substantial Completion*--The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

44. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

45. *Supplier*--A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.

46. *Underground Facilities*--All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

47. *Unit Price Work*--Work to be paid for on the basis of unit prices.

48. *Work*--The entire completed construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

49. *Work Change Directive*--A written statement to CONTRACTOR issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

50. *Written Amendment*--A written statement modifying the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

## 1.02 Terminology

### A. Intent of Certain Terms or Adjectives

1. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as approved," or terms of like effect or import are used to authorize an exercise of professional judgment by the ENGINEER, or the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of ENGINEER as to the Work, it is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.10 or any other provision of the Contract Documents.

### B. Day

1. The word "day" shall constitute a calendar day of 24 hours measured from midnight to the next midnight.

### C. Defective

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it does not conform to the Contract Documents or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER'S recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with paragraph 14.04 or 14.05).

### D. Furnish, Install, Perform, Provide

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word *Ainstall*, when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of CONTRACTOR, "provide" is implied.

E. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

## ARTICLE 2 - PRELIMINARY MATTERS

---

### 2.01 Delivery of Bonds

A. When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish.

### 2.02 Copies of Documents

A. OWNER shall furnish to CONTRACTOR up to ten copies of the Contract Documents. Additional copies will be furnished upon request at the cost of reproduction.

### 2.03 Commencement of Contract Times; Notice to Proceed

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

#### 2.04 *Starting the Work*

A. CONTRACTOR shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

#### 2.05 *Before Starting Construction*

A. *CONTRACTOR'S Review of Contract Documents:* Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity, or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless CONTRACTOR knew or reasonably should have known thereof.

B. *Preliminary Schedules:* Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for its timely review:

1. a preliminary progress schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
2. a preliminary schedule of Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing, and processing such submittal; and
3. a preliminary schedule of values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

C. *Evidence of Insurance:* Before any Work at the Site is started, CONTRACTOR and OWNER shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which CONTRACTOR and

OWNER respectively are required to purchase and maintain in accordance with Article 5.

#### 2.06 *Preconstruction Conference*

A. Within 20 days after the Contract Times start to run, but before any Work at the Site is started, a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in paragraph 2.05.B, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

#### 2.07 *Initial Acceptance of Schedules*

A. Unless otherwise provided in the Contract Documents, at least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to review for acceptability to ENGINEER, as provided below, the schedules submitted in accordance with paragraph 2.05.B. CONTRACTOR shall have an additional ten days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to CONTRACTOR until acceptable schedules are submitted to ENGINEER.

1. The progress schedule will be acceptable to ENGINEER if it provides an orderly progression of the Work to completion within any specified Milestones and the Contract Times. Such acceptance will not impose on ENGINEER responsibility for the progress schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR'S full responsibility therefor.

2. CONTRACTOR'S schedule of Shop Drawing and Sample submittals will be acceptable to ENGINEER if it provides a workable arrangement for reviewing and processing the required submittals.

3. CONTRACTOR's schedule of values will be acceptable to ENGINEER as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT,  
AMENDING, REUSE

---

3.01 *Intent*

A. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to OWNER.

C. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in Article 9.

3.02 *Reference Standards*

A. *Standards, Specifications, Codes, Laws, and Regulations*

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of OWNER, CONTRACTOR, or ENGINEER, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall any such provision or instruction be effective to assign to OWNER, ENGINEER, or any of ENGINEER'S Consultants, agents, or employees any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once. CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as required by paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.04; provided, however, that CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity, or discrepancy unless CONTRACTOR knew or reasonably should have known thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways: (i) a Written Amendment; (ii) a Change Order; or (iii) a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or

more of the following ways: (i) a Field Order; (ii) ENGINEER'S approval of a Shop Drawing or Sample; or (iii) ENGINEER'S written interpretation or clarification.

### 3.05 *Reuse of Documents*

A. CONTRACTOR and any Subcontractor or Supplier or other individual or entity performing or furnishing any of the Work under a direct or indirect contract with OWNER: (i) shall not have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER or ENGINEER'S Consultant, including electronic media editions; and (ii) shall not reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaption by ENGINEER. This prohibition will survive final payment, completion, and acceptance of the Work, or termination or completion of the Contract. Nothing herein shall preclude CONTRACTOR from retaining copies of the Contract Documents for record purposes.

## ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

### 4.01 *Availability of Lands*

A. OWNER shall furnish the Site. OWNER shall notify CONTRACTOR of any encumbrances or restrictions not of general application but specifically related to use of the Site with which CONTRACTOR must comply in performing the Work. OWNER will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If CONTRACTOR and OWNER are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in OWNER'S furnishing the Site, CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

B. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

### 4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that ENGINEER has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that ENGINEER has used in preparing the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized:* CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER, or any of ENGINEER'S Consultants with respect to:

1. the completeness of such reports and drawings for CONTRACTOR'S purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by CONTRACTOR, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

### 4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If CONTRACTOR believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which CONTRACTOR is entitled to rely as provided in paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or



4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by paragraph 6.16.A), notify OWNER and ENGINEER in writing about such condition. CONTRACTOR shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *ENGINEER'S Review:* After receipt of written notice as required by paragraph 4.03.A, ENGINEER will promptly review the pertinent condition, determine the necessity of OWNER'S obtaining additional exploration or tests with respect thereto, and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER'S findings and conclusions.

C. *Possible Price and Times Adjustments*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in CONTRACTOR'S cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of paragraphs 9.08 and 11.03.

2. CONTRACTOR shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. CONTRACTOR knew of the existence of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and

contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for CONTRACTOR prior to CONTRACTOR'S making such final commitment; or

c. CONTRACTOR failed to give the written notice within the time and as required by paragraph 4.03.A.

3. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in paragraph 10.05. However, OWNER, ENGINEER, and ENGINEER'S Consultants shall not be liable to CONTRACTOR for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by CONTRACTOR on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities, including OWNER, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and CONTRACTOR shall have full responsibility for:

a. reviewing and checking all such information and data,

b. locating all Underground Facilities shown or indicated in the Contract Documents,

c. coordination of the Work with the owners of such Underground Facilities, including OWNER, during construction, and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents, CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, CONTRACTOR shall be responsible for the safety and protection of the underground facility.

2. If ENGINEER concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown with reasonable accuracy in the Contract Documents and that CONTRACTOR did not know of and could not reasonably have been expected to be aware of or to have anticipated. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, OWNER or CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

4.05 *Reference Points*

A. OWNER shall provide engineering surveys to establish reference points for construction which in ENGINEER'S judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

Distribution SCADA Replacement

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings*: Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the ENGINEER in the preparation of the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized*: CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data", CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER or any of ENGINEER'S Consultants with respect to:

1. the completeness of such reports and drawings for CONTRACTOR'S purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. CONTRACTOR shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. CONTRACTOR shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by CONTRACTOR, Subcontractors, Suppliers, or anyone else for whom CONTRACTOR is responsible.

D. If CONTRACTOR encounters a Hazardous Environmental Condition or if CONTRACTOR or anyone for whom CONTRACTOR is responsible creates a Hazardous Environmental Condition, CONTRACTOR shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by paragraph 6.16); and (iii) notify OWNER and ENGINEER (and promptly thereafter confirm such notice in writing). OWNER

General Conditions

Rev.10/05

shall promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. CONTRACTOR shall not be required to resume Work in connection with such condition or in any affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by CONTRACTOR, either party may make a Claim therefor as provided in paragraph 10.05.

F. If, after receipt of such written notice, CONTRACTOR does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then OWNER may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in paragraph 10.05. OWNER may have such deleted portion of the Work performed by OWNER's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER'S Consultants, and the officers, directors, partners, employees, agents, other consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing in this paragraph 4.06.G shall obligate CONTRACTOR to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. The provisions of paragraphs 4.02, 4.03, and 4.04 are not intended to apply to a Hazardous Distribution SCADA Replacement

Environmental Condition uncovered or revealed at the Site.

## ARTICLE 5 - BONDS AND INSURANCE

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### 5.01 *Performance, Payment, and Other Bonds*

A. CONTRACTOR shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR'S obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as provided otherwise by Laws or Regulations or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Contract Documents.

B. All Bonds shall be in the form prescribed by the Contract Documents, except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

C. If the surety on any Bond furnished by CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.01.B, CONTRACTOR shall within 20 days thereafter substitute another Bond and surety, both of which shall comply with the requirements of paragraphs 5.01.B and 5.02.

### 5.02 *Licensed Sureties and Insurers*

A. All Bonds and insurance required by the Contract Documents to be purchased and maintained by OWNER or CONTRACTOR shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue Bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

### 5.03 *Certificates of Insurance*

A. CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by OWNER or any other additional insured) which CONTRACTOR is required to purchase and maintain. OWNER shall deliver to CONTRACTOR, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by CONTRACTOR or any other additional insured) which OWNER is required to purchase and maintain.

### 5.04 *CONTRACTOR'S Liability Insurance*

A. CONTRACTOR shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR'S performance of the Work and CONTRACTOR'S other obligations under the Contract Documents, whether it is to be performed by CONTRACTOR, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
2. claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR'S employees;
3. claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR'S employees;
4. claims for damages insured by reasonably available personal injury liability coverage which are sustained: (i) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (ii) by any other person for any other reason;
5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance so required by this paragraph 5.04 to be purchased and maintained shall:

1. with respect to insurance required by paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (subject to any customary exclusion in respect of professional liability) OWNER, ENGINEER, ENGINEER'S Consultants, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
3. include completed operations insurance;
4. include contractual liability insurance covering CONTRACTOR'S indemnity obligations under paragraphs 6.07, 6.11, and 6.20;
5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least thirty days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the CONTRACTOR pursuant to paragraph 5.03 will so provide);
6. remain in effect at least until final payment and at all times thereafter when CONTRACTOR may be correcting, removing, or replacing defective Work in accordance with paragraph 13.07; and
7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment (and CONTRACTOR shall furnish OWNER and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to OWNER and any such additional insured of continuation of such insurance at final payment and one year thereafter).

5.05 *OWNER'S Liability Insurance*

A. In addition to the insurance required to be provided by CONTRACTOR under paragraph 5.04, OWNER, at OWNER's option, may purchase and maintain at OWNER'S expense OWNER'S own liability insurance as will protect OWNER against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance (See Supplementary Conditions)*

5.07 (Not Used)

5.08 (Not Used)

5.09 (Not Used)

5.10 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either OWNER or CONTRACTOR has any objection to the coverage afforded by or other provisions of the Bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by paragraph 2.05.C. OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the Bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent Bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

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6.01 *Supervision and Superintendence*

A. CONTRACTOR shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.

CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of OWNER or ENGINEER in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

B. At all times during the progress of the Work, CONTRACTOR shall assign a competent resident superintendent thereto who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR'S representative at the Site and shall have authority to act on behalf of CONTRACTOR. All communications given to or received from the superintendent shall be binding on CONTRACTOR.

6.02 *Labor; Working Hours*

A. CONTRACTOR shall provide competent, suitably qualified personnel to survey, lay out, and construct the Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday, or any legal holiday without OWNER's written consent (which will not be unreasonably withheld) given after prior written notice to ENGINEER.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the General Requirements, CONTRACTOR shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and

guarantees specifically called for by the Specifications shall expressly run to the benefit of OWNER. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

#### 6.04 Progress Schedule

A. CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.07 as it may be adjusted from time to time as provided below.

1. CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.07) proposed adjustments in the progress schedule that will not result in changing the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of Article 12. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

#### 6.05 Substitutes and "Or-Equals"

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to ENGINEER for review under the circumstances described below.

1. "Or-Equal" Items: If, in ENGINEER'S sole discretion, an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by ENGINEER as an "or-equal" item, in which case review and approval of the proposed item may, in

ENGINEER'S sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. In the exercise of reasonable judgment ENGINEER determines that: (i) it is at least equal in quality, durability, appearance, strength, and design characteristics; (ii) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole; and CONTRACTOR;

b. Certifies that: (i) there is no increase in cost to the OWNER; and (ii) it will conform substantially, even with deviations, to the detailed requirements of the item named in the Contract Documents.

#### 2. Substitute Items

a. If, in ENGINEER'S sole discretion, an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR.

c. The procedure for review by ENGINEER will be as set forth in paragraph 6.05.A.2.d, as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances.

d. CONTRACTOR shall first make written application to ENGINEER for review of a proposed substitute item of material or equipment that CONTRACTOR seeks to furnish or use. The application shall certify that the proposed substitute item will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified, and be suited to the same use as that specified. The application will state the extent, if any, to which the use of the proposed

substitute item will prejudice CONTRACTOR'S achievement of Substantial Completion on time, whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute item and whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute item from that specified will be identified in the application, and available engineering, sales, maintenance, repair, and replacement services will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute item. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute item.

*B. Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in ENGINEER'S sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in subparagraph 6.05.A.2.

*C. Engineer's Evaluation:* ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.05.A and 6.05.B. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized until ENGINEER'S review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." ENGINEER will advise CONTRACTOR in writing of any negative determination.

*D. Special Guarantee:* OWNER may require CONTRACTOR to furnish at CONTRACTOR'S expense a special performance guarantee or other surety with respect to any substitute.

*E. ENGINEER'S Cost Reimbursement:* ENGINEER will record time required by ENGINEER and ENGINEER'S Consultants in evaluating substitute proposed or submitted by CONTRACTOR pursuant to paragraphs 6.05.A.2 and 6.05.B and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER approves a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER'S Consultants for evaluating each such proposed substitute.

*F. CONTRACTOR'S Expense:* CONTRACTOR shall provide all data in support of any proposed substitute or "or-equal" at CONTRACTOR'S expense.

*6.06 Concerning Subcontractors, Suppliers, and Others*

A. CONTRACTOR shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to OWNER as indicated in paragraph 6.06.B), whether initially or as a replacement, against whom OWNER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to OWNER in advance for acceptance by OWNER by a specified date prior to the Effective Date of the Agreement, and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER'S acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. CONTRACTOR shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of OWNER or ENGINEER to reject defective Work.

C. CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as CONTRACTOR is responsible for CONTRACTOR'S own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other individual or entity, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR.

E. CONTRACTOR shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with ENGINEER through CONTRACTOR.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for CONTRACTOR by a Subcontractor or Supplier will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in paragraph 5.06, the agreement between the CONTRACTOR and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against OWNER, CONTRACTOR, ENGINEER, ENGINEER'S Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property

Distribution SCADA Replacement

insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, CONTRACTOR will obtain the same.

#### 6.07 *Patent Fees and Royalties*

A. CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER'S Consultants, and the officers, directors, partners, employees or agents, and other consultants of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

#### 6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto, such as plant investment fees.

#### 6.09 *Laws and Regulations*

A. CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise



expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR'S compliance with any Laws or Regulations.

B. If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, CONTRACTOR shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work; however, it shall not be CONTRACTOR'S primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve CONTRACTOR of CONTRACTOR'S obligations under paragraph 3.03.

#### 6.10 Taxes

A. CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by CONTRACTOR in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

#### 6.11 Use of Site and Other

##### A. Limitation on Use of Site and Other Areas

1. CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER'S Consultant, and the officers, directors, partners, employees, agents, and other consultants of each and any of them from and against all claims, costs, losses, and damages (including but

not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against OWNER, ENGINEER, or any other party indemnified hereunder to the extent caused by or based upon CONTRACTOR'S performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work CONTRACTOR shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work, CONTRACTOR shall clean the Site and make it ready for utilization by OWNER. At the completion of the Work CONTRACTOR shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

#### 6.12 Record Documents

A. CONTRACTOR shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents, together with all approved Samples, and a counterpart of all approved Shop Drawings, will be available to ENGINEER for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to ENGINEER for OWNER.

#### 6.13 Safety and Protection

A. CONTRACTOR shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. CONTRACTOR shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property. All damage, injury, or loss to any property referred to in paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or ENGINEER'S Consultant, or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them). CONTRACTOR'S duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

#### 6.14 *Safety Representative*

A. CONTRACTOR shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

#### 6.15 *Hazard Communication Programs*

A. CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

#### 6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, CONTRACTOR is obligated to act to prevent threatened damage, injury, or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If ENGINEER determines that a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Work Change Directive or Change Order will be issued.

#### 6.17 *Shop Drawings and Samples*

A. CONTRACTOR shall submit Shop Drawings to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. All submittals will be identified as ENGINEER may require and in the number of copies specified in the General Requirements. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show ENGINEER the services, materials, and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by paragraph 6.17.E.

B. CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers, and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.17.E. The numbers of each Sample to be submitted will be as specified in the Specifications.

C. Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER as required by paragraph 2.07, any related Work performed prior to ENGINEER'S review and

approval of the pertinent submittal will be at the sole expense and responsibility of CONTRACTOR.

*D. Submittal Procedures*

1. Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

a. all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

b. all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and

d. CONTRACTOR shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR'S obligations under the Contract Documents with respect to CONTRACTOR'S review and approval of that submittal.

3. At the time of each submittal, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to ENGINEER for review and approval of each such variation.

*E. ENGINEER'S Review*

1. ENGINEER will timely review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER. ENGINEER'S review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the

information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. ENGINEER'S review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. ENGINEER'S review and approval of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER'S attention to each such variation at the time of each submittal as required by paragraph 6.17.D.3 and ENGINEER has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.17.D.1.

*F. Resubmittal Procedures:*

1. CONTRACTOR shall make corrections required by ENGINEER and shall return the required number of corrected copies of Shop Drawings and submit as required new Samples for review and approval. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals.

*6.18 Continuing the Work*

A. CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.04 or as OWNER and CONTRACTOR may otherwise agree in writing.

*6.19 CONTRACTOR'S General Warranty and Guarantee*

A. CONTRACTOR warrants and guarantees to OWNER, ENGINEER, and ENGINEER'S Consultants that all Work will be in accordance with the Contract

Documents and will not be defective. CONTRACTOR'S warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors, Suppliers, or any other individual or entity for whom CONTRACTOR is responsible; or
2. normal wear and tear under normal usage.

B. CONTRACTOR'S obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of CONTRACTOR'S obligation to perform the Work in accordance with the Contract Documents:

1. observations by ENGINEER;
2. recommendation by ENGINEER or payment by OWNER of any progress or final payment;
3. the issuance of a certificate of Substantial Completion by ENGINEER or any payment related thereto by OWNER;
4. use or occupancy of the Work or any part thereof by OWNER;
5. any acceptance by OWNER or any failure to do so;
6. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER;
7. any inspection, test, or approval by others; or
8. any correction of defective Work by OWNER.

#### 6.20 Indemnification

A. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER'S Consultants, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out

of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage:

1. is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of real or personal property (other than the Work itself), including the loss of use resulting therefrom; and
2. is caused in whole or in part by any act or omission of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws or Regulations.

B. In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of CONTRACTOR under paragraph 6.20.A shall not be limited in any way by the amount or types of insurance provided by CONTRACTOR under Article 5 of the General Conditions.

D. The indemnification obligations of CONTRACTOR under paragraph 6.20.A shall not extend to the sole negligence or willful misconduct of OWNER, ENGINEER or ENGINEER'S Consultants or to the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them.

ARTICLE 7 - OTHER WORK

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7.01 *Related Work at Site*

A. OWNER may perform other work related to the Project at the Site by OWNER'S employees, or let other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to CONTRACTOR prior to starting any such other work; and

2. if OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in paragraph 10.05.

B. CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (and OWNER, if OWNER is performing the other work with OWNER'S employees) proper and safe access to the Site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

C. If the proper execution or results of any part of CONTRACTOR'S Work depends upon work performed by others under this Article 7, CONTRACTOR shall inspect such other work and promptly report to ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of CONTRACTOR'S Work. CONTRACTOR'S failure to so report will constitute an acceptance of such other work as fit and proper for integration with

CONTRACTOR'S Work except for latent defects and deficiencies in such other work.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

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8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.02 *Furnish Data*

A. OWNER shall promptly furnish the data required of OWNER under the Contract Documents.

8.03 *Pay Promptly When Due*

A. OWNER shall make payments to CONTRACTOR promptly when they are due as provided in paragraphs 14.02.C and 14.07.C.

8.04 *Lands and Easements; Reports and Tests*

A. OWNER'S duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.01 and 4.05. Paragraph 4.02 refers to OWNER'S identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by ENGINEER in preparing the Contract Documents.

8.05 *Insurance*

A. OWNER'S responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.06 *Change Orders*

A. OWNER is obligated to execute Change Orders as indicated in paragraph 10.03.

8.07 *Inspections, Tests, and Approvals*

A. OWNER'S responsibility in respect to certain inspections, tests, and approvals is set forth in paragraph 13.03.B.

8.08 *Limitations on OWNER'S Responsibilities*

A. The OWNER shall not supervise, direct, or have control or authority over, nor be responsible for,

CONTRACTOR'S means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work. OWNER will not be responsible for CONTRACTOR'S failure to perform the Work in accordance with the Contract Documents.

#### 8.09 *Undisclosed Hazardous Environmental Condition*

A. OWNER'S responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in paragraph 4.06.

#### 8.10 *Evidence of Financial Arrangements*

A. If and to the extent OWNER has agreed to furnish CONTRACTOR reasonable evidence that financial arrangements have been made to satisfy OWNER'S obligations under the Contract Documents, OWNER'S responsibility in respect thereof will be as set forth in the Supplementary Conditions.

### ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

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#### 9.01 *OWNER'S Representative*

A. ENGINEER will be OWNER'S representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER'S representative during construction are set forth in the Contract Documents and will not be changed without written consent of OWNER and ENGINEER.

#### 9.02 *Visits to Site*

A. ENGINEER will make visits to the Site at intervals appropriate to the various stages of construction as ENGINEER deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of CONTRACTOR'S executed Work. Based on information obtained during such visits and observations, ENGINEER, for the benefit of OWNER, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. ENGINEER'S efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform generally to the

Contract Documents. On the basis of such visits and observations, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defective Work.

B. ENGINEER'S visits and observations are subject to all the limitations on ENGINEER'S authority and responsibility set forth in paragraph 9.10, and particularly, but without limitation, during or as a result of ENGINEER'S visits or observations of CONTRACTOR'S Work. ENGINEER will not supervise, direct, control, or have authority over or be responsible for CONTRACTOR'S means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work.

#### 9.03 *Project Representative*

A. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more extensive observation of the Work. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.10 and in the Supplementary Conditions. If OWNER designates another representative or agent to represent OWNER at the Site who is not ENGINEER'S Consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

#### 9.04 *Clarifications and Interpretations*

A. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents as ENGINEER may determine necessary, which shall be consistent with the intent of and reasonably inferable from the Contract Documents. Such written clarifications and interpretations will be binding on OWNER and CONTRACTOR. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a written clarification or interpretation, a Claim may be made therefor as provided in paragraph 10.05.

#### 9.05 *Authorized Variations in Work*

A. ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the

Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER and also on CONTRACTOR, who shall perform the Work involved promptly. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of a Field Order, a Claim may be made therefor as provided in paragraph 10.05.

#### 9.06 *Rejecting Defective Work*

A. ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be defective, or that ENGINEER believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER will also have authority to require special inspection or testing of the Work as provided in paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

#### 9.07 *Shop Drawings, Change Orders and Payments*

A. In connection with ENGINEER'S authority as to Shop Drawings and Samples, see paragraph 6.17.

B. In connection with ENGINEER'S authority as to Change Orders, see Articles 10, 11, and 12.

C. In connection with ENGINEER'S authority as to Applications for Payment, see Article 14.

#### 9.08 *Determinations for Unit Price Work*

A. ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR the ENGINEER'S preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER'S written decision thereon will be final and binding (except as modified by ENGINEER to reflect changed factual conditions or more accurate data) upon OWNER and CONTRACTOR, subject to the provisions of paragraph 10.05.

#### 9.09 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the

acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work, the quantities and classifications of Unit Price Work, the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, and Claims seeking changes in the Contract Price or Contract Times will be referred initially to ENGINEER in writing, in accordance with the provisions of paragraph 10.05, with a request for a formal decision.

B. When functioning as interpreter and judge under this paragraph 9.09, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to this paragraph 9.09 with respect to any such Claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.07) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such Claim, dispute, or other matter.

#### 9.10 *Limitations on ENGINEER'S Authority and Responsibilities*

A. Neither ENGINEER'S authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by ENGINEER shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. ENGINEER will not supervise, direct, control, or have authority over or be responsible for CONTRACTOR'S means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work. ENGINEER will not be responsible for CONTRACTOR'S failure to perform the Work in accordance with the Contract Documents.

C. ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. ENGINEER'S review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

E. The limitations upon authority and responsibility set forth in this paragraph 9.10 shall also apply to ENGINEER'S Consultants, Resident Project Representative, and assistants.

## ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

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### 10.01 *Authorized Changes in the Work*

A. Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Written Amendment, a Change Order, or a Work Change Directive. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If OWNER and CONTRACTOR are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in paragraph 10.05.

### 10.02 *Unauthorized Changes in the Work*

A. CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in paragraph 3.04, except in the case of an emergency as provided in paragraph 6.16 or in the case of uncovering Work as provided in paragraph 13.04.B.

### 10.03 *Execution of Change Orders*

A. OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER (or Written Amendments) covering:

1. changes in the Work which are: (i) ordered by OWNER pursuant to paragraph 10.01.A, (ii) required because of acceptance of defective Work under paragraph 13.08.A or OWNER'S correction of defective Work under paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.18.A.

### 10.04 *Notification to Surety*

A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR'S responsibility. The amount of each applicable Bond will be adjusted to reflect the effect of any such change.

### 10.05 *Claims and Disputes*

A. *Notice:* Written notice stating the general nature of each Claim, dispute, or other matter shall be delivered by the claimant to ENGINEER and the other party to the Contract promptly (but in no event later than 20 days) after the start of the event giving rise thereto. Notice of the amount or extent of the Claim, dispute, or other matter with supporting data shall be delivered to the ENGINEER and the other party to the Contract within 45 days after the start of such event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of such Claim, dispute, or other matter). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event.



The opposing party shall submit any response to ENGINEER and the claimant within 30 days after receipt of the claimant's last submittal (unless ENGINEER allows additional time).

B. *ENGINEER'S Decision:* ENGINEER will render a formal decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any. ENGINEER'S written decision on such Claim, dispute, or other matter will be final and binding upon OWNER and CONTRACTOR unless:

1. an appeal from ENGINEER'S decision is taken within the time limits and in accordance with the dispute resolution procedures set forth in Article 16; or

2. if no such dispute resolution procedures have been set forth in Article 16, a written notice of intention to appeal from ENGINEER'S written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within 30 days after the date of such decision, and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction within 60 days after the date of such decision or within 60 days after Substantial Completion, whichever is later (unless otherwise agreed in writing by OWNER and CONTRACTOR), to exercise such rights or remedies as the appealing party may have with respect to such Claim, dispute, or other matter in accordance with applicable Laws and Regulations.

C. If ENGINEER does not render a formal decision in writing within the time stated in paragraph 10.05.B, a decision denying the Claim in its entirety shall be deemed to have been issued 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

D. No Claim for an adjustment in Contract Price or Contract Times (or Milestones) will be valid if not submitted in accordance with this paragraph 10.05.

## ARTICLE 11 - COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK

### 11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in

Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to CONTRACTOR will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Such employees shall include without limitation superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by OWNER.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

3. Payments made by CONTRACTOR to Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from subcontractors acceptable to OWNER and CONTRACTOR and shall deliver such bids to OWNER, who will then determine, with the advice of ENGINEER, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the

Work and fee shall be determined in the same manner as CONTRACTOR'S Cost of the Work and fee as provided in this paragraph 11.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of CONTRACTOR'S employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of CONTRACTOR.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by OWNER with the advice of ENGINEER, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by CONTRACTOR in connection with the performance of the Work (except losses

and damages within the deductible amounts of property insurance established in accordance with paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR'S fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expressage, and similar petty cash items in connection with the Work.

i. When the Cost of the Work is used to determine the value of a Change Order or of a Claim, the cost of premiums for additional Bonds and insurance required because of the changes in the Work or caused by the event giving rise to the Claim.

j. When all the Work is performed on the basis of cost-plus, the costs of premiums for all Bonds and insurance CONTRACTOR is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of CONTRACTOR'S officers, executives, principals (of partnerships and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by CONTRACTOR, whether at the Site or in CONTRACTOR'S principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.01.A.1 or specifically covered by paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the CONTRACTOR'S fee.

2. Expenses of CONTRACTOR'S principal and branch offices other than CONTRACTOR'S office at the Site.

3. Any part of CONTRACTOR'S capital expenses, including interest on CONTRACTOR'S capital employed for the Work and charges against CONTRACTOR for delinquent payments.

4. Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraphs 11.01.A and 11.01.B.

C. *CONTRACTOR'S Fee:* When all the Work is performed on the basis of cost-plus, CONTRACTOR'S fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, CONTRACTOR'S fee shall be determined as set forth in paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to paragraphs 11.01.A and 11.01.B, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

#### 11.02 *Cash Allowances*

A. It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:

1. the allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. CONTRACTOR'S costs for unloading and handling on the Site, labor, installation costs, overhead, profit, and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

B. Prior to final payment, an appropriate Change Order will be issued as recommended by ENGINEER to reflect actual amounts due CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

#### 11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER subject to the provisions of paragraph 9.08.

B. Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR'S overhead and profit for each separately identified item.

C. For provisions for an adjustment of a unit price for an increase or decrease in the quantity of Unit Price Work, if any, see General Requirements Section 01270, Measurement and Payment.

### ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

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#### 12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in paragraph 11.01) plus a CONTRACTOR'S fee for overhead and profit (determined as provided in paragraph 12.01.C).

C. *CONTRACTOR'S Fee*: The CONTRACTOR'S fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under paragraphs 11.01.A.1 and 11.01.A.2, the CONTRACTOR'S fee shall be 15 percent;

b. for costs incurred under paragraph 11.01.A.3, the CONTRACTOR's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and CONTRACTOR will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by CONTRACTOR to OWNER for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in CONTRACTOR'S fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in CONTRACTOR'S fee shall be computed on the basis of the net change in accordance with paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

## 12.02 *Change of Contract Times*

A. The Contract Times (or Milestones) may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Times (or Milestones) shall be based on written notice submitted by the party making the claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.05.

B. Any adjustment of the Contract Times (or Milestones) covered by a Change Order or of any Claim for an adjustment in the Contract Times (or Milestones) will be determined in accordance with the provisions of this Article 12.

## 12.03 *Delays Beyond CONTRACTOR'S Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in paragraph 12.02.A. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

## 12.04 *Delays Within CONTRACTOR'S Control*

A. The Contract Times (or Milestones) will not be extended due to delays within the control of CONTRACTOR. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

## 12.05 *Delays Beyond OWNER'S and CONTRACTOR'S Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR'S sole and exclusive remedy for such delay.

### 12.06 *Delay Damages*

A. In no event shall OWNER or ENGINEER be liable to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from:

1. delays caused by or within the control of CONTRACTOR; or

2. delays beyond the control of both OWNER and CONTRACTOR including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

B. Nothing in this paragraph 12.06 bars a change in Contract Price pursuant to this Article 12 to compensate CONTRACTOR due to delay, interference, or disruption directly attributable to actions or inactions of OWNER or anyone for whom OWNER is responsible.

## ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

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### 13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which OWNER or ENGINEER has actual knowledge will be given to CONTRACTOR. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

### 13.02 *Access to Work*

A. OWNER, ENGINEER, ENGINEER=s Consultants, other representatives and personnel of OWNER, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR'S Site safety procedures and programs so that they may comply therewith as applicable.

### 13.03 *Tests and Inspections*

A. CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

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B. OWNER shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.04.B shall be paid as provided in said paragraph 13.04.B; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish ENGINEER the required certificates of inspection or approval.

D. CONTRACTOR shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for OWNER'S and ENGINEER'S acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to CONTRACTOR'S purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to OWNER and ENGINEER.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by CONTRACTOR without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation.

F. Uncovering Work as provided in paragraph 13.03.E shall be at CONTRACTOR'S expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR'S intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

### 13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER'S observation and replaced at CONTRACTOR'S expense.

B. If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER'S request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment. If it is found that such Work is defective, CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefor as provided in paragraph 10.05. If, however, such Work is not found to be defective, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

#### 13.05 *OWNER May Stop the Work*

A. If the Work is defective, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

#### 13.06 *Correction or Removal of Defective Work*

A. CONTRACTOR shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by ENGINEER, remove it from the Project and replace it with Work that is not defective. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or

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other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

#### 13.07 *Correction Period*

A. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for CONTRACTOR'S use by OWNER or permitted by Laws and Regulations as contemplated in paragraph 6.11.A is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER'S written instructions: (i) repair such defective land or areas, or (ii) correct such defective Work or, if the defective Work has been rejected by OWNER, remove it from the Project and replace it with Work that is not defective, and (iii) satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or repaired or may have the rejected Work removed and replaced, and all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

B. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

C. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

D. CONTRACTOR'S obligations under this paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this paragraph 13.07 shall

not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

#### 13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, OWNER (and, prior to ENGINEER'S recommendation of final payment, ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to OWNER'S evaluation of and determination to accept such defective Work (such costs to be approved by ENGINEER as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by CONTRACTOR pursuant to this sentence. If any such acceptance occurs prior to ENGINEER'S recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and OWNER shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefor as provided in paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

#### 13.09 *OWNER May Correct Defective Work*

A. If CONTRACTOR fails within a reasonable time after written notice from ENGINEER to correct defective Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.06.A, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days written notice to CONTRACTOR, correct and remedy any such deficiency.

B. In exercising the rights and remedies under this paragraph, OWNER shall proceed expeditiously. In connection with such corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the Site, take possession of all or part of the Work and suspend CONTRACTOR'S services related thereto, take possession of CONTRACTOR'S tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere.

CONTRACTOR shall allow OWNER, OWNER'S representatives, agents and employees, OWNER'S other contractors, and ENGINEER and ENGINEER'S Consultants access to the Site to enable OWNER to exercise the rights and remedies under this paragraph.

C. All Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by OWNER in exercising the rights and remedies under this paragraph 13.09 will be charged against CONTRACTOR, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, OWNER may make a Claim therefor as provided in paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of CONTRACTOR'S defective Work.

D. CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones) because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER'S rights and remedies under this paragraph 13.09.

### ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

#### 14.01 *Schedule of Values*

A. The schedule of values established as provided in paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units completed.

#### 14.02 *Progress Payments*

##### A. *Applications for Payments*

1. -At least 10 days before the date established for each progress payment (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment

not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that OWNER has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect OWNER'S interest therein, all of which must be satisfactory to OWNER.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of CONTRACTOR stating that all previous progress payments received on account of the Work have been applied on account to discharge CONTRACTOR'S legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

#### B. *Review of Applications*

1. ENGINEER will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to OWNER or return the Application to CONTRACTOR indicating in writing ENGINEER'S reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application.

2. ENGINEER'S recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER'S observations on the Site of the executed Work as an experienced and qualified design professional and on ENGINEER'S review of the Application for Payment and the accompanying data and schedules, that to the best of ENGINEER'S knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under

paragraph 9.08, and to any other qualifications stated in the recommendation); and

c. the conditions precedent to CONTRACTOR'S being entitled to such payment appear to have been fulfilled in so far as it is ENGINEER'S responsibility to observe the Work.

3. By recommending any such payment ENGINEER will not thereby be deemed to have represented that: (i) inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents; or (ii) that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or entitle OWNER to withhold payment to CONTRACTOR.

4. Neither ENGINEER'S review of CONTRACTOR'S Work for the purposes of recommending payments nor ENGINEER'S recommendation of any payment, including final payment, will impose responsibility on ENGINEER to supervise, direct, or control the Work or for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for CONTRACTOR'S failure to comply with Laws and Regulations applicable to CONTRACTOR'S performance of the Work. Additionally, said review or recommendation will not impose responsibility on ENGINEER to make any examination to ascertain how or for what purposes CONTRACTOR has used the moneys paid on account of the Contract Price, or to determine that title to any of the Work, materials, or equipment has passed to OWNER free and clear of any Liens.

5. ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER'S opinion, it would be incorrect to make the representations to OWNER referred to in paragraph 14.02.B.2. ENGINEER may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in ENGINEER'S opinion to protect OWNER from loss because:



a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Written Amendment or Change Orders;

c. OWNER has been required to correct defective Work or complete Work in accordance with paragraph 13.09; or

d. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraph 15.02.A.

#### C. *Payment Becomes Due*

1. Sixty days after presentation of the Application for Payment to OWNER with ENGINEER'S recommendation, the amount recommended will (subject to the provisions of paragraph 14.02.D) become due, and when due will be paid by OWNER to CONTRACTOR.

#### D. *Reduction in Payment*

1. OWNER may refuse to make payment of the full amount recommended by ENGINEER because:

a. claims have been made against OWNER on account of CONTRACTOR'S performance or furnishing of the Work;

b. liens have been filed in connection with the Work, except where CONTRACTOR has delivered a specific Bond satisfactory to OWNER to secure the satisfaction and discharge of such Liens;

c. there are other items entitling OWNER to a set-off against the amount recommended; or

d. OWNER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.02.B.5.a through 14.02.B.5.c or paragraph 15.02.A.

2. If OWNER refuses to make payment of the full amount recommended by ENGINEER, OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action and promptly pay CONTRACTOR any amount remaining after deduction of the amount so withheld. OWNER shall promptly pay CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER'S satisfaction the reasons for such action.

3. If it is subsequently determined that OWNER'S refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by paragraph 14.02.C.1.

#### 14.03 *CONTRACTOR'S Warranty of Title*

A. CONTRACTOR warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

#### 14.04 *Substantial Completion*

A. When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Promptly thereafter, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within 14 days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER'S objections, ENGINEER considers the Work substantially complete, ENGINEER will within said 14 days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, and protection of the Work, maintenance, heat,

utilities, insurance, and warranties and guarantees. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER in writing prior to ENGINEER'S issuing the definitive certificate of Substantial Completion, ENGINEER'S aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

B. OWNER shall have the right to exclude CONTRACTOR from the Site after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

#### 14.05 *Partial Utilization*

A. Use by OWNER at OWNER'S option of any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which OWNER, ENGINEER, and CONTRACTOR agree constitutes a separately functioning and usable part of the Work that can be used by OWNER for its intended purpose without significant interference with CONTRACTOR'S performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following conditions.

1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

2. No occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of the Supplementary Conditions regarding property insurance.

#### 14.06 *Final Inspection*

A. Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will promptly make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

#### 14.07 *Final Payment*

##### A. *Application for Payment*

1. After CONTRACTOR has, in the opinion of ENGINEER, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, Bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in paragraph 6.12), and other documents, CONTRACTOR may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by subparagraph 5.04.B.7; (ii) consent of the surety, if any, to final payment; and (iii) complete and legally effective releases or waivers (satisfactory to OWNER) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in paragraph 14.07.A.2 and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full and an affidavit of CONTRACTOR that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or OWNER'S property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in

full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

B. *Review of Application and Acceptance*

1. If, on the basis of ENGINEER'S observation of the Work during construction and final inspection, and ENGINEER'S review of the final Application for Payment and accompanying documentation as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR'S other obligations under the Contract Documents have been fulfilled, ENGINEER will, within 10 days after receipt of the final Application for Payment, indicate in writing ENGINEER'S recommendation of payment and present the Application for Payment to OWNER for payment. At the same time ENGINEER will also give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.09. Otherwise, ENGINEER will return the Application for Payment to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due*

1. Sixty days after the presentation to OWNER of the Application for Payment and accompanying documentation, the amount recommended by ENGINEER will become due and, when due, will be paid by OWNER to CONTRACTOR.

D. *Final Completion Delayed*

1. If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed, and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR'S final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and

conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.08 *(Not Used)*

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by OWNER against CONTRACTOR, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from CONTRACTOR'S continuing obligations under the Contract Documents; and

2. a waiver of all Claims by CONTRACTOR against OWNER other than those previously made in writing which are still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

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15.01 *OWNER May Suspend Work*

A. At any time and without cause, OWNER may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes a Claim therefor as provided in paragraph 10.05.

15.02 *OWNER May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. CONTRACTOR'S persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.07 as adjusted from time to time pursuant to paragraph 6.04);

2. CONTRACTOR'S disregard of Laws or Regulations of any public body having jurisdiction;

3. CONTRACTOR'S disregard of the authority of ENGINEER; or

4. CONTRACTOR'S violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in paragraph 15.02.A occur, OWNER may, after giving CONTRACTOR (and the surety, if any) seven days written notice, terminate the services of CONTRACTOR, exclude CONTRACTOR from the Site, and take possession of the Work and of all CONTRACTOR'S tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case, CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by OWNER arising out of or relating to completing the Work, such excess will be paid to CONTRACTOR. If such claims, costs, losses, and damages exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such claims, costs, losses, and damages incurred by OWNER will be reviewed by ENGINEER as to their reasonableness and, when so approved by ENGINEER, incorporated in a Change Order. When exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

C. Where CONTRACTOR'S services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

#### 15.03 OWNER May Terminate For Convenience

A. Upon seven days written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to terminate the Contract. In such case, CONTRACTOR shall be paid (without duplication of any items):

1. for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. for expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. for all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. for reasonable expenses directly attributable to termination.

B. CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

#### 15.04 CONTRACTOR May Stop Work or Terminate

A. If, through no act or fault of CONTRACTOR, the Work is suspended for more than 90 consecutive days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within 30 days after it is submitted, or OWNER fails for 60 days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days written notice to OWNER and ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Contract and recover from OWNER payment on the same terms as provided in paragraph 15.03. In lieu of terminating the Contract and without prejudice to any other right or remedy, if ENGINEER has failed to act on an Application for Payment within 30 days after it is submitted, or OWNER has failed for 60 days to pay CONTRACTOR any sum finally determined to be due, CONTRACTOR may, seven days after written notice to OWNER and ENGINEER, stop the Work until payment is made of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.04 are not intended to preclude CONTRACTOR from making a Claim under paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly

attributable to CONTRACTOR'S stopping the Work as permitted by this paragraph.

## ARTICLE 16 - DISPUTE RESOLUTION

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### 16.01 *Methods and Procedures*

A. Dispute resolution methods and procedures, if any, shall be as set forth in the Supplementary Conditions. If no method and procedure has been set forth, and subject to the provisions of paragraphs 9.09 and 10.05, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

## ARTICLE 17 - MISCELLANEOUS

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### 17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

### 17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of

the applicable jurisdiction, such day will be omitted from the computation.

### 17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

### 17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Agreement.

### 17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

### 17.06 *Headings*

A. The Article and paragraph headings are inserted for convenience only and do not constitute part of these General Conditions.

END OF GENERAL CONDITIONS

ERIE COUNTY WATER AUTHORITY  
BUFFALO, NEW YORK

CONTRACT NO: EMA-03A  
DISTRIBUTION SCADA REPLACEMENT  
PROJECT NO: 201400160

SECTION 00800

SUPPLEMENTARY CONDITIONS

SCOPE

These Supplementary Conditions amend or supplement the General Conditions. All provisions of the General Conditions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions.

SC-1.01.A.7. Modify paragraph 1.01.A.7. by changing the word "Advertisement" in the first sentence to "Notice".

SC-1.01.A.43 Add the following to Paragraph 1.01.A.43:

Substantial Completion shall be achieved at such time as when all remote sites have been fully commissioned and are operational on the new SCADA Server and the following requirements have been completed:

- Draft Operations and Maintenance Manuals submitted, in accordance with 409000 1.06
- Closeout Submittals provided, in accordance with 409000 1.07 and 409635 1.06 C.
- Site Acceptance Testing completed, in accordance with 409000 3.03
- Training completed, in accordance with 409000 3.04

SC-5.01.A Modify the first part of the second sentence of paragraph 5.01.A of the General Conditions to read:

The payment Bond shall remain in effect for one year and the performance Bond shall remain in effect for two years after Final Completion.

SC-5.04 through 5.10. Delete paragraph 5.04 through 5.10, inclusive, in their entirety.

SC-5.03 Add a new paragraph immediately after Paragraph 5.03, which is to read as follows:

“SC-5.04 *Insurance Requirements*

A. CONTRACTOR shall procure and maintain insurance in accordance with Insurance Requirements, as set forth in the attached Appendix B and hereby made a part of these General Conditions.”

SC-6.02.B Add new paragraphs immediately after paragraph 6.02.B which are to read as follows:

“SC-6.02.B.1 Except where otherwise prohibited by Laws or Regulations, regular working hours are defined as up to 8 hours per day, beginning no earlier than 7:00 am and ending no later than 6:00 pm.

SC-6.02.B.2 Maintenance and cleanup activities may be performed during hours other than regular working hours provided that such activities do not require the startup or operation of construction equipment.

SC-6.02.B.3 If it shall become absolutely necessary to perform Work at night or on Saturdays, Sundays or legal holidays, written notice shall be submitted to OWNER and ENGINEER at least two days in advance of the need for such Work. OWNER will only consider the performance of such Work as can be performed satisfactorily under the conditions. Sufficient lighting and all other necessary facilities for carrying out and observing the Work shall be provided and maintained where such Work is being performed at night.”

SC-6.06.G Modify paragraph 6.06.G. by changing paragraph reference 5.06 to SC-5.04.

SC-6.06.H Add the following new paragraph immediately following paragraph 6.06.G, which is to read as follows:

“SC-6.06.H The CONTRACTOR shall perform with the CONTRACTOR’S own organization, contract work amounting to not less than fifty percent of the original total contract price. The term “the CONTRACTOR’S own organization” shall be construed to include only workmen employed and paid directly by the CONTRACTOR, and equipment owned or rented by the CONTRACTOR, with or without operators.”

SC-6.09.B. Add a new paragraph immediately after paragraph 6.09.B which is to read as follows:

“SC-6.09.C Refer to Article SC-18 for Laws and Regulations which, by terms of said Laws and Regulations are to be included in the Contract Documents. The failure to include in Article SC-18 any Law or Regulation applicable to the performance of the Work does not diminish CONTRACTOR’S responsibility to comply with all Laws and Regulations applicable to the performance of the work.”

SC-6.10. Add a new paragraph immediately after paragraph 6.10.A, which is to read as follows:

“SC-6.10.B OWNER is exempt from payment of sales and compensating use taxes of the State of New York and of cities and counties on all materials to be incorporated into the Work.

1. OWNER will furnish the required certificates of tax exemption to CONTRACTOR for use in the purchase of supplies and materials to be incorporated into the Work.
2. OWNER’S exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by CONTRACTOR, or to supplies or materials not incorporated into the Work.”

SC-6.15.A. Add a new paragraph immediately after paragraph 6.15.A, which is to read as follows:

“SC-6.15.B CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with all Laws and regulations. CONTRACTOR shall provide a centralized location for the maintenance of the material safety data sheets or other hazard communication information required to be made available by any employer on the Site. Location of the material safety data sheets or other hazard communication information shall be readily accessible to the employees of any employer on the Site.”

SC-7.01 Add a new paragraph immediately after Paragraph 7.01 which is to read as follows:

“SC-7.02 *Separate Contractor Claims*

- A. Should CONTRACTOR cause damage to the work or property of any other contractor at the Site, or should any claim arising out of CONTRACTOR’S performance of the Work be made by any other contractor against CONTRACTOR, OWNER, or ENGINEER, CONTRACTOR shall promptly settle with such other contractor by agreement, or otherwise resolve the dispute by arbitration or at law.
- B. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, and the officer, directors, partners, employees, agents, and other consultants or subcontractors of each and any of them from and against all claims, costs, losses and damages (including but not limited to, all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising directly, indirectly, or consequentially out of or relating to any claim or action, legal or equitable, brought by any other contractor against OWNER, ENGINEER, to the extent based upon CONTRACTOR’S performance of the Work.



- C. Should another contractor cause damage to the Work or property of CONTRACTOR at the Site or should the performance of work by any other contractor give rise to any other claim, CONTRACTOR shall not institute any action, legal or equitable, against OWNER, ENGINEER, or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from OWNER, ENGINEER, on account of any such damage or claim.
- D. If CONTRACTOR is delayed at any time in performing or furnishing Work by any act or neglect of another contractor and OWNER and CONTRACTOR are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, CONTRACTOR may make a claim for an extension of time in accordance with paragraph 10.05. Notwithstanding any other provision of the Contract Documents, an extension of the Contract Times shall be CONTRACTOR'S sole and exclusive remedy with respect to OWNER, ENGINEER, for any delay, disruption, interference or hindrance caused by any other contractor."

SC-9.03 Add a new paragraph immediately after paragraph 9.03.A which is to read as follows:

"SC-9.03.B. Resident Project Representative (RPR) will be OWNER'S agent at the Site, will act as directed by and under the supervision of OWNER, and will confer with OWNER AND ENGINEER regarding RPR's actions. RPR's dealings in matters pertaining to the on-site Work shall in general be with OWNER and CONTRACTOR keeping ENGINEER advised as necessary. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of CONTRACTOR."

SC-13.07 Modify paragraphs 13.07.A. and C. by changing the words "one year" in the first line to "two years".

SC-14.02.A. Add a new paragraph immediately after paragraph 14.02.A.3. which is to read as follows:

"4. Each Application for Payment shall be accompanied by a copy of the certified payroll record."

SC-14.07.A. Add a new paragraph immediately after paragraph 14.07.A.3. which is to read as follows:

"4. The Final Application for Payment shall be accompanied by a copy of the certified payroll record."

SC-14.07.A.2 Modify paragraph 14.07.A.2 by changing the words "subparagraph 5.04.B.7" to "SC-5.04".

SC-17.06 Add new paragraphs immediately after paragraph 17.06,A. which are to read as follows:

“ARTICLE SC-18 - STATUTORY REQUIREMENTS

SC-18.01 This Article contains portions of certain Laws or Regulations which, by provision of Law or Regulations, are required to be included in the Contract Documents. The material included in this Article may not be complete or current. CONTRACTOR’S obligation to comply with all Laws and Regulations applicable to the Work is set forth in paragraph 6.09 of the General Conditions.

SC-18.02 Non-Discrimination in Employment:

A. During the performance of this contract, CONTRACTOR agrees as follows:

1. CONTRACTOR will not discriminate against any employee or applicant for employment because of race, creed, color, or national origin, and will take affirmative action to insure that they are afforded equal employment opportunities without discrimination because of race, creed, color or national origin. Such action shall be taken with reference but not limited to: recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff or termination, rates of pay or other forms of compensation, and selection for training or retraining, including apprenticeship and on-the-job training.
2. CONTRACTOR will send to each labor union or representative of workers with which he has or is bound by a collective bargaining or other agreement or understanding, a notice, to be provided by the State Commission for Human Rights, advising such labor union or representative of the CONTRACTOR’S agreement under clauses 1. through 8. hereinafter called “non-discrimination clauses”. If the CONTRACTOR was directed to do so by the OWNER as part of the Bid or negotiation of this contract, CONTRACTOR shall request labor union or representative to furnish him with a written statement that such labor union or representative will not discriminate because of race, creed, color or national origin and that such labor union or representative either will affirmatively cooperate within the limits of its legal and contractual authority, in the implementation of the policy and provisions of these non-discrimination clauses or that it consents and agrees that recruitment, employment, and the terms and conditions of employment under this contract shall be in accordance with the purposes and provisions of these non-discrimination clauses. If such labor union or representative fails or refuses to comply with such a request, that it furnish such a statement, CONTRACTOR shall promptly notify the State Commission for Human Rights of such failure or refusal.
3. CONTRACTOR will post and keep posted in conspicuous places, available to employees and applicants for employment, notices to be provided by the State Commission for Human Rights setting forth the substance of the provisions of clauses 1. through 2. and such provisions of the State’s Laws against discrimination as the State Commission for Human Rights shall determine.
4. CONTRACTOR will state, in all solicitations or advertisements for employees placed by or on behalf of CONTRACTOR, that all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color or national origin.

5. CONTRACTOR will comply with the provisions of the Executive Law, Human Rights Law, Article 15, will furnish all information and reports deemed necessary by the State Commission for Human Rights under these non-discrimination clauses and such sections of the Executive Law, and will permit access to his books, records and accounts by the State Commission for Human Rights, the Attorney General, District Commissioner of Housing and Community Renewal and the Industrial Commission for purposes of investigation to ascertain compliance with these non-discrimination clauses of the Executive Law, Human Rights Law, Article 15.
6. This contract may be forthwith canceled, terminated or suspended, in whole or in part, by the OWNER upon the basis of a finding made by the State Commission for Human Rights that CONTRACTOR has not complied with these non-discrimination clauses, and CONTRACTOR may be declared ineligible for future contracts made by or on behalf of the State or a public authority or agency of the State or housing authority, or an urban renewal agency, or contracts requiring the approval of the Commissioner of Housing and Community Renewal, until he has satisfied the State Commission for Human Rights after conciliation efforts by the Commission have failed to achieve compliance with these non-discrimination clauses and after a verified complaint has been filed with the Commission, notice thereof has been given to CONTRACTOR and an opportunity has been afforded him to be heard publicly before three members of the Commission. Such sanctions may be imposed and remedies invoked independently of or in addition to sanctions and remedies otherwise provided by law.
7. If this contract is canceled or terminated under clause 6., in addition to other rights of the OWNER provided in this contract upon its breach by CONTRACTOR, CONTRACTOR will hold the OWNER harmless against any additional expenses or costs incurred by the OWNER in completing the Work or in purchasing the services, materials, equipment or supplies contemplated by this contract, and the OWNER may withhold payments from CONTRACTOR in an amount sufficient for this purpose and recourse may be had against the surety on the Performance Bond if necessary.
8. CONTRACTOR will include the provisions of clauses 1. through 2. in every subcontract or purchase order altered only to reflect the proper identity of the parties in such a manner that such provisions will be binding upon each Subcontractor or vendor as to operations to be performed within the State of New York. CONTRACTOR will take such actions in enforcing such provisions of such subcontract or purchase order as the OWNER may direct, including sanctions or remedies for non-compliance. If CONTRACTOR becomes involved in or is threatened with litigation with a Subcontractor or vendor as a result of such direction by the OWNER, the CONTRACTOR shall promptly so notify the Attorney General, requesting him to intervene and to protect the interest of the State of New York.

SC-18.03 Affirmative Action Requirements:

- A. During the performance of this Contract, the CONTRACTOR agrees that it will abide by and will require its subcontractors to abide by the AUTHORITY'S Affirmative Action Requirements and Women and Minority Business Enterprise Policy, as set forth in the attached Appendix A and hereby made a part of these General Conditions.

SC-18.04 Prevailing Rate Schedule:

- A. The labor on this contract shall be performed in accordance with the requirements of Article 8 (Sections 220-223) of the New York State Labor Law. The supplements to be provided and wages to be paid to workers, laborers and mechanics employed on this contract, determined pursuant to Section 220 of the Labor Law, are set forth in Appendix C, Prevailing Rate Schedule, attached to and hereby made a part of these General Conditions.
- B. CONTRACTOR shall note that the wage rates and supplemental benefits shown in the attached schedules are subject to change. The wage rates and supplemental benefits to be paid and provided shall be those prevailing at the time the contract is being performed.

SC-18.05 Payments to Subcontractors:

- A. In accordance with N.Y. State General Municipal Law, Section 106-b, CONTRACTOR shall:
  - 1. Within fifteen calendar days of the receipt of any payment from the OWNER, the CONTRACTOR shall pay each of his Subcontractors and materialmen the proceeds from the payment representing the value of the work performed and/or materials furnished by the Subcontractor and/or materialman and reflecting the percentage of the Subcontractor's work completed or the materialman's material supplied in the requisition approved by the OWNER and based upon the actual value of the subcontract or purchase order less an amount necessary to satisfy any claims, liens or judgments against the Subcontractor or materialman which have not been suitably discharged and less any retained amount as hereafter described. The CONTRACTOR shall retain not more than five per centum of each payment to the Subcontractor and/or materialman except that the CONTRACTOR may retain in excess of five per centum but not more than ten per centum of each payment to the Subcontractor provided that prior to entering into a subcontract with the CONTRACTOR, the Subcontractor is unable or unwilling to provide a Performance bond and a Labor and Material bond both in the full amount of the subcontract at the request of the CONTRACTOR. However, the CONTRACTOR shall retain nothing from those payments representing proceeds owed the Subcontractor and/or materialman from OWNER'S payments to the CONTRACTOR for the remaining amounts of the contract balance after the work or portions thereof are substantially complete. Within fifteen calendar days of the receipt of payment from the CONTRACTOR, the Subcontractor and/or materialman shall pay each of his Subcontractors and materialmen in the same manner as the CONTRACTOR has paid the Subcontractor. Nothing provided herein shall create any obligation on the part of the OWNER to pay or to see to the payment of any moneys to any Subcontractor or materialman from any CONTRACTOR nor shall anything provided herein serve to create any relationship in contract or otherwise, implied or expressed, between the Subcontractor or materialman and the OWNER.

SC-18.06 NOT USED

SC-18.07 NOT USED

END OF SUPPLEMENTARY CONDITIONS

## SECTION 01100

### SUMMARY OF WORK

#### PART 1 GENERAL

##### 1.01 THIS SECTION INCLUDES:

- A. Summary of Work Covered by Contractor Document
- B. Work Locations
- C. Summary of Work by Owner in Support of the Project
- D. Sequence of Construction
- E. Ongoing Projects
- F. Contractor's Use of Premises
- G. Regulatory Requirements

##### 1.02 SUMMARY OF THE WORK COVERED BY THE CONTRACT DOCUMENTS

- A. The work shall be constructed under one prime Contractor.
- B. Work of this Contract comprises general construction for replacing Erie County Water Authority's (ECWA) Supervisory Control and Data Acquisition (SCADA) system. The new SCADA System shall consist of new SCADA and Historian Servers and Operator Workstations, including new Human-Machine-Interface (HMI) software, new/upgraded RTUs, and shall utilize an existing IP radio-based remote communication system.
- C. HMI System Overview
  - 1. The HMI System at the Van de Water Plant consists of redundant virtual SCADA servers, redundant Historian Servers, and twelve (12) thin-client Operator Workstations.
  - 2. Operator Workstations will be located at the following locations:
    - Van de Water Plant Operations Building Control Room (3)
    - Service Center (2)
    - Sturgeon Point Plant Operations Building Control Room - *future*
    - SCADA Laptops (6)
  - 3. The HMI and Historian Servers, and Operator Workstations will be purchased by the Owner and staged in a new server room at the Van de Water Plant. A Development Server will be purchased by the Owner and shipped to the Contractor's facility for software development and testing.

4. GE Proficy iFix software will be utilized for the SCADA and Historian Servers and Operator Workstations. The following software shall be purchased and configured by the Contractor:
    - a. GE, Proficy iFIX & iPower
    - b. GE, DNP3 Driver
    - c. GE, iClient Thin-Terminal Services (10 clients)
    - d. GE, Proficy iHistorian (mirrored)
  5. The following software shall be purchased by the Contractor, but configured by the Owner:
    - a. GE, Workflow
  6. The following additional software shall be purchased by the Contractor and configured to function as an integral part of the Distribution SCADA System:
    - a. SyTech Inc., XLReporter
    - b. ACP, ThinManager
    - c. Specter Instrument, WIN911 PRO
  7. The Contractor shall utilize the Software Allowance for all software purchases. A preliminary list of the required software packages is provided in Section 409434. The list of software will be finalized after contract award.
  8. The Contractor shall configure the HMI System in accordance with the requirements outlined in the specifications.
  9. The Contractor shall stage the HMI System using the Development Server along with at least five (5) new RTU panels in their factory and conduct a comprehensive Factory Acceptance Test (FAT). Upon successful completion of the FAT, the Contractor shall then install the HMI System on the servers located at the Owner's facility.
- D. RTU Replacement/Upgrade Overview
1. New RTU backplates shall be provided and installed at the twenty (20) locations indicated in Table 1.
  2. The new RTU control panel shall be mounted in the existing wall-mounted enclosure after removing the existing back panel. The Contractor shall disconnect the field wires from terminal blocks on the existing RTU back panel and then reconnect them to terminal blocks on the new RTU control panel. The Contractor shall install wire tags on all field wiring, in accordance with ECWA's SCADA Standards.
  3. The new RTU control panel shall include a new backplate, Modicon M340 PLC with required I/O modules, associated terminal blocks, power supply, UPS, LAN switch, Operator Interface Terminal (OIT), disconnect switch, and various appurtenances. The existing batteries and MDS SD9 radio shall be retained and incorporated into the new RTU control panel.
  4. Existing RTU panels shall be upgraded as indicated in the drawings at the thirty-four (34) locations indicated in Table 2. Modifications shall consist of removing the existing HSQ processor and switch, providing and installing a new LAN Switch, providing and installing a new DNP3 communication module, and reconnecting communication cabling as appropriate.

5. The new and existing RTUs shall be programmed by the Contractor per the requirements outlined in the specification. The Contractor shall be responsible for the field testing and startup of all new and upgraded RTUs.

E. SCADA Remote Communications Network Overview

1. The SCADA Remote Communications Network consists of two separate radio networks. One network consists of a master MDS SD9 radio located at the Vukelic site communicating to 15 remote sites with remote SD9 radios. The Vukelic system utilizes a number of repeater sites and also includes a dedicated INET link to the Ball Pump Station and Tank Site.
2. A second network consists of two master MDS SD9 radios located at the Windom Tank site communicating to 38 remote sites with remote SD9 radios. The Windom system also utilizes a number of repeater sites and includes a direct Ethernet link to a number of PLCs and RTUs located at the Windom Site.
3. The radio system is existing, including all radios, antennas, and associated cabling, and all communication paths have been verified. The Contractor is responsible for reconnecting the new and existing M340 PLC's to the existing SD9 radios and establishing communications with the associated master radio. The existing RTUs communicate over the serial port on the SD9s and the new configuration will use the DNP's communications module over the Ethernet port.
4. An existing microwave radio link connects the Windom site with the Service Center site. In addition, there are existing WAN connections between the Service Center and Van de Water and between the Service Center and Sturgeon Point. The current WAN links consist of 100 MB leased fiber connections. ECWA has a project in design that will implement a high-speed (2 GB) microwave WAN with drops at their key locations. The construction schedule for the microwave project has not yet been finalized. If the microwave link to Van de Water has not been completed in time to support startup and testing of the new Distribution SCADA System, the existing leased fiber connection will be utilized. The Contractor can consider the WAN connections required to support the SCADA System as existing; the description has been provided here for information only.



### 1.03 WORK LOCATIONS

- A. The table below provides a list of the sites for which new RTU backplates are required.

*Table 1: New RTU Backplates*

	<i>Site #</i>	<i>Site Name</i>	<i>Service Area</i>
1	39	Benning Road Tank	Orchard Park
2	16	Castle Hill Tank	Orchard Park
3	38	Cole Road Tank	Orchard Park
4	33	Crestwood Tank	Eden
5	12	East & West Tank	Central
6	09	East Church Street Tank	Eden
7	30	Eden 4 Tank	Eden
8	24	Janice Street Tank	Hamburg
9	84	Kulp Road Tank	Eden
10	23	Long Street Tank	Hamburg
11	47	Marilla Tank	Lancaster
12	87	Newstead Tank	Lancaster
13	05	Pleasantview Tank	Central
14	18	Rice Hill Tank	Eden
15	07	Sandridge Tank	Lancaster
16	37	Scherff Road Tank	Orchard Park
17	88	Trevett Road Tank	Eden
18	36	Ward Road Tank	Orchard Park
19	01	Wehrle Tank	Central
20	82	Wohlheuter Tank	Orchard Park

- B. The table below provides a list of the sites for which the existing RTU panels shall be modified.

*Table 2: RTU Panel Modifications*

	<i>Site #</i>	<i>Site Name</i>	<i>Service Area</i>
1	52	Aurora Pump Station and Tank	Orchard Park
2	42	Ball Pump Station and Tank	Central
3	06	Broadway Pump Station and Tank	Lancaster
4	17	Center Street Pump Station and Tank	Orchard Park

	<i>Site #</i>	<i>Site Name</i>	<i>Service Area</i>
5	34	Chestnut Ridge Pump Station and Tank	Orchard Park
6	26	Clark Street Pump Station	Orchard Park
7	79	Colvin Blvd Pump Station & Tank	Tonawanda
8	15	East Aurora Pump Station and Tank	Orchard Park
9	83	East Hill Pump Station	Orchard Park
10	27	Eden 1 Pump Station	Eden
11	28	Eden 2 Pump Station and Tank	Eden
12	29	Eden 3 Pump Station and Tank	Eden
13	19	Ellis Road Pump Station	Orchard Park
14	43	Emery Pump Station and Tank	Orchard Park
15	35	Gartman Pump Station and Tank	Orchard Park
16	53	Griffin Mills Pump Station	Orchard Park
17	31	Guenther Pump Station and Tank	Central
18	25	Hamburg Pump Station	Hamburg
19	81	Harris Hill Pump Station	Lancaster
20	10	Horner Pump Station	Orchard Park
21	85	Jennings Road Pump Station	Eden
22	03	Jewett-Holmwood Pump Station	Orchard Park
23	11	Keller Road Pump Station	Eden
24	21	Lakeview Pump Station	Hamburg
25	13	Leydecker Pump Station	Central
26	46	Marilla Pump Station	Lancaster
27	32	North Boston Pump Station	Eden
28	02	Pine Hill Pump Station and Tank	Central
29	89	Shadagee Road Pump Station	Hamburg
30	80	Trevett Road Pump Station	Eden
31	78	Veterans Park Pump Station and Tank	Tonawanda
32	22	Violet Street Pump Station and Tank	Eden
33	86	William Street Pump Station	Lancaster
34	08	Windom Pump Station and Tank	Central

#### 1.04 SUMMARY OF WORK BY OWNER IN SUPPORT OF THE PROJECT

- A. Owner will decommission existing HSQ HMI screens, alarms, etc. as stations/sites are brought online. Contractor shall coordinate with the Owner to ensure Operations knows which system is monitoring/controlling a station or site.
- B. Owner will configure the radio network, WAN and LAN for the project with assistance from the Contractor.
- C. The Owner will provide IP addressing for the project.
- D. Owner will configure GE Workflow.

#### 1.05 SEQUENCE OF CONSTRUCTION

- A. General
  - 1. The Work generally shall be constructed without disruption to the normal operation of the Authority, except as noted in Section 01311, and as otherwise approved by the OWNER.
  - 2. It is hereby understood that Time is of Essence in performing all work, but especially in the time that service is interrupted to the customer.
  - 3. The Contractor is responsible for the sequencing of activities as necessary to satisfactorily complete all project Work within the Contract period. The Contractor's sequencing, cutovers and shutdowns plans shall be presented in the Progress Schedule.
- B. Constraints
  - 1. No more than five (5) remote stations shall be constructed at a time and only one remote station shall be commissioned at a time.
  - 2. The Contractor shall schedule his work such that the remote stations associated with a particular Service Area are completed or near completion before starting work on stations associated with another Service Area.
  - 3. Only Owner licensed operators may operate process equipment at the facilities

#### 1.06 ONGOING PROJECTS

- A. During construction, the Contractor is advised that there are other on-going and future Owner projects that will require extensive coordination to minimize any scheduling impact on this and other projects. At a minimum, the Contractor shall be required to review, every quarter, the construction schedule of other projects and include a line item in the monthly project meeting agenda to address any inter-project coordination concerns. The Contractor's project schedule shall be updated monthly taking into account other project coordination concerns. The project is being constructed concurrently with at least the following projects:
  - 1. ECWA Enterprise WAN Implementation
  - 2. Pine Hill Pump Station and Tank Rehabilitation

## 1.07 CONTRACTOR'S USE OF PREMISES

- A. CONTRACTOR'S use of the premises shall be confined to the areas shown.
- B. The full use of the premises for storage, the operations of workmen and all other required construction activities will not be available to the CONTRACTOR.
- C. CONTRACTOR must share use of the premises with the OWNER and other contractors specified in Article 1.03.
- D. CONTRACTOR shall:
  - 1. Assume full responsibility for protection and safekeeping of products stored on or off premises.
  - 2. Move stored products that interfere with the operations of OWNER or other contractor.
  - 3. Obtain and pay for all additional storage or work areas required for his operations.
  - 4. Obtain and pay for all permits and satisfy all permit requirements.
  - 5. Comply with all requirements defined in other specification sections.
- E. Limits on CONTRACTOR'S use of site are:
  - 1. OWNER will designate the area available for field offices.
- F. See General Conditions for additional requirements.

## 1.08 REGULATORY REQUIREMENTS

- A. Comply with all Federal, State, and local laws, regulations, codes, and ordinances applicable to the Work.
- B. Obtain all required permits, post required bonds, and pay all required fees.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01140

USE OF OWNER'S FACILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. CONTRACTOR may use existing facilities or equipment in the new Work for construction purposes only if the OWNER'S written permission is obtained.
- B. Restore existing facilities and equipment used for temporary purposes to original condition in a manner satisfactory to OWNER.
- C. CONTRACTOR shall assume full responsibility for any damage that may result to existing or new facilities or equipment used for construction purposes and shall repair or replace any damaged facilities or equipment at CONTRACTOR'S cost.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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## SECTION 01210

### ALLOWANCES

#### PART 1 - GENERAL

##### 1.01 SCOPE

- A. This Section includes administrative and procedural requirements governing the following types of allowances:
  - 1. Cash allowances.
  - 2. Contingency allowances.
- B. Authorization of Allowances:
  - 1. Work that will be done and paid under an allowance will be authorized in OWNER'S written instruction to CONTRACTOR.
  - 2. Do not provide Work under an allowance without written authorization of OWNER.

##### 1.02 CASH ALLOWANCES

- A. Cash allowances are stipulated amounts for purchase of products, systems, or services. In addition to this Section, refer to General Conditions, as may be modified by the Supplementary Conditions; and individual Specification Sections for CONTRACTOR'S costs to be covered by allowances, and CONTRACTOR'S costs, including overhead and profit, to be included elsewhere in the Contract Price.
- B. At earliest practical date after Notice to Proceed, advise ENGINEER of date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- C. Consult with ENGINEER in selecting suppliers and obtain proposals for price and time from selected suppliers. Submit proposals to ENGINEER along with recommendations relevant to furnishing and installing products covered in the allowance.
- D. Purchase products or systems from suppliers selected by ENGINEER.
- E. Submit invoices or delivery slips to show actual cost and quantity of products or systems delivered to Site and used in fulfilling each allowance.
- F. Properly dispose of unused products and systems purchased under cash allowance.
- G. For each allowance, submit to ENGINEER a Change Order proposal to adjust Contract Price for difference between specified allowance amount and actual cost. Prepare Change Order proposal in accordance with General Conditions as may be modified by the Supplementary Conditions, except that payment within limit of a



cash allowance shall exclude cost of bond and insurance premiums. No subcontractor markup is allowed under allowance work.

### 1.03 CONTINGENCY ALLOWANCE

- A. Contingency allowances are stipulated amounts available as reserve for sole use by OWNER to cover unanticipated costs.
- B. When authorization of Work under contingency allowance is contemplated by OWNER for a defined scope, submit Change Order proposal to ENGINEER. Prepare Change Order proposal in accordance with the General Conditions as may be modified by the Supplementary Conditions, except that payments within limit of contingency allowance shall exclude cost of bond and insurance premiums.
- C. For each allowance, submit to ENGINEER a Change Order proposal to adjust Contract Price for difference between specified allowance amount and actual cost. Prepare Change Order in accordance with General Conditions as may be modified by the Supplementary Conditions, except that payment within limit of a cash allowance shall exclude cost of bond and insurance premiums.

### PART 2 – PRODUCTS (NOT USED)

### PART 3 - EXECUTION

#### 3.01 SCHEDULE OF ALLOWANCES

- A. Cash Allowances: Include the following stipulated cash allowances
  - 1. \$200,000.00 for Software Licenses as defined by Section 409434
  - 2. \$10,000.00 for Vendor Training (to be defined by OWNER after contract award)
- B. Contingency Allowances: Include a stipulated contingency allowance of \$50,000.00 for additional software development in accordance with the OWNER'S instruction to perform miscellaneous work.

END OF SECTION

## SECTION 01270

### MEASUREMENT AND PAYMENT

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. The items listed below beginning with Article 1.05, refer to and are the same pay items listed in the Bid Form. They constitute all of the pay items for the completion of the Work. No direct or separate payment will be made for providing miscellaneous temporary or accessory works, plant, services, ENGINEER'S and/or CONTRACTOR'S field offices, layout surveys, job signs, sanitary requirements, permits, testing, safety devices, shop drawings and samples, approval and record drawings, water supplies, power, maintaining traffic, removal of waste, watchmen, bonds, insurance, test pits and all other requirements of the General Conditions, Supplementary Conditions, and the General Requirements. Compensation for all such services, things and materials shall be included in the prices stipulated for the lump sum and unit price pay items listed herein.
- B. The lump sum and unit bid prices will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR'S overhead and profit for each separately identified item.
- C. The CONTRACTOR shall furnish all labor, materials, tools, equipment, services, and all appurtenances necessary to perform all work required, at the unit or lump sum prices for the items listed in the Bidder's Proposal. Each bid item shall include all costs to perform all work to complete each item.

##### 1.02 NOT USED

##### 1.03 NOT USED

##### 1.04 RELATED PROVISIONS

- A. Payments to CONTRACTOR: Refer to General Conditions and Agreement.
- B. Changes in Contract Price: General Conditions.
- C. Schedule of Values: Section 01290.

## 1.05 BID ITEMS

- A. ITEM 1 – HMI Programming in accordance with HMI Style Guide.
  - 1. Work Included:
    - a. This item includes all labor, materials and incidentals required to develop the HMI graphics, alarm screens, reports, trends, etc.
  - 2. Measurement
    - a. Approved submittals.
  - 3. Payment:
    - a. Percentage complete.
  
- B. ITEM 2 – Replacement of twenty (20) RTU Control Panel, including back plate, PLC, power supply, UPS, Ethernet switch, OIT, and all required appurtenances.
  - 1. Work Included:
    - a. This item includes all labor, materials and incidentals required to furnish twenty (20) RTU control panels, including back plate, PLC, power supply, UPS, Ethernet switch, OIT, and all required appurtenances for sites shown on Drawings E-02 and E-03.
  - 2. Measurement
    - a. Quantity of RTU control panels furnished.
  - 3. Payment:
    - a. Percentage of control panels furnished.
  
- C. ITEM 3 – Installation of twenty (20) Replacement RTU Control Panel, including field testing, startup, and cutover.
  - 1. Work Included:
    - a. This item includes all labor, materials and incidentals required to install twenty (20) RTU control panels, including field testing, startup, and cutover for sites as described on Drawings E-02 and E-03.
  - 2. Measurement
    - a. Quantity of RTU control panels installed.
  - 3. Payment:
    - a. Percentage of RTU control panels installed.
  
- D. ITEM 4 – Upgrades to thirty-four (34) existing RTUs, as described on Drawing E-04, including field testing and documentation.
  - 1. Work Included:
    - a. This item includes all labor, materials and incidentals required to upgrade thirty-four (34) existing RTU control panels as described on Drawing E-04, including field testing and documentation
  - 2. Measurement
    - a. Quantity of RTU control panels upgraded.
  - 3. Payment:
    - a. Percentage of RTU control panels upgraded.

- E. ITEM 5 – Conducting workshops and meetings as described in Section 409000,
  - 1. Work Included:
    - a. This item includes all labor, materials and incidentals required to conduct workshops and meetings as described in Section 40900 including:
      - 1) Tag Naming Convention Workshop
      - 2) P&ID and PCN Review Workshops
      - 3) HMI Graphics/Alarming and OIT Graphics Review Workshops
      - 4) RTU Programming Workshops
  - 2. Measurement
    - a. Quantity of workshops completed.
  - 3. Payment:
    - a. Percentage complete.
- F. ITEM 6 – RTU Programming in accordance with Section 409650, including field testing and documentation,
  - 1. Work Included:
    - a. This item includes all labor, materials and incidentals required for RTU programming in accordance with section 409650 including field testing and documentation.
  - 2. Measurement
    - a. Quantity of site programs completed
  - 3. Payment:
    - a. Percentage complete
- G. ITEM 7 – Training per Section 409000.
  - 1. Work Included:
    - a. This item includes all labor, materials and incidentals required for training per Section 409000.
  - 2. Measurement:
    - a. Work Completed.
  - 3. Payment:
    - a. Lump sum.
- H. ITEM 8 – System documentation per Section 409000.
  - 1. Work Included:
    - a. This item includes all labor, materials and incidentals required for system documentation per Section 409000.
  - 2. Measurement:
    - a. Work Completed.
  - 3. Payment:
    - a. Lump sum.

- I. ITEM 9 – Factory Acceptance Test
  - 1. Work Included:
    - a. This item includes all labor, materials and incidentals required for Factory Acceptance Testing.
  - 2. Measurement:
    - a. Work Completed.
  - 3. Payment:
    - a. Lump sum.
  
- J. ITEM 10 – Site Acceptance Test
  - 1. Work Included:
    - a. This item includes all labor, materials and incidentals required for site acceptance testing
  - 2. Measurement:
    - a. Quantity of sites tested
  - 3. Payment:
    - a. Percent complete
  
- A. ITEM 11 – Spares per Section 409513,
  - 4. Work Included:
    - a. This item includes all labor, materials and incidentals to provide spares as identified in section 409513.
  - 5. Measurement:
    - a. All spares provided
  - 6. Payment:
    - a. Lump sum
  
- K. ITEM 12 – Warranty
  - 1. Work Included:
    - a. This item includes all labor, materials and incidentals required for warranty work.
  - 2. Measurement:
    - a. Warranty Plan submitted.
  - 3. Payment:
    - a. Lump sum.
  
- L. ITEM 13 – Bonds, Insurance, Permits.
  - 1. Work Included:
    - a. This item includes all labor, materials, and incidentals required for bonds, insurance and permits.
  - 2. Measurement:
    - a. Proof of permits, insurance, and bonds.
  - 3. Payment:
    - a. Cost of Permits
    - b. Cost of Insurance

c. Cost of Bonds.

M. ITEM 14 – Other Items

1. Work Included:
  - a. This item includes work and materials not specifically called out under other items or not include in the cost for other items.
2. Measurement
  - a. Percentage of work completed
3. Payment:
  - a. Materials and labor cost.

N. ITEM 15 – Cash Allowances.

1. 15A For HMI Software as specified in Section 409434.
  - a. Work Included:
    - 1) This item includes all labor, materials and incidentals required for the purchase of HMI software as specified in Section 409434.
  - b. Measurement:
    - 1) Software has been purchased
  - c. Payment:
    - 1) Actual Cost.
2. 15B For Vendor Training as specified in 409000
  - a. Work Included:
    - 1) This item includes all labor, materials and incidentals required
  - b. Measurement:
    - 1) Training has been completed
  - c. Payment:
    - 1) Actual Cost.

O. ITEM 16: For Contingency Allowance.

- a. Work Included:
  - 1) This item includes all labor, materials, and incidentals required for work directed by the Owner.
- b. Measurement:
  - 1) As work is performed.
- c. Payment.
  - 1) Labor, materials, and incidental costs.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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## SECTION 01290

### SCHEDULE OF VALUES

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. The Schedule of Values is an itemized list that establishes the value or cost of each part of the Work. It shall be used as the basis for preparing progress payments and may be used as a basis for negotiations concerning additional work or credits, which may arise during the construction. Quantities and unit prices may be included in the schedule when approved by or required by the ENGINEER.

##### 1.02 PREPARATION

- A. Schedule shall show breakdown of labor, materials, equipment, and other costs used in preparation of the Bid.
- B. Costs shall be in sufficient detail to indicate separate amounts for each Section of the Specifications.
- C. CONTRACTOR may include an item for bond, insurance, temporary facilities and job mobilization on lump sum project only. This item will be included for payment at a rate of 25 percent per month for the first four months.
- D. Schedule of Values shall be prepared on 8 1/2-inch by 11-inch white paper.
- E. Use Table of Contents of the Specifications as basis for Schedule format and identify each item with number and title in the Table of Contents. List sub-items of major products or systems as appropriate or when requested by ENGINEER.
- F. When requested by ENGINEER, support values with data that will substantiate their correctness.
- G. The sum of the individual values shown on the Schedule of Values must equal the total Contract Price.
- H. Each item shall include a directly proportional amount of the CONTRACTOR'S overhead and profit.
- I. Schedule shall show the purchase and delivery costs for materials and equipment that the CONTRACTOR anticipates he shall request payment for prior to their installation.



1.03 SUBMITTAL

- A. Submit two copies of Schedule to ENGINEER for approval at least 20 days prior to submitting first application for a progress payment but no later than 10 days after date of execution of agreement. After review by ENGINEER, revise and resubmit Schedule as required until it is approved.

PART 2 - PRODUCTS (NOT USED)

, PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01310

PROJECT COORDINATION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. As more fully set forth in Article 6 of the General Conditions, CONTRACTOR shall be solely responsible for coordination of all of the Work. He shall supervise, direct and cooperate fully with all Subcontractors, manufacturers, fabricators, suppliers, distributors, installers, testing agencies and all others whose services, materials or equipment are required to ensure completion of the Work within the Contract Time.
- B. As more fully set forth in Article 7 of the General Conditions, CONTRACTOR shall cooperate with and coordinate his Work with the work of any other contractor, utility service company or OWNER'S employees performing additional work related to the Project at the site.
- C. CONTRACTOR shall not be responsible for damage done by contractors not under his jurisdiction. He will not be liable for any such loss or damage unless it is through the negligence of CONTRACTOR.
- D. CONTRACTOR shall maintain sufficient competent personnel, drafting equipment and supplies at the site for the purpose of preparing layout and coordination drawings. These drawings shall supplement the contract documents, and the Shop Drawings, as necessary to correlate the work of various trades. Where such drawings are to be prepared by the mechanical, electrical, or plumbing Subcontractors, CONTRACTOR will ensure that each Subcontractor maintains the required personnel and facilities at the site.
- E. CONTRACTOR shall also coordinate his Work with the work of others to assure compliance with schedules.
- F. CONTRACTOR shall attend and participate in all project coordination or progress meetings and report on the progress of all Work and compliance with schedules.

PART 2 - PRODUCT (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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## SECTION 01311

### COORDINATION WITH OWNER'S OPERATIONS

#### 1.01 SUMMARY

- A. The intent of this specification is to have the Contractor schedule and perform the cutover work in a manner such that the Owner can maintain service in continuous dependable operation and meet all regulatory requirements. The Contractor shall adhere to the constraints listed in this Section.
- B. The Contractor shall:
  - 1. Keep existing facilities in operation unless otherwise specifically permitted in these specifications or approved by the Owner.
  - 2. Perform all construction activities so as to avoid interference with operations of the facility and the work of others.
  - 3. Start-up the new control systems in their respective facilities in a controlled, systematic order as outlined in this section and other related sections.

#### 1.02 DEFINITIONS

- A. Cutover: Cutover is defined as the time beginning when the Contractor transitions from the existing controls to the new controls and ending when the new controls are successfully tested as defined in Section 409000.

#### 1.03 GENERAL CONSTRAINTS

- A. All cutover operations shall be approved by the Owner. All cutover operations shall be coordinated with and scheduled at times suitable to the Owner.
  - 1. Owner Operations field support is limited to Tuesdays, Wednesdays, and Thursdays (excluding Owner observed holidays) only.
  - 2. All site cutovers that involve station shutdown shall be between the hours of 8 a.m. and 3 p.m. unless otherwise noted or approved.
  - 3. Each site must be remotely monitored and operable by 3:30 p.m. on any given day.
- B. For remote stations that have special operational requirements and constraints, the Contractor shall comply with those special requirements and work around the constraints to ensure minimal operational impacts during cutover.
- C. Shop drawing and O&M submittals and appurtenance materials required for the cutover work shall be reviewed and approved by the Engineer prior to scheduling of the cutover.
- D. Cutovers shall not begin until all required materials are on-hand and ready for installation and a written Plan of Operation has been submitted and approved by the Owner.

- E. At a time approved by the Owner, the cutover period shall commence and the Contractor shall proceed with the work continuously, start to finish, unless otherwise approved in the cutover plan, until the work is completed and the system is tested and ready for operation. If the Contractor has not completed all required work before the specific cutover period was to end the Owner may stop the cutover and
  - 1. Immediately place the existing or temporary control system back in service or
  - 2. Require the Contractor to remain on site to monitor the system and assist the Owner in operating the facility until the cutover can be continued and completed.
- F. The Owner reserves the right to cancel scheduled cutovers if conditions warrant.
- G. Interim Record Drawings for both temporary and permanent installation shall be submitted for review and approved by Owner prior to a cutover.
- H. Owner operators and maintenance staff shall be trained on the new controls immediately following completion of the cutover. Training shall be conducted onsite and shall include review of the procedures outline in the O&M manual for the site.

#### 1.04 TEMPORARY CONTROLS AND ALARMS

- A. Temporary controls and Alarms shall be required when manual operation of a stations is expected to be longer than 1 day. Critical alarms shall be wired to the existing SCADA System.

#### 1.05 SUBMITTALS

- A. Submit detailed information for each cutover described herein and all others required to complete the work. Submittal shall include detailed description of cutover, detailed breakdown of work to be completed prior to and during cutover, materials required and availability, proposed manpower, proposed method of protecting equipment, and equipment that will require operation by the Owner and any other details to adequately describe the proposed cutover.
- B. Submittal must be approved before cutover can begin. Submit information at least 21 days prior to start of proposed cutover.

### PART 2 PRODUCTS (NOT USED)

### PART 3 EXECUTION

#### 3.01 DESCRIPTION

- A. CONTRACTOR shall carry out all operations to avoid interference with the operations of the existing facilities.
- B. The CONTRACTOR shall not have exclusive possession of the sites of the work to be done under this contract.

- C. In the performance of the work, the CONTRACTOR shall schedule and cooperate fully with the OWNER and other Contractors, affording them facilities for the performance of their work even though it interferes with his own.

END OF SECTION

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## SECTION 01312

### PRECONSTRUCTION CONFERENCE

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Date, Time, and Location: Conference will be held after execution of the Agreement and before construction is started at the site. ENGINEER will fix the date, time and location of the meeting in accordance with the General Conditions.
- B. ENGINEER shall prepare agenda, preside at meeting, and prepare and distribute a transcript of proceedings to all parties.
- C. CONTRACTOR(S) shall provide data required, contribute appropriate items for discussion, and be prepared to discuss all items on agenda.
- D. CONTRACTOR shall prepare and distribute a preliminary construction schedule.

##### 1.02 REQUIRED ATTENDANCE

- A. CONTRACTOR(S) and major Subcontractors.
- B. OWNER'S representative.
- C. ENGINEER.
- D. Representatives of governmental agencies having any degree of control or responsibility, if available.

##### 1.03 AGENDA

- A. Agenda will include, but will not necessarily be limited to, the following:
  - 1. Designation of responsible personnel.
  - 2. Subcontractors.
  - 3. Coordination with other contractors.
  - 4. Construction schedule.
  - 5. Review preliminary construction schedule.
  - 6. Processing of Shop Drawings.
  - 7. Schedule of Shop Drawing submittals.
  - 8. Processing of Field Orders and Change Orders.
  - 9. Requirements for copies of Contract Documents.
  - 10. Insurance in force.
  - 11. Schedule of Values.
  - 12. Processing of progress payments.
  - 13. Cash flow.



14. Use of premises.
15. CONTRACTOR(S) responsibility for safety and first aid procedures.
16. Security.
17. Housekeeping.
18. Field Offices.
19. Record Drawings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01313  
PROGRESS MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Date and Time:
  - 1. Regular monthly meetings: As mutually agreed upon by OWNER, ENGINEER, and CONTRACTOR.
  - 2. Other Meetings: On call.
  - 3. Final Inspection on project completion.
- B. Place: OWNER'S Conference Room office at Project site or other mutually agreed upon location.
- C. ENGINEER shall prepare agenda, preside at meetings, and prepare and distribute a transcript of proceedings to all parties.
- D. CONTRACTOR shall provide data required and be prepared to discuss all items on agenda.

1.02 MINIMUM ATTENDANCE

- A. CONTRACTOR:
  - 1. When needed for the discussion of a particular agenda item, CONTRACTOR shall require representatives of Subcontractors or suppliers to attend a meeting.
- B. ENGINEER.
- C. OWNER'S representative, if required.
- D. Others as appropriate.
- E. Representatives present for each party shall be authorized to act on their behalf.

1.03 AGENDA

- A. Agenda will include, but will not necessarily be limited to, the following:
  - 1. Transcript of previous meeting.
  - 2. Progress since last meeting.
  - 3. Planned progress for next period.
  - 4. Problems, conflicts and observations.
  - 5. Change Orders.
  - 6. Status of Shop Drawings.
  - 7. Quality standards and control.

8. Schedules, including off-site fabrication and delivery schedules. Corrective measures, if required.
9. Coordination between parties.
10. Safety concerns.
11. Other business.

#### 1.04 FINAL INSPECTION

- A. A Final Inspection shall not be scheduled until the ENGINEER is satisfied that all requirements of the contract have been met and the Work is acceptable.
- B. ENGINEER shall schedule final inspection at least 72 hours in advance, and shall notify CONTRACTOR and OWNER.
- C. The ENGINEER, OWNER and CONTRACTOR shall be present during the final inspection.
- D. CONTRACTOR shall provide sufficient manpower during final inspection.
- E. CONTRACTOR shall furnish necessary equipment to demonstrate the new Work to ENGINEER and OWNER for approval.
- F. ENGINEER shall itemize deficiencies and provide list to OWNER and CONTRACTOR.
- G. CONTRACTOR shall rectify any items identified by ENGINEER prior to final payment.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01320

SCHEDULE OF COMPLETION

PART 1 GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall perform the Work to achieve the Contract Times and specified completion requirements.
2. This Section describes selected Milestones and completion requirements and is not intended to describe all the work or its constraints, interrelationships, or sequential requirements.

1.02 SCHEDULE OF COMPLETION

A. The schedule for Completion shall be as follows:

Item	Description	Contract Time
Milestone M1	Work completed shall include: -Pre-installation activities as defined in Section 40900. - P&ID Drawings -Site Specific Process Control Narratives -HMI Graphic Displays -RTU Function Blocks -Submittals as defined in Section 409513	120 days from Notice to Proceed
Milestone M2	Factory Acceptance Testing completed	180 days from Notice to Proceed
Milestone M3	Substantial Completion	470 days from Notice to Proceed

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

END OF SECTION

## SECTION 01321

### CONSTRUCTION SCHEDULES

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Provide construction schedule, which conforms to the requirements below, unless otherwise approved by ENGINEER.
- B. Update schedules every month and for progress meetings unless otherwise specified or directed by ENGINEER.

##### 1.02 CONTENT

- A. Shop Drawing submittal dates and required approval dates.
- B. Product delivery dates.
- C. Factory and field testing dates.
- D. Dates for beginning and completing each phase of the Work by activity.

##### 1.03 FORMAT

- A. Schedule will be created on computer using Microsoft Project, latest version.
- B. Type: Horizontal bar chart.
- C. Sheet Size: 8<sup>1</sup>/<sub>2</sub>" x 11".
- D. Time Scale: Indicate first date in each work week.
- E. Organization:
  - 1. Group Shop Drawing submittals and reviews into a separate subschedule.
  - 2. Group product deliveries into a separate subschedule.
  - 3. Group construction work into a separate subschedule by activity.
  - 4. Group critical activities which dictate the rate of progress into a separate subschedule.
- F. Provide electronic copies of project schedule to ENGINEER via email as requested.

##### 1.04 SUBMITTALS

- A. Submit initial schedule at least 20 days prior to submitting first application for a progress payment but no later than 10 days after date of execution of Agreement.

Subsequent schedule updates shall be submitted concurrently with monthly payment applications.

- B. Submit updated schedules at progress meetings. If a schedule remains unchanged from one period to the next, submit a written notice to that effect. Updated schedules shall show progress completed to date.
- C. Submit schedules electronically to ENGINEER. Provide both native MS Project (.mpp) and .pdf formats.
- D. Attach a letter of transmittal to each submittal and include the following information in the letter:
  - 1. A listing of items which have changed since the last submittal.
  - 2. Discussion of problems causing delays, anticipated length of delays, and proposed countermeasures.
- E. Payment of partial estimates shall not be made unless the CONTRACTOR has, in force, an approved construction schedule.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01331

SHOP DRAWING PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Shop Drawing procedures shall conform to requirements of General Conditions and as described in this Section.

1.02 PROCEDURE

- A. Two (2) copies of all submittals shall be made to the ENGINEER at the address listed in the Notice to Bidders.
- B. Two (2) copies of each submittal shall also be sent to the ERIE COUNTY WATER AUTHORITY at the Service Center Address at 3030 Union Road, Buffalo, New York 14227 at the same time CONTRACTOR submits to ENGINEER.
- C. A letter of transmittal shall accompany each submittal. If data for more than one Section of the Specifications is submitted, a separate transmittal letter shall accompany the data submitted for each Section.
- D. At the beginning of each letter of transmittal provide a reference heading indicating the following:
  - 1. OWNER'S Name Erie County Water Authority
  - 2. Project Name Distribution SCADA Replacement
  - 3. Contract No. EMA-03A
  - 4. Transmittal No. \_\_\_\_\_
  - 5. Section No. \_\_\_\_\_
- E. If a Shop Drawing deviates from the requirements of the Contract Documents, CONTRACTOR shall specifically note each variation in his letter of transmittal.
- F. All Shop Drawings submitted for approval shall have a title block with complete identifying information satisfactory to ENGINEER.
- G. All Shop Drawings submitted shall bear the stamp of approval and signature of CONTRACTOR as evidence that they have been reviewed by CONTRACTOR. Submittals without this stamp of approval will not be reviewed by ENGINEER and will be returned to CONTRACTOR. CONTRACTOR'S stamp shall contain the following minimum information:



Project Name: Distribution SCADA Replacement

CONTRACTOR'S Name: \_\_\_\_\_

Date: \_\_\_\_\_

Reference Item: \_\_\_\_\_

Specifications:

Section: \_\_\_\_\_

Page No.: \_\_\_\_\_

Para. No.: \_\_\_\_\_

Drawing No.: \_\_\_\_\_ of \_\_\_\_\_

Submittal No.: \_\_\_\_\_

Approved By: \_\_\_\_\_

- H. A number shall be assigned to each submittal by CONTRACTOR starting with No. 1 and thence numbered consecutively. Resubmittals shall be identified by the original submittal number followed by the suffix "A" for the first resubmittal, the suffix "B" for the second resubmittal, etc.
- I. After ENGINEER completes his review, Shop Drawings will be marked with one of the following notations:
  - 1. Approved.
  - 2. Approved as Corrected.
  - 3. Revise and Resubmit.
  - 4. Not Approved.
  - 5. Submitted for Information.
- J. If a submittal is acceptable, it will be marked "Approved" or "Approved as Corrected". One copy of the submittal will be returned to CONTRACTOR.
- K. Upon return of a submittal marked "Approved" or "Approved as Corrected", CONTRACTOR may order, ship or fabricate the materials included on the submittal, provided it is in accordance with the corrections indicated.
- L. If a Shop Drawing marked "Approved as Corrected" has extensive corrections or corrections affecting other drawings or Work, ENGINEER may require that CONTRACTOR make the corrections indicated thereon and resubmit the Shop Drawings for record purposes. Such drawings will have the notation, "Approved as Corrected - Resubmit."

- M. If a submittal is unacceptable, one copy will be returned to CONTRACTOR with one of the following notations:
1. "Revise and Resubmit"
  2. "Not Approved"
- N. Upon return of a submittal marked "Revise and Resubmit", CONTRACTOR shall make the corrections indicated and repeat the initial approval procedure. The "Not Approved" notation is used to indicate material or equipment that is not acceptable. Upon return of a submittal so marked, CONTRACTOR shall repeat the initial approval procedure utilizing acceptable material or equipment.
- O. Any related Work performed or equipment installed without an "Approved" or "Approved as Corrected" Shop Drawing will be at the sole responsibility of the CONTRACTOR.
- P. Shop Drawings shall be submitted well in advance of the need for the material or equipment for construction and with ample allowance for the time required to make delivery of material or equipment after data covering such is approved. CONTRACTOR shall assume the risk for all materials or equipment, which are fabricated or delivered prior to the approval of Shop Drawings. Materials or equipment will not be included in periodic progress payments until approval thereof has been obtained in the specified manner.
- Q. ENGINEER will review and process all submittals promptly, but a reasonable time should be allowed for this, for the Shop Drawings being revised and resubmitted, and for time required to return the approved Shop Drawings to CONTRACTOR.
- R. It is CONTRACTOR'S responsibility to review submittals made by his suppliers and Subcontractors before transmitting them to ENGINEER to assure proper coordination of the Work and to determine that each submittal is in accordance with his desires and that there is sufficient information about materials and equipment for ENGINEER to determine compliance with the Contract Documents. Incomplete or inadequate submittals will be returned for revision without review.
- S. CONTRACTOR shall furnish required submittals with complete information and accuracy in order to achieve required approval of an item within two submittals. All costs to ENGINEER involved with subsequent submittals of Shop Drawings, Samples or other items requiring approval, will be backcharged to CONTRACTOR, at the rate of 3.0 times direct technical labor cost, by deducting such costs from payments due CONTRACTOR for Work completed. In the event that CONTRACTOR requests a substitution for a previously approved item, all of ENGINEER'S costs in the reviewing and approval of the substitution will be backcharged to CONTRACTOR unless the need for such substitution is beyond the control of CONTRACTOR.

## PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01332

### SAMPLES

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. The submittal of Samples shall conform to the requirements of the General Conditions and to procedures described in the Section.
- B. Samples and Shop Drawings which are related to the same unit of Work or Specification Section shall be submitted at the same time. If related Shop Drawings and Samples are submitted at different times, they cannot be reviewed until both are furnished to the ENGINEER.

##### 1.02 PROCEDURE

- A. CONTRACTOR shall review, approve and submit all Samples promptly. Samples shall be identified with correct reference to Specification Section, page, article and paragraph number, the Drawing No. when applicable. Samples shall clearly illustrate functional characteristics of the product and all related parts and attachments, and full range of color, texture, pattern and material. Samples shall be furnished so as not to delay fabrication, allowing the ENGINEER reasonable time for the consideration of the Samples submitted.
- B. CONTRACTOR shall submit at least two Samples of each item required for the ENGINEER'S approval. Submission of Samples shall conform to all applicable provisions under Shop Drawing Submittal and Correspondence procedure. One of the Samples shall be delivered to the ENGINEER'S main office unless otherwise authorized by the ENGINEER. One Sample shall be delivered to the ENGINEER'S field office. If the CONTRACTOR requires a Sample for his use he shall notify the ENGINEER in writing.
- C. The CONTRACTOR shall make all corrections required and shall resubmit the required number of new Samples until acceptable to the ENGINEER.

##### 1.03 SAMPLES FOR TESTS

- A. CONTRACTOR shall furnish such Samples of material as may be required for examination and test. All Samples of materials for tests shall be taken according to standard methods and as required by the Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01523

EMERGENCY TELEPHONE NUMBERS

PART 1 - GENERAL

1.01 EMERGENCY TELEPHONE NUMBERS

- A. The CONTRACTOR shall, at the CONTRACTOR'S expense, furnish to the ENGINEER an emergency phone number list for 24-hour contact during the construction period. Include numbers for office phones, pagers, and cellular phones, as applicable.
- B. The list should include, but not be limited to:
  - 1. CONTRACTOR'S office representative,
  - 2. CONTRACTOR'S field superintendent,
  - 3. CONTRACTOR'S foreman,
  - 4. OWNER'S main office,
  - 5. OWNER'S 24 hour emergency number,
  - 6. PROJECT ENGINEER,
  - 7. PROJECT INSPECTOR.
- C. CONTRACTOR shall add names and numbers given to him by ENGINEER and resubmit to ENGINEER as requested.
- D. Emergency phone list must be submitted and considered acceptable to ENGINEER prior to the start of construction.
- E. Phone list must be neatly typed or word processed and submitted on 8-1/2 x 11 inch paper.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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## SECTION 01562

### PROTECTION OF THE WORK AND PROPERTY

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. CONTRACTOR shall be responsible for taking all precautions, providing all programs, and taking all actions necessary to protect the Work and all public and private property and facilities from damage as specified in the General Conditions and herein.
- B. In order to prevent damage, injury or loss, CONTRACTOR'S actions shall include, but not be limited to, the following:
  - 1. Store apparatus, materials, supplies, and equipment in an orderly, safe manner that will not unduly interfere with the progress of the Work or the Work of any other contractor or utility service company.
  - 2. Provide suitable storage facilities for all materials which are subject to injury by exposure to weather, theft, breakage, or otherwise.
  - 3. Place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the Work.
  - 4. Clean up frequently all refuse, rubbish, scrap materials, and debris caused by his operations, to the end that at all times the site of the Work shall present a safe, orderly and workmanlike appearance.
  - 5. Provide barricades and guard rails around openings, for scaffolding, for temporary stairs and ramps, around excavations, elevated walkways and other hazardous areas.
- C. CONTRACTOR shall not, except after written consent from proper parties, enter or occupy privately-owned land with men, tools, materials or equipment, except on easements provided herein.
- D. CONTRACTOR shall assume full responsibility for the preservation of all public and private property or facility on or adjacent to the site. If any direct or indirect damage is done by or on account of any act, omission, neglect or misconduct in the execution of the Work by the CONTRACTOR, it shall be restored by the CONTRACTOR, at his expense, to a condition equal to that existing before the damage was done

##### 1.02 BARRICADES AND WARNING SIGNALS

- A. Where Work is performed on or adjacent to any roadway, right-of- way, or public place, CONTRACTOR shall provide barricades, fences, lights, warning signs, danger signals, watchmen, and shall take other precautionary measures for the protection of persons or property and of the Work. Barricades shall be painted to be visible at night. From sunset to sunrise, CONTRACTOR shall furnish and



maintain at least one light at each barricade. Sufficient barricades shall be erected to keep vehicles from being driven on or into Work under construction. CONTRACTOR shall furnish watchmen in sufficient numbers to protect the Work. CONTRACTOR'S responsibility for the maintenance of barricades, signs, lights, and for providing watchmen shall continue until the Project is accepted by OWNER.

#### 1.03 TREE AND PLANT PROTECTION

- A. CONTRACTOR shall protect existing trees, shrubs and plants on or adjacent to the site that are shown or designated to remain in place against unnecessary cutting, breaking or skinning of trunk, branches, bark or roots.
- B. Materials or equipment shall not be stored or parked within the drip line.
- C. Temporary fences or barricades shall be installed to protect trees and plants in areas subject to traffic.
- D. Fires shall not be permitted under or adjacent to trees and plants.
- E. Within the limits of the work, water trees and plants that are to remain, in order to maintain their health during construction operations.
- F. Cover all exposed roots with burlap that shall be kept continuously wet. Cover all exposed roots with earth as soon as possible. Protect root systems from mechanical damage and damage by erosion, flooding, run-off or noxious materials in solution.
- G. If branches or trunks are damaged, prune branches immediately and protect the cut or damaged areas with a nursery product specifically for horticultural use in a manner approved by the ENGINEER.
- H. All damaged trees and plants that die or suffer permanent injury shall be removed when ordered by the ENGINEER and replaced by a specimen of equal or better quality.
- I. Coordinate work in this section with requirements of Division 2 Technical Specifications.

#### 1.04 PROTECTION OF EXISTING STRUCTURES

- A. Underground Structures:
  - 1. Underground structures are defined to include, but not be limited to, all sewer, water, gas, and other piping, and manholes, chambers, electrical conduits, tunnels and other existing subsurface work located within or adjacent to the limits of the Work.
  - 2. All underground structures known to ENGINEER except water, sewer, electric, and telephone service connections are shown. This information is

shown for the assistance of CONTRACTOR in accordance with the best information available, but is not guaranteed to be correct or complete.

3. CONTRACTOR shall explore ahead of his trenching and excavation Work and shall uncover all obstructing underground structures sufficiently to determine their location, to prevent damage to them and to prevent interruption to the services which such structures provide. If CONTRACTOR damages an underground structure, he shall restore it to original condition at his expense.
4. Necessary changes in the location of the Work may be made by ENGINEER, to avoid unanticipated underground structures.
5. If permanent relocation of an underground structure or other subsurface facility is required and is not otherwise provided for in the Contract Documents, ENGINEER will direct CONTRACTOR in writing to perform the Work, which shall be paid for under the provisions of Article 11 of the General Conditions.

B. Surface Structures:

1. Surface structures are defined as all existing buildings, structures and other facilities above the ground surface. Included with such structures are their foundations or any extension below the surface. Surface structures include, but are not limited to, buildings, tanks, walls, bridges, roads, dams, channels, open drainage, piping, poles, wires, posts, signs, markers, curbs, walks and all other facilities that are visible above the ground surface.

C. Protection of Underground and Surface Structures:

1. CONTRACTOR shall sustain in their places and protect from direct or indirect injury all underground and surface structures located within or adjacent to the limits of the Work. Such sustaining and supporting shall be done carefully and as required by the party owning or controlling such structure. Before proceeding with the work of sustaining and supporting such structure, CONTRACTOR shall satisfy the ENGINEER that the methods and procedures to be used have been approved by the party owning same.
2. CONTRACTOR shall assume all risks attending the presence or proximity of all underground and surface structures within or adjacent to the limits of the Work. CONTRACTOR shall be responsible for all damage and expense for direct or indirect injury caused by his Work to any structure. CONTRACTOR shall repair immediately all damage caused by his work, to the satisfaction of the owner of the damaged structure.

- D. All other existing surface facilities, including but not limited to, guard rails, posts, guard cables, signs, poles, markers, and curbs which are temporarily removed to facilitate installation of the Work shall be replaced and restored to their original condition at CONTRACTOR'S expense.

1.05 PROTECTION OF FLOORS, ROOFS, AND CEILINGS

- A. CONTRACTOR shall protect floors, roofs and ceilings during the entire construction period.
- B. Proper protective covering shall be used when moving heavy equipment, handling materials or other loads, when painting, handling mortar and grout and when cleaning walls and ceilings.
- C. Use metal pans to collect all oil and cuttings from pipe, conduit, or rod threading machines and under all metal cutting machines.
- D. Roofs and ceilings shall not be loaded without written permission of the ENGINEER.

1.05 PROTECTION OF INSTALLED PRODUCTS AND LANDSCAPING

- A. Provide protection of installed products to prevent damage from subsequent operations. Remove protection facilities when no longer needed, prior to completion of Work.
- B. Control traffic to prevent damage to equipment, materials and surfaces.
- C. Provide coverings to protect equipment and materials from damage.
  - 1. Cover projections, wall corners, and jambs, sills and soffits of openings, in areas used for traffic and for passage of products in subsequent work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01563

### TEMPORARY CONTROLS

#### PART1 - GENERAL

##### 1.01 DESCRIPTION

- A. Provide and maintain methods, equipment, and temporary construction, as necessary to provide controls over environmental conditions at the construction site and adjacent areas. Remove physical evidence of temporary facilities at completion of Work.

##### 1.02 NOISE CONTROL

- A. CONTRACTOR'S vehicles and equipment shall be such as to minimize noise to the greatest degree practicable. Noise levels shall conform to the latest OSHA standards and in no case will noise levels be permitted which interfere with the work of the OWNER or others.

##### 1.03 DUST CONTROL

- A. CONTRACTOR shall be responsible for controlling objectionable dust caused by his operation of vehicles and equipment, clearing or for any reason whatever. CONTRACTOR shall apply water or use other methods subject to the ENGINEER'S approval which will keep dust in the air to a minimum.

##### 1.04 PEST AND RODENT CONTROL

- A. Provide rodent and pest control as necessary to prevent infestation of construction or storage area.
  - 1. Employ methods and use materials which will not adversely affect conditions at the site or on adjoining properties.

##### 1.05 WATER CONTROL

- A. Provide methods to control surface water and water from excavations and structures to prevent damage to the Work, the site, or adjoining properties
  - 1. Control fill, grading and ditching to direct water away from excavations, pits, tunnels and other construction areas; and to direct drainage to proper runoff courses so as to prevent any erosion, damage or nuisance.
- B. Provide, operate and maintain equipment and facilities of adequate size to control surface water.

- C. Dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas and in conformance with all environmental requirements.

#### 1.06 POLLUTION CONTROL

- A. Provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.
- B. Provide equipment and personnel, perform emergency measures required to contain any spillages, and to remove contaminated soils or liquids.
  - 1. Excavate and dispose of any contaminated earth offsite, and replace with suitable compacted fill and topsoil.
- C. Take special measures to prevent harmful substances from entering public waters.
  - 1. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewers.
- D. Provide systems for control of atmospheric pollutants.
  - 1. Prevent toxic concentrations of chemicals.
  - 2. Prevent harmful dispersal of pollutants into the atmosphere.
- E. All CONTRACTOR'S equipment used during construction shall conform to all current federal, state and local laws and regulations.

#### 1.07 EROSION CONTROL

- A. Plan and execute construction and earthwork by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation.
  - 1. Hold the areas of bare soil exposed at one time to a minimum.
  - 2. Provide temporary control measures such as berms, dikes, and drains.
- B. Construct fills and waste areas by selective placement to eliminate surface silts or clays, which will erode.
- C. Periodically inspect earthwork to detect any evidence of the start of erosion, apply corrective measures as required to control erosion.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01630

### SUBSTITUTIONS

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Requests for review of a substitution shall conform to the requirements of the General Conditions and shall contain complete data substantiating compliance of proposed substitution with Contract Documents.

##### 1.02 CONTRACTOR'S OPTIONS

- A. For materials or equipment (hereinafter products) specified only by reference standard, select product meeting that standard, by any manufacturer, fabricator, supplier or distributor (hereinafter manufacturer). To the maximum extent possible, provide products of the same generic kind from a single source.
- B. For products specified by naming several products or manufacturers, select any one of the products or manufacturers named which complies with Specifications.
- C. For products specified by naming one or more products or manufacturers and stating "or equal", submit a request for a substitution for any product or manufacturer which is not specifically named.
- D. For products specified by naming only one product or manufacturer and followed by words indicating that no substitution is permitted, there is no option and no substitution will be allowed.
- E. Where more than one choice is available as a CONTRACTOR'S option, select product which is compatible with other products already selected or specified.

##### 1.03 SUBSTITUTIONS

- A. During a period of 30 days after date of commencement of Contract Time, ENGINEER will consider written requests from CONTRACTOR for substitution of products or manufacturers, and construction methods (if specified).
  - 1. After end of specified period, requests will be considered only in case of unavailability of product or other conditions beyond control of CONTRACTOR.
- B. Submit 5 copies of request for substitution. Submit separate request for each substitution. In addition to requirements set forth in Article 6.05 of General Conditions, include in request the following:
  - 1. For products or manufacturers:
    - a. Product identification, including manufacturer's name and address.

- b. Manufacturer's literature with product description, performance and test data, and reference standards.
    - c. Samples, if appropriate.
    - d. Name and address of similar projects on which product was used, and date of installation.
  2. For construction methods (if specified):
    - a. Detailed description of proposed method.
    - b. Drawings illustrating method.
  3. Such other data as the ENGINEER may require to establish that the proposed substitution is equal to the product, manufacturer or method specified.
- C. In making request for substitution, CONTRACTOR represents that:
  1. CONTRACTOR has investigated proposed substitution, and determined that it is equal to or superior in all respects to the product, manufacturer or method specified.
  2. CONTRACTOR will provide the same or better guarantees or warranties for proposed substitution as for product, manufacturer or method specified.
  3. CONTRACTOR waives all claims for additional costs or extension of time related to proposed substitution that subsequently may become apparent.
- D. A proposed substitution will not be accepted if:
  1. Acceptance will require changes in the design concept or a substantial revision of the Contract Documents.
  2. It will delay completion of the Work, or the work of other contractors.
  3. It is indicated or implied on a Shop Drawing and is not accompanied by a formal request for substitution from CONTRACTOR.
- E. If the ENGINEER determines that a proposed substitute is not equal to that specified, CONTRACTOR shall furnish the product, manufacturer or method specified at no additional cost to OWNER.
- F. Approval of a substitution will not relieve CONTRACTOR from the requirement for submission of Shop Drawings as set forth in the Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01640

### TRANSPORTATION AND HANDLING OF MATERIALS AND EQUIPMENT

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. CONTRACTOR shall make all arrangements for transportation, delivery and handling of equipment and materials required for prosecution and completion of the Work. Included in CONTRACTOR'S work shall be acceptance of consignment and coordination of equipment deliveries for equipment purchased by OWNER.
- B. Shipments of materials to CONTRACTOR or Subcontractors shall be delivered to the site only during regular working hours. Shipments shall be addressed and consigned to the CONTRACTOR giving name of Project, street number and city. Shipments shall not be delivered to OWNER except where otherwise directed.
- C. If necessary to move stored materials and equipment during construction, CONTRACTOR shall move or cause to be moved materials and equipment without any additional compensation.

##### 1.02 DELIVERY

- A. Arrange deliveries of products in accordance with construction schedules and in ample time to facilitate inspection prior to installation.
- B. Coordinate deliveries to avoid conflict with Work and conditions at site and to accommodate the following:
  - 1. Work of other contractors, or OWNER.
  - 2. Limitations of storage space.
  - 3. Availability of equipment and personnel for handling products.
  - 4. OWNER'S use of premises.
  - 5. Work under other construction projects on OWNER'S site.
- C. Do not have products delivered to project site until related Shop Drawings have been approved by the ENGINEER.
- D. Do not have products delivered to site until required storage facilities have been provided.
- E. Have products delivered to site in manufacturer's original, unopened, labeled containers. Keep ENGINEER informed of delivery of all equipment to be incorporated in the Work.



- F. Partial deliveries of component parts of equipment shall be clearly marked to identify the equipment, to permit easy accumulation of parts and to facilitate assembly.
- G. Immediately on delivery, inspect shipment to assure:
  - 1. Product complies with requirements of Contract Documents and reviewed submittals.
  - 2. Quantities are correct.
  - 3. Containers and packages are intact, labels are legible.
  - 4. Products are properly protected and undamaged.

### 1.03 PRODUCT HANDLING

- A. Provide equipment and personnel necessary to handle products by methods to prevent soiling or damage to products or packaging.
- B. Provide additional protection during handling as necessary to prevent scraping, marring or otherwise damaging products or surrounding surfaces.
- C. Handle products by methods to prevent bending or overstressing.
- D. Lift heavy components only at designated lifting points.
- E. Materials and equipment shall at all times be handled in a safe manner and as recommended by manufacturer or supplier so that no damage will occur to them. Do not drop, roll or skid products off delivery vehicles. Hand carry or use suitable materials handling equipment.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01660

### STORAGE OF MATERIAL

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Store and protect materials in accordance with manufacturer's recommendations and requirements of Specifications.
- B. CONTRACTOR shall make all arrangements and provisions necessary for the storage of materials and equipment. All excavated materials, construction equipment, and materials and equipment to be incorporated into the Work shall be placed so as not to injure any part of the Work or existing facilities and so that free access can be had at all times to all parts of the Work and to all public utility installations in the vicinity of the Work. Materials and equipment shall be kept neatly and compactly stored in locations that will cause a minimum of inconvenience to other contractors, public travel, adjoining owners, tenants and occupants. Arrange storage in a manner to provide easy access for inspection.
- C. CONTRACTOR shall be consigned responsibility for scheduling, coordination of delivery and manufacturer's representatives' services, on-site storage, and handling of equipment items purchased directly by OWNER for this project. CONTRACTOR shall make provisions for temporary storage, if required, and all handling of said equipment items.
- D. Areas available on the construction site for storage of material and equipment shall be as shown or approved by the ENGINEER.
- E. Materials and equipment which are to become the property of the OWNER shall be stored to facilitate their inspection and insure preservation of the quality and fitness of the Work, including proper protection against damage by freezing and moisture. They shall be placed inside storage areas unless otherwise acceptable to OWNER.
- F. Lawns, grass plots or other private property shall not be used for storage purposes without written permission of the property owner or other person in possession or control of such premises.
- G. CONTRACTOR shall be fully responsible for loss or damage to stored materials and equipment.
- H. Do not open manufacturers' containers until time of installation unless recommended by the manufacturer or otherwise specified.
- I. Do not store products in the structures being constructed unless approved in writing by the ENGINEER.

## 1.02 UNCOVERED STORAGE

- A. The following types of materials may be stored out-of-doors without cover:
  - 1. Reinforcing steel.
  - 2. Precast concrete items.
  - 3. Masonry block and brick.
  - 4. Castings.
  - 5. Manholes and exterior buried pipe.
- B. Store the above materials on wood blocking so there is no contact with the ground.

## 1.03 COVERED STORAGE

- A. The following types of materials may be stored out-of-doors if covered with material impervious to water:
  - 1. Rough lumber.
  - 2. Piping.
- B. Tie down covers with rope and slope to prevent accumulation of water on covers.
- C. Store materials on wood blocking.

## 1.04 FULLY PROTECTED STORAGE

- A. Store all products not named above in buildings or trailers which have a concrete or wooden floor, a roof, and fully closed walls on all sides.
- B. Provide heated storage space for materials which would be damaged by freezing.
- C. Protect mechanical and electrical equipment from being contaminated by dust, dirt and moisture.
- D. Maintain humidity at levels recommended by manufacturers for electrical and electronic equipment.

## 1.05 MAINTENANCE OF STORAGE

- A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:
  - 1. State of storage facilities is adequate to provide required conditions.
  - 2. Required environmental conditions are maintained on continuing basis.
  - 3. Products exposed to elements are not adversely affected.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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## SECTION 01780

### RECORD DOCUMENTS

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. CONTRACTOR shall assist the ENGINEER in generating record documents as specified below.
- B. Maintenance of Documents:
  - 1. Maintain complete sets of the following: Drawings, Specifications, Addenda, approved Shop Drawings, Samples, photographs, Change Orders, other modifications of Contract Documents, test records, survey data, Field Orders, and all other documents pertinent to CONTRACTOR'S Work.
  - 2. Make documents available at all times for inspection by ENGINEER and OWNER.
  - 3. Record documents shall not be used for any other purpose and shall not be removed from the CONTRACTOR'S office without ENGINEER'S approval.
  - 4. Record Drawings may be reviewed anytime by the ENGINEER and processing of Payment Applications may be withheld if documents are not current.
- C. Marking System: Provide colored pencils or felt tipped pens for marking changes, revisions, additions and deletions, to the record set of Drawings. Use following color code unless otherwise approved by the ENGINEER:
  - 1. Process and Mechanical: Red
  - 2. Architectural: Blue
  - 3. Structural: Purple
  - 4. Plumbing: Brown
  - 5. HVAC: Green
  - 6. Other Printed Notations: Black
- D. Recording:
  - 1. Label each document "PROJECT RECORD" in 2-inch high printed letters.
  - 2. Keep record documents current.
  - 3. Do not permanently conceal any Work until required information has been recorded.
  - 4. Drawings: Legibly mark to record actual construction including:
    - a. Depths of various elements of foundation in relation to datum.
    - b. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
    - c. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.

- d. Field changes of dimensions and details.
  - e. Changes made by Change Order or Field Order.
  - f. Details not on original Drawings.
5. Specifications and Addenda: Legibly mark up each Section to record:
- a. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
  - b. Changes made by Change Order or Field Order.
  - c. Other matters not originally specified.
- E. Submittal:
- 1. Upon Substantial Completion of the Work, CONTRACTOR will deliver record documents to ENGINEER. Final payment to the CONTRACTOR will not be made until satisfactory record documents are received and approved by the ENGINEER.
  - 2. CONTRACTOR shall submit to ENGINEER, accompanied with a transmittal letter, the following:
    - a. Date.
    - b. Project title and number.
    - c. CONTRACTOR'S name and address.
    - d. Title and number of each record document.
    - e. Certification that each document as submitted is complete and accurate.
    - f. Signature of CONTRACTOR, or his authorized representative.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01783

### EXTENDED WARRANTY AND MAINTENANCE

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Scope
- B. Submittals
- C. Schedule of Warranties
- D. Warranty Requirements
- E. Manufacturer's Certifications
- F. Definitions

##### 1.2 RELATED SECTIONS

- A. Refer to GENERAL CONDITIONS Article 6 for the general requirements relating to warranties.

##### 1.3 SCOPE

- A. This Section specifies general administrative and procedural requirements for manufacturer warranties required by the Contract Documents, including manufacturer's standard product and equipment warranties ("Standard Product Warranties") and special product and equipment warranties from manufacturers ("Special Product Warranties").
- B. All products and equipment will be warranted by the manufacturer for a minimum period of twenty-four (24) months following Final Completion of the Project. If a Standard Product Warranty from a product or equipment manufacturer does not meet this requirement, CONTRACTOR will provide, at no additional cost to the OWNER, extended warranties for products and equipment to meet the warranty requirements in this Section. Warranty period to begin at Partial Utilization, cover to project completion and extend to twenty-four (24) months after Final Completion.



- C. This Section will in no way limit the CONTRACTOR's general warranty obligations specified in GENERAL CONDITIONS Article 6 of the Contract Documents.

#### 1.4 SUBMITTALS

- A. Submit written product and equipment warranties to the OWNER prior to Substantial Completion.
- B. When a Special Product Warranty is required to be executed by the CONTRACTOR, or the CONTRACTOR and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the OWNER for approval prior to final execution.
- C. Refer to individual Sections of these Specifications for specific content requirements, and particular requirements for Submittals of Special Product Warranties.
- D. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual. Coordinate this work with the requirements of Section 409000.

#### 1.5 SCHEDULE OF WARRANTIES

- A. All products and equipment will be warranted by the manufacturer for a period of 24-months, which will begin at the date Final Completion is attained for the Project. The manufacturer warranties are in addition to all other warranties included in the Contract Documents.
- B. CONTRACTOR will provide extended warranties for products and equipment, as needed, so that all warranties comply with this Section. This cost will be included in the cost of the Work in SECTION 01 29 73 – SCHEDULE OF VALUES.
- C. Refer to technical requirements found elsewhere in the Contract Documents for the products and equipment to be warranted by the manufacturer.

## 1.6 MANUFACTURER WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting Work warranted by a manufacturer that has failed, CONTRACTOR and/or the manufacturer will remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- B. Reinstatement of a Manufacturer's Product Warranty: When Work covered by either a Standard or Special Product Warranty has failed and has been corrected by replacement or rebuilding, the CONTRACTOR and the manufacturer will reinstate the warranty by written endorsement from the CONTRACTOR and the manufacturer to the OWNER. The reinstated warranty will be equal to the original warranty in duration and coverage.
- C. Replacement Cost: Upon determination that Work covered by a either a Standard or Special Product Warranty has failed within the warranty period, CONTRACTOR and/or manufacture will replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The CONTRACTOR is responsible for the entire cost of replacing or rebuilding defective work regardless of whether the OWNER has benefited from use of the Work through a portion of its anticipated useful service life. OWNER's Recourse: Written Standard or Special Product Warranties made to the OWNER are in addition to CONTRACTOR's other warranty obligations included in the Contract Documents and implied warranties, and will not limit the duties, obligations, rights and remedies otherwise available under the law, nor will warranty periods be interpreted as limitations on time in which the OWNER can enforce such other warranties, duties, obligations, rights, or remedies.
- D. Rejection of Warranties: The OWNER will consider the warranty provisions in reviewing the product Submittals and reserves the right to reject Submittals based solely upon the warranties' compliance to the Contract Documents. The OWNER also reserves the right to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- E. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product Standard or Special Product Warranties do not relieve the CONTRACTOR of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers and subcontractors required to countersign Special Product Warranties with the CONTRACTOR.

1.7 MANUFACTURERS' CERTIFICATIONS

- A. Where required, the CONTRACTOR will supply evidence, satisfactory to the OWNER, that the CONTRACTOR can obtain manufacturers' certifications as to the CONTRACTOR's installation of equipment.

1.8 DEFINITIONS

- A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the CONTRACTOR and/or subcontractor, Supplier or manufacturer to the OWNER.
- B. Special Product Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by Standard Product Warranties or to provide greater rights for the OWNER as required by the Contract Documents.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

## SECTION 409000

### COMMON WORK RESULTS FOR PROCESS CONTROLS

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes the general requirements for the SCADA system.
- B. Related Sections:
  - 1. Section 01100 – Summary of Work
  - 2. Section 01313 – Progress Meetings
  - 3. Section 01331 – Shop Drawing Procedure
  - 4. Section 01780 – Record Documents
  - 5. Section 01783 – Extended Warranty and Maintenance
  - 6. Section 409433 – Human Machine Interface Hardware Requirements
  - 7. Section 409434 – Human Machine Interface Software Requirements
  - 8. Section 409513 – SCADA Control Panel Hardware Requirements
  - 9. Section 409635 - SCADA Programming Requirements
  - 10. Section 409650 – Process Control Narratives
  - 11. Appendix D – HMI Style Guide
  - 12. Appendix E – Site Inventory

##### 1.02 REFERENCES

- A. The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic definition only.
- B. In case of conflict between the referenced standard and the requirements of the specification, the specifications shall prevail.
- C. Materials and installation shall comply with codes, laws and ordinances of Federal, State, local governing bodies having jurisdiction.
- D. International Society of Automation (ISA)
  - 1. ISA S51.1 Process Instrumentation Terminology
- E. American National Standards Institute / Institute of Electrical and Electronic Engineers (ANSI/IEEE)
  - 1. ANSI/IEEE C37.1 Standard for SCADA and Automation Systems, 2007
  - 2. ANSI/IEEE C63.12 American National Standard for Electromagnetic Compatibility Limits – Recommended Practices, 1999

##### 1.03 ACRONYMS AND DEFINITIONS

- A. FAT: Factory Acceptance Test

- B. I/O: Field Inputs and Outputs (I/O) connected to an RTU
- C. KMM: Keyboard Mouse and Monitor (KMM) is the keyboard, mouse and monitor used with a KVM.
- D. KVM: Keyboard Video and Mouse (KVM) hardware device used to control multiple servers from one keyboard, video monitor and mouse.
- E. OIT: Operator Interface Terminal (OIT)
- F. P&ID: Process and Instrumentation Diagram (P&ID)
- G. PCN: Process Control Narrative (PCN)
- H. RTU: Remote Terminal Unit (RTU) is a programmable logic device design for industrial control of remote facilities. This device may be a PLC configured as an RTU.
- I. SCADA: Supervisory Control And Data Acquisition (SCADA).
- J. SAT: Site Acceptance Test
- K. TP: Treatment Plant
- L. VFD: Variable Frequency Drive (VFD) used to control the speed of a motor for pump control.
- M. WAN: Wide Area Network

#### 1.04 PRE-INSTALLATION ACTIVITIES

- A. Site Surveys
  1. The Contractor shall conduct field surveys at each location following contract award and the project kickoff meeting.
  2. The visit to each individual site shall be to verify the work to be completed including location of equipment, installation requirements, etc. and for the Contractor to become familiar with the location. The field survey shall also include verification of RTU I/O requirements and documentation for development of site specific P&IDs and Process Control Narratives (PCNs).
  3. The Contractor is encouraged to take extensive photographs/videos and develop sketches during each site visit for their future reference.
- B. System Development Workshops
  1. General:
    - a. The workshops are in addition to the monthly coordination/progress meetings as specified in Section 01313.

- b. Prepare an agenda with copies to participants at least five working days prior to the scheduled workshops and schedule the use of an Owner on-site conference room.
  - c. Attendance for the workshops shall include, as a minimum, Owner, Engineer, and Contractor.
2. Tag Naming Convention
- a. The purpose of this workshop is to determine what tag naming convention shall be used for the project. The Owner is currently developing a new tag naming convention for all of their facilities including the water treatment plants and the distribution system. The new tag naming convention shall be used to develop the P&ID instrument tags, I/O tags, etc.
3. P&ID and PCN Review Workshops
- a. The purpose of these workshops is to review the site specific operation of a remote site with Owner's operations and maintenance staff before RTU, HMI and OIT programming is begun.
  - b. Schedule an initial meeting after the P&IDs have been submitted and approved and before the site specific Process Control Narratives have been developed.
  - c. Schedule a second meeting after the site specific Process Control Narratives have been submitted and reviewed.
  - d. Schedule additional workshops as necessary to prevent excessive re-submittals of site specific P&IDs and PCNs.
4. HMI Graphics/Alarming and OIT Graphics Review Workshops
- a. The purpose of these workshops is to enable the development of the graphics and alarms in a collaborative approach with Owner's operations and maintenance staff.
  - b. Schedule an initial meeting after the site specific PCNs have been approved.
  - c. Schedule a second meeting after the draft Graphic Displays have been submitted and reviewed.
  - d. Schedule additional meeting as necessary to prevent excessive re-submittals of graphics and alarm functionality.
5. RTU Programming Workshops
- a. The purpose of these workshops is to develop the RTU programs in a collaborative approach with Owner's operations and maintenance staff.
  - b. Schedule an initial meeting after the site specific PCNs have been approved and before the RTU Function Blocks have been developed.
  - c. Schedule a second meeting after the RTU Function Blocks have been developed and reviewed.
  - d. Schedule additional meeting as necessary to prevent excessive re-submittals of RTU code.

## 1.05 SUBMITTALS

- A. General
  - 1. Submittals shall be made in accordance with the requirements of this Specification Section, Specification Section 01331, and the requirements of individual sections within Specification Sections of Division 40.
- B. Product Data:
  - 1. Submit Product Data, including catalog cuts, for all products provided. Clearly indicate the usage of each product on each submittal.
- C. Field Survey Reports
  - 1. Report Requirements by location
    - a. Photographs or sketches showing proposed location of new equipment, etc.
    - b. Field verified RTU I/O list.
    - c. Site specific P&IDs.
    - d. Narrative describing work to be completed and method to complete the work.
    - e. Potential issues observed and proposed solutions.
- D. Process & Instrumentation Diagrams (P&IDs)
  - 1. General:
    - a. Modify contract typical P&IDs to make them site specific.
  - 2. Requirement
    - a. The Contractor shall prepare P&IDs to be submitted for approval for each remote site. P&IDs shall be reviewed and approved prior to the start of RTU programming, and OIT and HMI screen development.
    - b. P&IDs shall be developed in AutoCAD and submitted as PDFs.
    - c. Submit native AutoCAD format drawings in dwg at completion of project.
- E. Process Control Narratives
  - 1. General:
    - a. Modify the functional descriptions to make them specific for each remote station/site.
  - 2. Requirement
    - a. Provide enough detail to allow programming, configuration, testing and commission of the SCADA system for the RTUs, HMI and OITs.
    - b. Include miscellaneous equipment functional descriptions associated with a remote station/site.
    - c. Submit in Microsoft Word and PDF formats.
- F. HMI Graphic Displays
  - 1. General:
    - a. Develop HMI graphics that follow the HMI Style Guide and meet the functional requirements of the project.

2. Requirement
    - a. Submit sample HMI graphics in color PDF format for representative sites. Annotate in enough detail to explain any active objects on the graphic, for example (objects that change color or activate a pop-up, etc.)
    - b. Submit OIT graphics in color PDF format for representative sites
    - c. Provide all HMI and OIT graphics in the O&M manuals.
- G. RTU Function Blocks
1. General:
    - a. Provide documentation of the functional blocks to be used on the project.
  2. Requirement
    - a. Refer to Section 409635 for requirements.
    - b. Submit documents in MS Word and PDF formats
- H. RTU Programs
1. General:
    - a. Provide RTU program for all RTUs.
  2. Requirement
    - a. Submit RTU programs before FAT.
    - b. Submit well documented programs in PDF and native programming formats.
- I. Test Plan
1. General:
    - a. Provide a test plan for the FAT and SATs.
  2. Requirements.
    - a. Test plan for FAT shall be provide at least 10 days before FAT is to be conducted.
    - b. SAT test plan for each site shall be provide 5 days before the SAT is scheduled for a site.
- J. Training Plan
1. General:
    - a. Provide a complete description of all training classes, training outlines, a preliminary training schedule, a list of all proposed instructors along with resumes, examples of proposed training manuals, and a description of any special training tools available (simulators, self-paced modules, personal computer-based training, etc.).
  2. Requirements:
    - a. Training plan shall be submitted before FAT is conducted and at least 30 days before training is conducted.



## K. Training Manuals

1. Submit training manuals for each training course at least 7 calendar days prior to the scheduled start of the course. Training manuals shall not be submitted until approval of training course outline.

## 1.06 OPERATION AND MAINTENANCE (O&M) MANUALS

### A. General

1. Provide an individual O&M for each remote site including but not limited to RTU panel drawings and RTU & OIT programs, etc.
2. The Contractor shall supply O&M manuals for all the equipment and software provided. The O&M manuals shall be developed for personnel at the level of electronic technician. The O&M manuals shall describe the detailed preventive and restorative procedures required to keep the equipment in good operating condition.
3. An O&M manual or a set of manuals shall be furnished for all deliverable hardware, including OEM equipment. Printed O&M manuals for OEM equipment shall contain original printed materials, not copies, and may be provided in the manufacturer's original format.
4. Electronic or digitized version of O&M shall completely be in text-searchable PDF format, machine scanned PDF format shall not be acceptable. O&M manuals that include Contractor's custom generated documentation such as loop diagrams, preventative maintenance manual shall also be provided in its native format, i.e. AutoCAD, MS Word, Excel, etc.
5. O&M Manual drawings (with the exception of those provided by third-party manufacturers) shall not be larger than 11 inches by 17 inches and shall be clearly legible when reproduced using conventional office copying machines. Originals shall be provided for all third party O&M Manual materials. One reproducible of the O&M Manual drawing original must be supplied for each O&M Manual drawing larger than 11 inches by 17 inches, and must satisfy all drawing requirements specified herein. Those preprinted O&M Manual drawings which are not acceptable, or which must be modified or corrected to show the actual as-built design, shall be redrawn as new specially-prepared shop drawings. Acceptable equipment manufacturer's drawings incorporated into equipment operating and maintenance manuals need not be duplicated or removed from the manuals.
6. Each O&M Manual shall be bound in 8 1/2" x 11 inch 3-ring side binders with commercial quality hardback, cleanable plastic covers. Final versions of the O&M Manual shall also be provided on CD-ROM.
  - a. The manuals shall be subdivided with permanent page dividers with tab titling clearly printed under reinforced laminated plastic tabs.
  - b. Each volume shall have a Table of Contents, with each product or system description identified.

B. Requirement

1. At least twenty (20) days prior to the start of Factory Acceptance Testing, the Contractor shall submit for review five (5) copies of the preliminary Operation and Maintenance (O&M) Manuals. These preliminary copies shall contain sufficient detail for Owner to review the basic outline and scope of the manuals.
2. At least ten (10) days prior to the start of Site Acceptance Testing, the Contractor shall submit five (5) copies of the draft Operation and Maintenance Manuals. The draft O&M Manuals shall generally be complete (at least 90%) and shall be clearly marked to indicate where all missing or incomplete information will be included.
3. Provide five (5) printed copies of the final O&M Manuals and associated drawings. In addition, an electronic format copy of the manual shall be provided on CD-ROM.
4. Electronic documents shall be provided in both the native application used for creating the documents (MS Word, AutoCAD, etc.) and text searchable Adobe PDF format.

C. Maintenance (PM) Instructions

1. The instructions shall include all applicable visual examinations, periodic maintenance procedures, hardware testing, and diagnostic hardware/software routines. Instructions on how to load and use any test and diagnostic programs and any special or standard test equipment shall be an integral part of these procedures.
2. The Contractor shall coordinate with Owner on preventive maintenance submittal formatting suitable to incorporate the PM instructions into Owner's Computerized Maintenance Management System (CMMS) task schedule.

D. Corrective Maintenance Specific Instructions

1. These instructions shall include guides for locating malfunctions down to the card-replacement level. These guides shall include adequate details for quickly and efficiently locating the cause of an equipment malfunction and shall state the probable source(s) of trouble, the symptoms, probable cause, and instructions for remedying the malfunction. These guides shall explain how to use on-line test and diagnostic programs for all devices and any special test equipment, if applicable.
2. The corrective maintenance specific instructions shall include:
  - a. Explanations for the repair, adjustment, or replacement of all items, including printed circuit cards. Schematic diagrams of electrical, mechanical, and parts location, illustrations, photographs, and sectional views giving details of mechanical assemblies shall be provided as necessary to repair or replace equipment. Typical signal waveforms, logic levels, bit patterns, etc., shall be included. For mechanical items requiring field repair, information on tolerances, clearances, wear limits, and maximum bolt-down torques shall be supplied. Information on the loading and use of special off-line

diagnostic programs, tools, and test equipment as well as any cautions or warnings, which must be observed to protect personnel and equipment, shall be included.

- 1) A list of test equipment and special tools required.
- 2) A list of all abbreviations and symbols used.
- 3) Warranties, bonds, and maintenance records, including proper procedures in the event of failures and instances, which might affect the validity of warranties, bonds, or contracts.
- 4) A parts catalog enumerating every part to the lowest of card replaceable components. The description shall include component symbol, description, ratings, accuracy, manufacturer's name and address, manufacturer's part number, commercial equivalents, and quantity per assembly or subassembly. The parts catalog shall identify the appropriate locations of the parts and shall group each component by assemblies or subassemblies within each subsystem so that each component can be identified as being part of the next larger assembly.
- 5) A list of recommended spare parts that includes all parts necessary to maintain and repair SCADA components. The list shall identify the specific part or model number, description, manufacturer's name and address, commercial equivalents, unit price, lead time for delivery, and recommended quantity. The spare parts list shall indicate which components (by model and serial number) have been provided with the delivered system as part of the spares inventory.

E. System Configuration Inventory List

1. Format

- a. An inventory list shall be furnished for all contract material, for all contract software, for all contract documentation, spare parts, and test equipment. Hardware identification of each unique module by serial number and each software unique module shall be included on the list. The inventory list shall include, but not be limited to, the following information:
  - 1) Manufacturer's name, part number, and serial number
  - 2) Quantity of units supplied with the deliverable System/subsystem
  - 3) Software modules supplied
  - 4) Operating system software provided for all CPUs/microprocessors
  - 5) Operating systems enhancements provided
  - 6) Software versions, patches installed
  - 7) System documentation supplied
  - 8) Applicable cabinet, rack number or slot, and cables.
- b. The inventory list, which shall be prepared and updated by the Contractor, shall be subdivided by hardware, software, test equipment, and spares, and by documentation and training courses. Each of these major divisions shall be further subdivided to the

individual deliverable item level, e.g., complete cabinet assemblies, which will be shipped intact and individual spare modules. Each item must be defined in sufficient detail to permit its ready identification in shipping documents and inventory checks.

- c. The inventory list should be computer-maintained to simplify updating and developed in Microsoft Access. Provide copy of database in electronic form (CD-ROM).
2. Requirement
- a. A preliminary System Configuration Inventory List shall be submitted no later than 30 days prior to the scheduled start of FAT. The FAT shall not be initiated until the System Configuration Inventory List submittal has been approved. A System Configuration Inventory List updated to reflect any additions or changes during system installation shall be included as part of the Record Documents.

#### 1.07 CLOSEOUT SUBMITTALS

A. General:

- 1. Maintain a set of redlined Contract drawings in accordance with Section 01780.

B. Requirement

- 1. Submit redlined Contract drawing within thirty (30) days from successful completion of SAT for each location
- 2. The SAT shall not be considered complete until the redlined Contract drawings have been submitted.

#### 1.08 QUALITY ASSURANCE

A. SCADA Integrator Qualifications

- 1. The SCADA integrator (system integrator) shall have a minimum of 5 years' experience with the HMI and RTUs as specified in Sections 409433 and 409513 and have configured SCADA systems for water distribution systems of similar size over a radio network.

#### 1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and equipment in a clean condition.
- B. Provide packaging that plugs, caps, or otherwise seals openings both during shipping and temporary storage.
- C. Provide equipment needed for unloading operations, and have such equipment on the work site to perform unloading work when the material and equipment is delivered.
- D. If possible, clearly identify pick-points or lift-points on electrical equipment crating and packaging.

- E. In the absence pick-points or lift-points on equipment crating and packaging, identify pick-points or lift-points on the equipment itself.
- F. Handle materials and equipment in accordance with manufacturer's written instructions.
- G. When unloading materials and equipment, provide special lifting harnesses or apparatus as required by manufacturers.
- H. Store electrical materials and equipment, whether on-site or off-site, in accordance with the following:
  - 1. Follow the manufacturer's written instructions for storing the items.
  - 2. Store electrical equipment and products under cover.
  - 3. Except for electrical conduit, store electrical equipment and products in heated/cooled warehouses or enclosed buildings.

#### 1.10 ENVIRONMENTAL REQUIREMENTS

- A. RFI/EMI Protection
  - 1. All SCADA equipment shall be capable of operating without error in an environment that has a high electric and magnetic field strength of radio frequency electromagnetic energy. The general guide lines as described in ANSI/IEEE C37.1, Section 6.62 and ANSI/IEEE C63.12, Section 6.3.
- B. Radiated Immunity – Broad Band
  - 1. The equipment shall operate without error under an electric field strength of six V/M and an equivalent conversion for magnetic field strength, assuming a free space impedance of 377 ohms, over a frequency range of 10 kHz to 10 GHz.
- C. Radiated Immunity - Narrow Band
  - 1. The equipment shall operate without error or measurable degradation to sensitivity or functionality in the presence of a 900 MHz, hand held radio (HHR) operating at an effective radiated power (ERP) of five watts at a distance of 3 meters from the equipment.
- D. Conducted Immunity – Broad Band
  - 1. The equipment shall operate without error or measurable degradation to sensitivity or functionality in the presence of unwanted conducted interference coupled onto equipment power lines, communication lines, instrumentation, and other miscellaneous signaling cables.
  - 2. Common mode voltage immunity of 2 Volts rms
  - 3. Differential mode voltage immunity of 2 Volts rms.
- E. Conducted Immunity to Narrow Band Radiators
  - 1. The equipment supplied shall operate without error or degradation to sensitivity or functionality due to induced energy from the operation of intentional and unintentional transmitters within the plant onto

communication and power lines serving the equipment supplied by the Contractor.

2. The equipment supplied shall operate without error or degradation of performance in the presence of the following transmitter frequencies which may induce higher differential and common mode voltage levels specified above and which operate at a distance of three meters from the power and communication lines serving the supplied equipment.

Conducted Immunity - Narrow Band Limits		
Frequency (MHz)	ERP (Watts)	Distance (meters)
30 to 300	0.5	3
301 to 500	2.0	3
501 to 900	5.0	3

F. Environmental Conditions

1. Unless otherwise specified, all equipment provided under this contract shall, as a minimum, be suitable for operation in the ambient conditions specified below.
  - a. Control Rooms, Server Rooms & Office Space
    - 1) Temperature 60° to 85°F
    - 2) Humidity 40 to 70 percent
  - b. Field Locations
    - 1) Temperature 0° to 140°F
    - 2) Humidity 10 to 95 percent
    - 3) Chlorine

1.11 WARRANTY AND MAINTENANCE

- A. In accordance with Section 01783.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Commonality

1. Products which serve similar functions shall be from the same manufacturer and part number. If this commonality requirement cannot be met, indicate the reason for not meeting it during the submittal process.

B. Maintainability

1. Modular Design
  - a. Products shall be of modular design allowing easy replacement of components in the field. All components shall be replaceable without

dismantling other components or equipment to reach a failed component.

2. Test Equipment Connections
  - a. Test equipment connections shall be accessible and well-marked. Test connections referenced in service manuals shall be labeled on the equipment with the same name or number.

## 2.02 SPARES

- A. Spares Philosophy
  1. The spares philosophy is based on the concept of Owner technicians being able to perform normal system maintenance by troubleshooting the problem and replacing the defective component with one from the spares inventory.
- B. Spares Replacement During Warranty
  1. During the warranty period, make system repairs by initially replacing the defective component with one from the spares inventory. Replace the spare used for repair of the defective component with a new component and return the original spare to inventory. This procedure shall ensure that all new components are fully tested and compatible with the installed system.

## PART 3 EXECUTION

### 3.01 FACTORY TESTING

- A. Unwitnessed Factory Testing
  1. General:
    - a. The intent of the unwitnessed Factory Testing is to uncover and correct all wiring errors, identify defective devices, and to verify products supplied conform to approved shop drawings prior to the FAT.
    - b. Refer to Section 409513 for additional requirements.
  2. Test Documentation
    - a. Document testing and submit test results to Owner and Engineer prior to FAT.
- B. Factory Acceptance Testing (FAT)
  1. General:
    - a. The purpose of the FAT is to test the functional operation of the SCADA system. Major components to be tested include the HMI system, RTU/OITs.
    - b. FATs shall include testing of custom programs, control logic and communications.
    - c. Fully functioning programs shall be down loaded to the equipment and the equipment shall be made ready for testing.

- d. A test panel shall be used to simulate the process during the testing. Simulation software is not acceptable for witnessed testing, except as indicated in Section 409513.
  - e. The site specific PCN and approved HMI/OIT graphics shall be used as a guide for the testing
  - f. FAT shall be conducted at the supplier/manufacturer's facility, refer to Section 409513.
  - g. FAT shall be witnessed by Owner and the Engineer.
  - h. Approved shop drawings are required before FAT is conducted.
  - i. Notify Owner and Engineer 2 weeks prior to testing.
- 2. Owner Furnished Equipment
    - a. Two (2) radios.
    - b. Development server to be used as the primary SCADA server during the testing.
    - c. Operator Work Station.
  - 3. Sites to be tested
    - a. The new RTU backplates shall be temporarily repurposed for the FAT to test the functionality of the different types of remote sites. At a minimum the repurposed RTU backplates shall be used to demonstrate the functionality of the following:
      - 1) Typical Pump Station (including minor process equipment).
      - 2) Pump Station with Hydro-Pneumatic Tank (including minor process equipment).
      - 3) Tank.
      - 4) Provide a spare analog output card for this testing.
  - 4. Test Documentation
    - a. Maintain a copy of all the test documents and provide space for Owner and Engineer to sign off on witnessed testing.

### 3.02 HMI SITE ACCEPTANCE TESTING (HMI-SAT)

#### A. General:

- 1. The intent of this testing is to verify the applications have been installed properly on the Owner's servers and workstations.
- 2. Testing shall be successfully completed before any changes to the applications or hardware are started at any of the remote sites.
- 3. After successful FAT, install software applications on the servers and workstations at the Owner's facility.
- 4. Reconfigure the development server previously configured as the primary SCADA server for the FAT as the development server.
- 5. Testing shall include failure of the primary server and verification that backup server operates properly and the workstations automatically reconnect to the backup server.



### 3.03 SITE ACCEPTANCE TESTING (SAT)

#### A. General:

1. The intent of the site acceptance testing is to test the system under operational conditions.
2. SAT shall be witnessed by Owner and Engineer for each remote facility.
3. SAT shall demonstrate normal and abnormal conditions. Alarms and graphics shall be verified at an operator workstation and at the local OIT.
4. Onsite training shall be conducted for Owner operations and maintenance staff at the completion of the SAT.
5. SAT shall be conducted in a similar manner as FAT except on an operational system. Coordinate the SAT with Owner operations and maintenance staff.
6. Notify Owner and Engineer 2 weeks prior to testing.

#### B. Test Documentation

1. Maintain a copy of all the test documents and provide space for Owner and Engineer to sign off on witnessed testing.

### 3.04 TRAINING

#### A. General:

1. Training shall be conducted at Owner's facilities in a class room environment.
2. A comprehensive training program shall be provided covering the operation and maintenance of all elements of the SCADA System.
3. Training classes shall be tailored to the specific needs of the class participants. Separate curricula shall be developed for Operators, Maintenance Staff, and System Administrators.
4. Training classes shall be completed prior to the start of the Site Acceptance Test.
5. Instructors shall be highly qualified for technical training with demonstrated expertise in not only system functionality but also professional training techniques. Trainers should have no other duties that would interrupt training. Training shall not be combined with other activities such as Control System configuration or startup. Vendor Provided Training shall be conducted by Factory Authorized and Certified Trainers. Resumes and evidence of Qualifications of Instructors shall be provided as part of the Training Plan.
6. Complete, professional, training materials shall be provided for training classes including course outline and schedule, training manuals (in addition to Control System documentation), and review/testing materials. The training manuals shall be designed to not only assist the student's comprehension of the course material but also to serve as reference documents after the completion of training. Training materials shall be provided to students one week prior to class. Owner reserves the right to

make additional copies of training materials and record the training classes.

7. Training courses shall be a combination of classroom and hands-on training. To the extent possible, hands-on training shall utilize components from the new SCADA System.
8. Training shall be conducted onsite at Owner's facilities in a class room environment.
9. Multiple sessions will be required to allow Owner to conduct business while portions of the staff are in training.

B. Site Demonstration Training

1. Site demonstration training is training conducted immediately following successful SAT and is intended to train operations and maintenance personnel on the particular aspect of a site coming on line.
2. Training shall be conducted in the field.

C. Operator Training

1. Operator training is not only training for operators, but shall also be used as an introduction to the SCADA system and/or subsystem for maintenance, technicians and management. Provide an introductory session for a larger audience at the beginning of operator training classes.

D. RTU Programming Training

1. Provide training on the RTU logic to allow Owner's technicians to maintain the RTU programs and make changes. Identify any "hardcoded" timers, alarms, engineering units that the technicians should be aware of.

E. Administrator Training

1. Provide training on the HMI and Historian software. Include details on how the software was configured and how to make changes to the software.

F. Owner and Engineer Training

1. The Owner and Engineer intend to provide an overview of the project before Operator training is conducted. Coordinate operator training with Owner and Engineer so that the training can be seamless.

Training Description	Duration (Days)	Location	No. of Students
Operator Training	Two separate 1 day sessions	Owner	Up to 20
RTU Programming Training	3	Owner	Up to 5
Administration Training	2	Owner	Up to 5

END OF SECTION

## SECTION 409071

### DEMOLITION

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section Includes: The work specified in this Section consists of material for demolition and salvaging existing electrical systems, wiring, raceways, supports, equipment and minor repair of underlying structure.
- B. Related Sections:
  - 1. Section 01311 – Coordination with Owner.
  - 2. Section 409000 – Common Work Results for Process Control.

##### 1.02 REFERENCES

- A. National Fire Protection Association (NFPA):
  - 1. NFPA 70 - National Electrical Code (NEC), 2014

##### 1.03 DEFINITIONS

- A. Refer to Section 409000

##### 1.04 SUBMITTALS

- A. Submit demolition plan.

##### 1.05 QUALITY ASSURANCE

- A. Demolition information shown or otherwise indicated on the Drawings is based on visual field examination and existing record documents. The Contractor shall field verify the demolition work before starting demolition.
- B. Protection: Exercise care during demolition work to confine demolition operations to the areas as indicated on the Drawings. The physical means and methods used for protection are at the Contractor's option. However, the Contractor will be completely responsible for replacement and restitution work, of whatever nature, at no expense to the Owner.
  - 1. Additionally, if public safety is endangered during the progress of the demolition work, provide adequate protective measures to protect public pedestrian and vehicular traffic on streets and walkways.
  - 2. Conform signs, signals and barricades to requirements of Federal, State and local laws, rules, regulations, precautions, orders and decrees.

## 1.06 SEQUENCING AND SCHEDULING

- A. Schedule all work with the Owner. Do not start work in an area until a schedule has been prepared, submitted and approved. Refer to Section 013110 for additional requirements.
- B. Coordinate the work schedule with the Owner, and other Contractors. Coordinate the work to not interfere or conflict with the performance of work by the Owner.
- C. Coordinate all power outages with Owner.
- D. Perform demolition in a manner not to delay or interfere with other work of this project or of the Owner in operation of the facilities.

## PART 2 PRODUCTS

- A. Patching Materials: Patching materials shall match, as nearly as practical, the existing material for each surface being patched.

## PART 3 EXECUTION

### 3.01 INSPECTION

- A. Verify that measurements and existing circuiting arrangements are as shown on Drawings.
- B. Equipment, machinery and apparatus, motorized or otherwise, used to perform the demolition work may be used as chosen at the Contractor's discretion, but which will perform the work within the limits of the Contract requirements.
- C. Verify that abandoned wiring and electrical equipment serve only the abandoned facility.

### 3.02 DEMOLITION

- A. General:
  - 1. Remove, relocate and extend existing installations to accommodate new construction as indicated and/or as required.
  - 2. Remove exposed abandoned conduit systems, including abandoned conduit systems above accessible ceiling systems.
  - 3. Remove wiring in abandoned conduit systems to source of power supply.
  - 4. Maintain access to existing electrical installations, which remain active. Modify installations and provide access panels or plates as appropriate.
  - 5. Extend existing installations using materials and methods compatible with existing electrical installations.
  - 6. Wiring Devices:

- a. Disconnect and remove electrical devices and equipment serving equipment that has been removed.
  - 7. Equipment:
    - a. Disconnect and remove electrical equipment where so indicated on the Drawings.
  - 8. In exposed through-structure conduit locations, or where concealed conduits become exposed by penetrating a structural floor, wall or ceiling, the abandoned conduits must be cut below the finished structural surface in order to perform surface patching.
- B. Conduit openings or other demolition openings left in existing equipment enclosures, junction boxes, and or pull boxes which will remain after construction shall be covered. These conduit openings shall be covered with "snap in" or "screw in" type knockout closures used for this purpose. These knockout closures shall be the same as the NEMA rating of the enclosure, pull box, or junction box.
  - C. System De-activation: Prior to demolition and removal work, de-activate existing electrical systems as indicated and/or as required.
  - D. Use means and methods for permanent disconnection, which render the remaining electrical systems and apparatus in conformity with NFPA 70.
  - E. Provide temporary wiring and connections to maintain existing systems in service during construction.
    - 1. Conform temporary wiring to the requirements of NEC Article 400, Flexible Cords and Cables.
    - 2. Reinstate as soon as possible any existing circuits disrupted during construction not intended to be removed as part of this contract.
  - F. Remove all wiring from disconnected circuits, feeders, and equipment unless otherwise specified or indicated. Remove all exposed raceways and related supports. Cut all exposed raceways flush with floor and plug.
  - G. Use equipment and methods that do not damage items to remain or be salvaged and areas adjacent to demolition operations. Use methods that do not interfere with Owner's operations and which do not cause excessive dust. Remove debris as it accumulates.
  - H. Cutting: Perform cutting work of existing structure materials by such methods as will prevent extensive damage beyond the immediate area of cutting.
  - I. Debris Removal: Dispose of demolition debris off site in a lawful manner. Containerize or otherwise store debris as work is in progress.
  - J. Patching: After demolition and removal work is performed patch the existing structure as required to match surrounding finish and appearance including the appropriate surface decoration.

3.03 ABANDONED ELECTRICAL EQUIPMENT AND APPARATUS:

- A. Existing electrical equipment and apparatus in or on the structures not claimed as salvage by the Owner shall become the property of the Contractor and may not be disposed of on the site but removed and disposed of in a lawful manner off-site.

3.04 SALVAGE:

- A. The Owner shall have the right to claim as salvage any items and materials removed. Should such right of salvage be exercised by the Owner, move and neatly store removed items on the site in a location agreeable to the Owner.

3.05 HAZARDOUS MATERIALS

- A. In the case where there is lead based paint on existing equipment requiring removal, the Contractor shall do so to comply with all local, state, and federal regulations required for such removal.

END OF SECTION

## SECTION 409433

### HUMAN-MACHINE INTERFACE HARDWARE REQUIREMENTS

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section Includes: The general requirements for the SCADA top-end HMI hardware.
- B. Related Sections
  - 1. Section 409000 – Common Work Results for Process Controls
  - 2. Section 409434 – Human-Machine Interface Software

##### 1.02 REFERENCES

- A. Refer to Section 409000.

##### 1.03 ACRONYMS AND DEFINITIONS

- A. Refer to Section 409000

##### 1.04 SYSTEM DESCRIPTION

- A. Owner will provide servers and workstation for the project as identified in this section.  
The Owner's work will include:
  - 1. Installation of servers in server cabinets and connection to LAN/WAN.
  - 2. Installation of workstations and connection to LANs.
- B. Contractor shall install and configure application software for the project and assist Owner with any communications issue that may arise from connections to the WAN/LANs.

##### 1.05 SUBMITTALS

- A. Not applicable.



## PART 2 PRODUCTS

### 2.01 SERVERS

#### A. General

1. Owner will provide servers for the project and install the operating system.

#### B. Operating Systems

1. MS Windows Server 2012 R2
2. VMware ESXi, 6.0.0

#### C. Manufacturer

1. . Lenovo

### 2.02 SAN

#### A. General

1. Owner will provide SAN for the project.

### 2.03 GPS TIME SERVER

#### A. General

1. Owner will provide GPS time server for the project.

### 2.04 OPERATOR WORKSTATIONS

#### A. General

1. Owner will provide Operator Workstations (OWS), for the project.
2. Workstations will come configured with RDP manager installed.

#### B. Manufacturer

1. 5872v Linux 2GB RAM 2GB SATA

### 2.05 LAPTOPS

#### A. General

1. Owner will provide laptops for the project.

#### B. Software

1. MS Windows
2. VPN

#### C. Manufacturer

1. Lenovo

## PART 3 EXECUTION

### 3.01 CONFIGURATION

- A. The Owner will purchase the hardware with the operating systems installed, but it shall be the Contractor's responsibility to ensure the operating system has been configured properly for the project.
- B. Application software shall be installed on the hardware by the Contractor, refer to Section 409434 for software requirements.

### 3.02 TESTING

- A. The development server and one OWS will be furnished to the Contractor for application development and testing. Contractor will receive equipment from Owner at the Van de Water WTP and the Contractor shall make arrangements to have the equipment shipped to his facility. The development server shall be configured as the primary server for the FAT.
- B. Upon successful completion of the FAT, the Contractor shall install the applications on the appropriate servers and operator workstations in the field and fully test the software including failover during the HMI Site Acceptance Testing (HMI-SAT).
- C. Upon successful completion of the HMI-SAT, the development server configured as the primary server for the FAT shall be reconfigured as the development server.

END OF SECTION

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## SECTION 409434

### HUMAN-MACHINE INTERFACE SOFTWARE REQUIREMENTS

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section Includes: The general requirements for the SCADA top-end HMI software.
- B. Related Sections
  - 1. Section 409000 – Common Work Results for Process Controls.
  - 2. Section 409433 – Human-Machine Interface Hardware.
  - 3. Section 409635 – SCADA Programming Requirements.

##### 1.02 REFERENCES

- A. Refer to Section 409000.

##### 1.03 ACRONYMS AND DEFINITIONS

- A. Refer to Section 409000

##### 1.04 SYSTEM DESCRIPTION

- A. Software shall be purchased as a cash allowance and configured as specified in Section 409635.

##### 1.05 SUBMITTALS

- A. General: Submit in accordance with Section 409000 requirements. Submit in sufficient detail to show full compliance with Contract Documents.
- B. Product Data:
  - 1. For each component, include manufacturers descriptive literature; product specifications; published details; technical bulletins; performance and capacity, charts, and schedules; catalogue data sheets; and other submittal materials as required to verify that the proposed products conform to the quality and function ability of the specified products.

##### 1.06 OPERATION AND MAINTENANCE (O&M) MANUALS

- A. Provide operations and maintenance as specified in Section 409000.

##### 1.07 WARRANTY

- A. In accordance with Section 01783.

## PART 2 PRODUCTS

### 2.01 HMI

#### A. General

1. Provides a Human Machine Interface (HMI) graphics-based visualization for control and monitoring of the distribution system.
2. The HMI software shall operate on a MS Windows operating system.
3. Licensing shall provide for unlimited development.
4. Provide enhanced failover with active and standby nodes.
5. Provide application that will operate in an RDP environment.

#### B. Communications driver

1. I/O driver with DNP3, Modbus and SNMP protocol.
2. Product that is tightly integrated with HMI product and supported by HMI supplier.
3. Supports connectivity to historian.

#### C. Manufacturer

1. HMI Application
  - a. GE, Proficy iFIX.
  - b. GE, Proficy iClient.
2. Communications driver
  - a. Catapult Software, iPower latest version
  - b. GE, DNP3 master protocol
  - c. GE, IGS driver with Modbus and SNMP.

### 2.02 HISTORIAN

#### A. General

1. Realtime data repository for historical information.

#### B. Manufacturer

1. GE, Proficy iHistorian

### 2.03 SOP MANAGER

#### A. General

1. - Provide a configurable event engine that can trigger interactive Standard Operating Procedures (SOPs) and workflows from HMI and historian triggers.

#### B. Manufacturer

1. GE, Workflow

### 2.04 REPORT MANAGER

#### A. General

1. Provides the ability to design templates in Excel to collect data from any data source including HMI and historian applications.
2. Generate reports from Excel templates on-demand and automatically based on time of day or an HMI event.

B. Manufacturer

1. SyTech Inc., XLReporter

2.05 REDUNDANT RDP MANAGER

A. General

1. Provide terminal services manager that manages both the terminal server and the terminals.
2. Provide multi-monitor capability of up to five screens on a single thin client. Multi-monitor capability shall include the capability to span across multiple monitors and/or run individual or multiple session on each monitor.

B. Manufacturer

1. ACP, ThinManager

2.06 REMOTE ALARM NOTIFIER

A. General

1. Support email notification and SMS text notification.
2. The remote alarm notification system shall support multiple notification lists and escalation of notification protocols.

B. Manufacturer

1. Specter Instruments, WIN911 PRO

PART 3 EXECUTION

3.01 GENERAL

- A. Refer to Section 409635 for general programming requirements and Section 409650 for site specific programming requirements

3.02 SOFTWARE INSTALLATION

- A. Software shall be installed on the Owner furnished servers as follows:

QTY	Units	Description
<b>Primary Virtualized Server</b>		
1	ea	iFIX v5.8 Plus Development Unlimited Points with SCADA Synch & iPower
1	ea	Driver DNP3 Master Protocol for Unlimited points

QTY	Units	Description
1	ea	iClient v5.8 Thin-Terminal Services, Development 12 Clients with iPower
0.5	ea	Historin v6.0 Enterprise 5,000 tags, <b>Two Mirror</b>
1	ea	IGS Driver with Modbus and SNMP Drivers IGS- Industrial Gateway Server for Basic Points 1 Additional IGS Protocols: With Modbus and SNMP
0.5	ea	ThinManager XLr Software with 5 ThinManager Client Licenses (Mirrored). 1-year of Platform Maintenance Plan for TM-005 TMM-005 TMR-005 and Xli
0.5	ea	ThinManager Software with 10 ThinManager Ready Client licenses - Mirrored Licensing: 1-year of Platform Maintenance Plan for TM-010 TMM-010 TMR-010 and Xli
1	ea	WIN-911 Alarm Software for Additional Developer Telephony E-mail Paging & 2-way SMS. Includes XTools and first 6 months Maintenance and support.
1	ea	XLReporter Terminal Services (Run in Parralel) Profesional : XLReporter Single User Suite *Multiple Interface (*Plus Historian) for both real time and historical data consists of Product XLViewer (to be installed on the same machine as XL Reporter) XWeb Director and Extended Product Support (includes One Year Technical support Major Version Upgrades) Provides up to 500 connections per report/workbook. Unlimited reports/workbooks. XLReporter Single User Suite
<b>Backup Virtualized Server</b>		
1	ea	iFIX v5,.8 Runtime Unlimited Points, SCADA Synch & iPower
1	ea	Driver DNP3 Master Protocol for Unlimited points
1	ea	iClient v5.8 Thin-Terminal Services, Development 12 Clients with iPower
0.5	ea	Historin v6.0 Enterprise 5,000 tags, <b>Two Mirror</b>
1	ea	IGS Driver with Modbus and SNMP Drivers IGS- Industrial Gateway Server for Basic Points 1 Additional IGS Protocols: With Modbus and SNMP
0.5	ea	ThinManager XLr Software with 5 ThinManager Client Licenses (Mirrored). 1-year of Platform Maintenance Plan for TM-005 TMM-005 TMR-005 and Xli
0.5	ea	ThinManager Software with 10 ThinManager Ready Client licenses - Mirrored Licensing: 1-year of Platform Maintenance Plan for TM-010 TMM-010 TMR-010 and Xli
1	ea	WIN-911 Alarm Software for Additional Developer Telephony E-mail Paging & 2-way SMS. Includes XTools and first 6 months Maintenance and support.

QTY	Units	Description
1	ea	XLReporter Terminal Services (Run in Parralel) Profesional : XLReporter Single User Suite *Multiple Interface (*Plus Historian) for both real time and historical data consists of Product XLViewer (to be installed on the same machine as XL Reporter) XWeb Director and Extended Product Support (includes One Year Technical support Major Version Upgrades) Provides up to 500 connections per report/workbook. Unlimited reports/workbooks. XLReporter Single User Suite
<b>Development Server</b>		
1	ea	iFix v5.8 Plus Development Unlimited Points English iPower
1	ea	Driver DNP3 Master Protocol for Unlimited points
1	ea	Workflow v2.5
1	ea	IGS Driver with Modbus and SNMP Drivers IGS- Industrial Gateway Server for Basic Points 1 Additional IGS Protocols: With Modbus and SNMP
1	ea	Historian v6.0 Standard <b>500</b> Points
1	ea	WIN-911 Alarm Software for Telephony E-mail Paging & 2-way SMS and XTools. Must be purchased with primary WIN-911/PRO system. Note: Requires Telephony Card for Voice and GSM Modem for SMS WIN-911 Alarm Software
1	ea	XLReporter Single User Suite *Multiple Interface (*Plus Historian) for both real time and historical data consists of Product XLViewer (to be installed on the same machine as XL Reporter) XWeb Director and Extended Product Support (includes One Year Technical support Major Version Upgrades) Provides up to 500 connections per report/workbook. Unlimited reports/workbooks. XLReporter Single User Suite
<b>Enterprise Historian Server</b>		
1	ea	Historian v6.0 Standard <b>500</b> Points

B. The exact software licenses and quantities will be finalized after award.

### 3.03 SYSTEM HARDENING

- A. Before installation of the software programs, verify what operating services and programs are required for proper operation. Remove/uninstall non-essential applications and turn-off any non-required services. The software to be removed and/or disabled may include, but not be limited to the following
1. Games
  2. Messaging Services (MSN, AOL, IM, etc.)
  3. Clients or Servers for Internet services that are not used
  4. Device Drivers for network devices not included in the SCADA System
  5. Software compilers for languages that are not used in the SCADA System
  6. Software compilers in all user workstation and servers except for development workstations and servers



7. Unused communication and networking protocols
  8. Unused system management functions, diagnostics, administrative utilities, and network management
  9. Backups of database, files and programs used only during system development
  10. All unused configuration files and data
  11. Sample programs and scripts
  12. Unused document processing utilities (e.g., Microsoft Word, Excel, PowerPoint, Adobe Acrobat, etc.)
- B. Disable, through physical disconnection or software manipulation, all unneeded communication ports and removable media drives or provide engineered hardened barriers.
- C. Password protect the BIOS from unauthorized changes unless it is not technically feasible.
- D. Disable or remove all default and guest accounts

END OF SECTION

## SECTION 409513

### SCADA CONTROL PANEL HARDWARE REQUIREMENTS

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section Includes: General requirements for SCADA Control Panels and associated hardware
- B. Products Installed But Not Supplied Under This Section
  - 1. Reinstall existing UHF Radio, batteries and appurtenances in the control panels.
- C. Related Sections:
  - 1. Section 01783 – Extended Warranty and Maintenance
  - 2. Section 409000 – Common Work Results for Process Control
  - 3. Section 409635 – SCADA Programming Requirements

##### 1.02 REFERENCES

- A. In addition to the requirements of Section 409000, all materials and workmanship shall conform to the latest published applicable provisions of the following codes and standards:
  - 1. National Fire Protection Association
    - a. NFPA70 – National Electrical Code.
  - 2. National Electrical Manufacturers Association:
    - a. NEMA ICS 1 - Industrial Control and Systems: General Requirements.
    - b. NEMA ICS 4 - Industrial Control and Systems: Terminal Blocks.
    - c. NEMA ICS 5 - Industrial Control and Systems: Control Circuit and Pilot Devices.
    - d. NEMA ICS 6 - Industrial Control and Systems: Enclosures.
    - e. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts maximum)
  - 3. American National Standards Institute
    - a. ANSI-C-37.13 - Low Voltage AC Power Circuit Breaker (600 Volt Insulation Class)
  - 4. International Society of Automation
    - a. ISA-RP60.6 – Nameplates, Labels, and Tags for Control Centers

##### 1.03 DEFINITIONS

- A. Refer to Section 409000

##### 1.04 SUBMITTALS

- A. General: Submit in accordance with Section 409000 requirements. Submit in sufficient detail to show full compliance with Contract Documents.

B. Product Data:

1. For each component, include manufacturers descriptive literature; product specifications; published details; technical bulletins; performance and capacity rating curves, charts, and schedules; catalogue data sheets; and other submittal materials as required to verify that the proposed products conform to the quality and function ability of the specified products.

C. Shop Drawings:

1. Load Calculations

- a. Electrical load calculations shall be provided for power supplies, transformers and UPSs to determine that the appropriate size and capacity has been selected.
- b. Heating and cooling requirement calculations shall be provided.

2. Arrangement Drawings:

- a. Provide Arrangement Drawing for external front panel, and internal side and rear mounting sub-panels.
- b. Provide Bill of Materials, on Arrangement Drawing, identifying equipment shown. Equipment shall be referenced by a numerical item number.

Material schedule shall include the following information:

- 1) Item
- 2) Identity
- 3) Quantity
- 4) Description
- 5) Manufacturer
- 6) Catalog Number
- 7) Remarks

- c. Provide nameplate schedule, on the Arrangement Drawings, and include the following information:

- 1) Item
- 2) Quantity
- 3) Line 1 Text
- 4) Line 2 Text
- 5) Line 3 Text
- 6) Text Height
- 7) Nameplate Size

- d. Provide Legend schedule, on the Arrangement Drawings, and include the following information:

- 1) Item
- 2) Quantity
- 3) Line Text

3. Ladder Diagrams:

- a. Digital control shall be drawn with circuitry arranged in functional sequence on ladder type diagrams. Each horizontal line or "rung" on the ladder diagram shall be assigned a sequential number which shall be written to the left the ladder. The rung number shall be used to develop the wire numbers and relay numbers.

- b. Relay coils shall be drawn on the right side of the ladder. The line numbers on which the relay contacts appear shall be shown on the right of each coil. A normally closed contact shall be designated by drawing a diagonal line through the contact. Timed contacts shall be designated by letter "TR" under the line number.
- c. Field and control panel terminal blocks shall be shown on the drawing with the terminal numbers of devices.
- d. Symbols shall be NEMA standard and indicated on a symbols sheet.
- e. Field wiring shall be shown as a dashed line with cable number identified.
- f. RTU input modules shall be drawn on the right side of the ladder and controller output modules shall be drawn on the left side of the ladder.

#### 1.05 QUALITY ASSURANCE

##### A. Manufacturer Qualifications

- 1. Manufacturer engaged in the assembly of control panels for not less than three (3) years and who has experience with the assembly of Schneider Electric PLC/RTUs model M340.
- 2. Control panels shall be assembled within a 150 mile radius of the Owner's facilities.

##### B. Modifications to Panel Layout

- 1. The Contractor shall generally follow the arrangements of components shown on the Drawings. However, the Contractor shall make adjustments as necessary to allow each component to be mounted as recommended by the manufacturer, to facilitate easy installation, removal and in-place maintenance of each component, and to enable normal operation of the component. Component arrangements shall allow space for routing of wiring without kinking or bending around sharp edges, and for free flow of air around and through equipment that requires ventilation or cooling.
- 2. Equipment and materials shall have been tested by a testing laboratory; and shall meet, or exceed, nationally recognized standards, or have been found suitable for use in the specific manner as intended by the Engineer.
- 3. Equipment and materials utilized shall be included within published listings prepared by testing laboratories, inspection agencies or other organizations concerned with product evaluations.

#### 1.06 DELIVERY STORAGE AND HANDLING

- A. Store all control panels and accessories specified in this Section, which are delivered to the project site prior to the time the Contractor is ready to install them. Verify from the Contractor the maximum and minimum temperature and maximum relative humidity for storing the equipment, and conform to the Contractor's requirements. In any case, the minimum storage requirements will be not be less than 50 degrees F. Protect the equipment from humid conditions which might cause corrosion of the electrical and electronic parts of the equipment. Failure to store equipment in the specified or approved manner shall be sufficient reason for not accepting the

equipment, regardless of the outside appearance or warranty of the manufacturer. Protect all electronic equipment from a dusty environment by sealing the equipment in plastic, etc.

#### 1.07 PROJECT SITE CONDITIONS

- A. Environmental Requirements
  - 1. Refer to Section 409000

#### 1.08 SEQUENCING AND SCHEDULING

- A. Arrangement drawings and ladder diagrams shall be submitted after the field survey reports, I/O lists and P&IDs have been submitted and approved, refer to Section 409000.

#### 1.09 WARRANTY AND MAINTENANCE

- A. In accordance with Section 01783.

### PART 2 PRODUCTS

#### 2.01 CONTROL PANEL BACKPLATES

- A. General
  - 1. Control panel backplates or "panels" shall be pre-manufactured by the same manufacturer as the existing control panels
- B. Manufacturer
  - 1. Hoffman: CP3630 & A36P30

#### 2.02 NAMEPLATES

- A. General:
  - 1. New name plates shall be installed on the front door of all existing RTU control panels.
  - 2. Nameplates shall conform to ISA Recommended Practice publication ISA-RP60.6.
- B. Construction:
  - 1. Nameplates shall be used to display basic information including function.
  - 2. Letters shall be gothic upper case (capital letters), minimum height shall be 1/8 inch with a 3/64 inch space between lines.
  - 3. Nameplates shall be made of laminated engraving stock having a white core with a black surface.
  - 4. The characters shall be engraved using an industry standard engraving machine.
  - 5. Nameplates shall be attached to the enclosure using double-faced pressure-sensitive tape. Where the environment is not conducive to tape i.e. outdoors,

NEMA 4, 4X, and 3R environments stainless steel screws shall be used in place of the tape.

6. Enclosure identification nameplates shall be larger sized letters, 3/16 inch minimum.
7. Abbreviations shall conform to appendix B of ISA Recommended Practice publication ISA-RP60.6.
8. Margins shall conform to the following:
  - a. With holes
    - 1) Top/bottom - 1/16" min
    - 2) Sides left/right - 5/16" min
  - b. Without holes
    - 1) Top/bottom - 1/16" min
    - 2) Sides left/right - 1/8" min

### 2.03 ADHESIVE LABELS

- A. General: All labels shall conform to ISA Recommended Practice publication ISA-RP60.6.
- B. Construction:
  1. Adhesive labels shall be used inside the panel to identify equipment.
  2. The labels shall be smudge proof and shall have an adhesive back. The printing on the labels shall be done by mechanical means only.

### 2.04 LEGEND PLATES

- A. General: All legend plates shall conform to ISA Recommended Practice publication ISA-RP60.6.
- B. Construction:
  1. Legend plates shall be used to display basic functions of push buttons, selector switches and pilot lights.
  2. Letters shall be gothic upper case (capital letters), minimum height shall be 1/8 inch with a 3/64 inch space between lines.
  3. Legend plates shall be made of laminated engraving stock having a black core with a white surface.
  4. The characters shall be engraved using an industry standard engraving machine.
  5. Legend plates shall be held to the enclosure by the ring nuts used to hold the operator in place.
  6. All legend plates for a particular panel shall be of the same size and shape.

### 2.05 WIRE MARKERS

- A. General: All wire markers & tags shall conform to ISA Recommended Practice publication ISA-RP60.6.
- B. Construction:

1. Each wire shall be identified on both ends of the wire with wraparound or shrink type wire markers.
2. The wire marker number shall be a unique number, incorporates the instrument / equipment tag number if applicable, shall be easily cross referenced with schematic drawings, and shall have the same number on both sides of the wire.

C. Manufacturers:

1. Brady
2. Approved equal

## 2.06 ANALOG SIGNAL WIRING

A. General:

1. Signal wiring shall be 18 gauge twisted pairs with foil shield and drain wire. The insulation shall be 600 volt, 90° C. Drain wires shall be grounded at the panel only.

B. Manufacturers:

1. Beldon

## 2.07 POWER AND CONTROL WIRING

A. General:

1. Control wiring shall be 16 gauge, 600 volt, type THHN/MTW. Power wiring shall be 600 volt type THHN/MTW sized as required.

## 2.08 TERMINAL BLOCKS

A. General

1. Unless otherwise shown or specified, terminal blocks shall be captive screw with pressure plate, DIN rail mounted, 600 volt rating.

B. Manufacturers

1. Phoenix Contact
  - a. Block module UT4 & UT4BU
  - b. End covers for single high terminals block # 3047028
  - c. Double high terminal blocks model UTTB4BU
  - d. End covers for double high terminal blocks model D-UTTB2 5/4
  - e. End clamp model E/NS-35-N # 0800886.
  - f. Ground block model UT4-PE
  - g. DC 5x20mm fuse block #3004126
  - h. AC 5x20mm fuse block #3004142
  - i. Terminal Labels #ZB6 #1051003
  - j. Blue Jumpers FBS20-6BU

C. Spares

1. Provide ten (10) spare fuses of each type.

## 2.09 FUSED TERMINAL BLOCKS

### A. General

1. Unless otherwise shown or specified, terminal blocks shall be captive screw with pressure plate, DIN rail mounted, 600 volt rating.
2. Glass Fuse
3. Rated Surge 6 kV
4. LED indicator

### B. Manufacturers

1. Phoenix Contact
  - a. DC 5x20mm Fuse Block # 3004126
  - b. AC 5x20mm Fuse Block # 3004142
2. Fuses
  - a. Bussman S505 time-delay

### C. Spares

1. Provide ten (10) spare fuses of each type.

## 2.10 CIRCUIT BREAKERS

### A. Description:

1. Provide DIN rail type quick-make, quick-break thermal magnetic type.

### B. Spares

1. Provide two (2) of each type.

### C. Manufacturers:

1. Square D 10A model 60110
2. Square D 15A model 60112.
3. Square D 20A model 60110.

## 2.11 RELAYS (120 VAC)

### A. Description:

1. Coil
  - a. Nominal input voltage  $U_N$ : 120 VAC
  - b. Typical input current at  $U_N$ : 3.5 mA (at 120 VAC)
  - c. Typical response time: 6 ms
  - d. Typical release time: 15 ms
  - e. Protective circuit: Bridge rectifier
  - f. Operating voltage display: Yellow LED
  - g. Power dissipation for nominal condition: 0.42 W
2. Contacts
  - a. Contact type: SPDT
  - b. Contact material: AgSnO
  - c. Maximum switching voltage: 250 V AC/DC
  - d. Minimum switching voltage: 5 V (at 100 mA)



- e. Min. switching current: 10 mA (at 12 V)
- f. Limiting continuous current: 6 A
- g. Interrupting rating (ohmic load) max: 140 W (at 24 V DC)

B. Spares

- 1. Provide two (2) spares of each type.

C. Manufacturers:

- 1. Phoenix AC RELAY# 2966197

## 2.12 RELAYS (24 VDC)

A. Description

- 1. Contact Form : SPDT
- 2. Current Rating: 6 A
- 3. Current, Rating: 6 A
- 4. Function: PLC
- 5. Material, Contact: AgSnO
- 6. Power, Rating : 140 W
- 7. Relay Type: Electro Mechanical
- 8. Standards: cULus, UL, RoHS
- 9. Temperature, Operating, Maximum: 60 °C
- 10. Temperature, Operating, Minimum: -20 °C
- 11. Termination: Screw
- 12. Voltage, Control: 24 VDC
- 13. Voltage; Rating: 250 VAC/VDC

B. Spares

- 1. Provide two (2) spares of each type.

C. Manufacturers:

- 1. Phoenix Part Number: PLC-RSC- 24DC/21 model 2966171

## 2.13 SURGE PROTECTION DEVICE

A. Description:

- 1. Type 3 SPD
- 2. IEC test classification: T3
- 3. Nominal voltage: 120 V AC
- 4. Nominal frequency: 60 Hz
- 5. Voltage protection level (L-N):  $\leq 620$  V
- 6. Response time (L-N):  $\leq 25$  ns
- 7. Surge protection fault message: Optical, remote indicator contact

B. Manufacturers

- 1. Phoenix surge suppressor model #2839334 with #2839282 base.

C. Spares

1. Provide two (2) of each type.

## 2.14 24 VOLT POWER SUPPLY

### A. Description:

1. 24 volt switching power supply
2. Input
  - a. Nominal input voltage range: 100 VAC to 240 VAC
  - b. Input voltage range: 85 VAC to 264 VAC
  - c. Inrush surge current: < 15 A (typical)
  - d. Power failure bypass: > 36 ms (120 V AC)
  - e. Input fuse 10 A (slow-blow, internal)
  - f. Type of protection: Transient surge protection
  - g. Protective circuit/component: Varistor, gas-filled surge arrester.
3. Output
  - a. Nominal output voltage 24 V DC  $\pm 1\%$
  - b. Setting range of the output voltage: 18 VDC to 29.5 VDC (> 24 VDC, constant capacity restricted)
  - c. Nominal output current: 10 A (-25°C ... 60°C at 24 VDC)
  - d. POWER BOOST 15 A (-25°C to 40°C permanent, at 24 VDC )
  - e. Connection in parallel: Yes, for redundancy and increased capacity
  - f. Output power: 240 W
  - g. Maximum power dissipation in no-load condition: 9.1 W

### B. Spares

1. Provide two (2) spares of each type.

### C. Manufacturers:

1. Phoenix Contact #2866763.

## 2.15 WIRING DUCT

### A. Description:

1. Plastic wiring duct shall be slotted type with dust cover.

### B. Manufacturers:

1. Panduit
  - a. 1"W x 3"H # F1X3WH6,
  - b. 1.5"W x 3"H # F1.5x3WH6.

## 2.16 WIRE FERRULES

### A. General

1. Nylon insulated. Color shall match the color of the wire insulation
2. Electrically tin plated copper.
3. Used to terminate wires to terminal blocks.

### B. Spares

1. None

## 2.17 REMOTE TERMINAL UNITS (RTU)

### A. Description:

1. CPU:
  - a. Communication module processor with 2 Ethernet communication ports.
  - b. Port Ethernet: 10BASE-T/100BASE-TX
  - c. Communication service: SNMP network administrator, Ethernet TCP/IP, Rack Viewer, Ethernet TCP/IP, Modbus TCP messaging, Ethernet TCP/IP, Data Editor, Ethernet TCP/IP, Bandwidth management, Ethernet TCP/IP
  - d. Memory description: Supplied memory card (BMXRMS008MP) for activation of standard web server, class B10 3584 kB internal RAM for program constants and symbols 256 kB internal RAM for data 4096 kB internal RAM Supplied memory card (BMXRMS008MP) for backup of programs, constants, symbols and data
  - e. Status LED: 1 LED yellow activity on Modbus (SER COM) 1 LED red processor or system fault (ERR) 1 LED red memory card fault (CARD ERR) 1 LED red I/O module fault (I/O) 1 LED red data rate (ETH 100) 1 LED green status of Ethernet network (ETH STS) 1 LED green processor running (RUN) 1 LED green activity on Ethernet network (ETH ACT)
  - f. Ambient air temperature for operation: 32...140 °F (0...60 °C)
  - g. Relative humidity: 10...95 % without condensation
2. Power Module:
  - a. 24 volt input power
  - b. Size power module to accommodate future spare chassis slots.
3. Input and Output (I/O) Modules:
  - a. Provide I/O modules with remote termination option.
4. Chassis:
  - a. Provide chassis sized to accommodate two future I/O modules.
5. Blank slot covers
  - a. Provide blank slot covers to cover blank slots.
6. Communications protocol:
  - a. MODBUS over Ethernet
  - b. DNP3 over Ethernet

### B. Spares

1. Provide 2 spares of each type.

### C. Manufacturer:

1. Schneider Electric M340
  - a. Processor: # BMXP342020
  - b. Backplane: # BMXXBP0800
  - c. Power supply: # BMXCPS3020
  - d. Communications: NOE CARD # BMXNOE0100
  - e. 16 point DI card: # BMXDDI1602
  - f. 8 point AI card: # BMXAMI0810

- g. 8 channel DO card: # BMXDRA0805
- h. DNP3 module: # BMXNOR0200H
- i. Analog Terminal Block: # ABE7CPA03
- j. 16 PDI terminal: # BMXFTB2000
- k. Analog Wiring Harness # BMXFTA150

## 2.18 OPERATOR INTERFACE TERMINAL (OIT)

### A. Description:

1. Display Type: TFT Color LCD
2. Display Size: 5.7"
3. Resolution: 320 x 240 pixels (VCA)
4. Effective Display Area: W 115.2 x H 86.4 mm [W 4.54 x H 3.4 in.]
5. Display Colors: 65,536 Colors (No blink)/16,384 Colors (Blink)
6. Backlight: White LED
7. Brightness Control: 8 Levels (Adjusted with the touch panel of the software)
8. Backlight Service Life: 50,000 hrs. or more (continuous operation at 25°C [77 °F] before backlight brightness decreases to 50%)
9. Character Sizes: Standard font: 8 x 8, 8 x 16, 16 x 16 and 32 x 32 pixel fonts, Stroke font: 6 to 127 pixel fonts, Image font: 8 to 72 pixel fonts
10. Font Sizes: Standard font: Width can be expanded up to 8 times. Height can be expanded up to 8 times.
11. Program Area: FLASH EPROM 132 KB (Equivalent to 15,000 steps)\*1
12. Application Memory: FLASH EPROM 16 MB (including a logic program area)
13. Data Backup: SRAM 128 KB (Rechargeable Lithium battery for backup memory)
14. Clock Accuracy: ±65 sec/month (deviation at room temperature and power is OFF)\*2
15. Touch Panel Type: Resistive Film (analog)
16. Touch Panel Resolution: 1,024 x 1,024
17. Touch Panel Service Life: 1,000,000 times or more
18. Serial (COM1): RS-232C Asynchronous Transmission Data Length: 7 or 8 bits, Parity: none, Odd or Even, Stop Bit: 1 or 2 bits, Data Transmission Speed: 2,400 bps to 115.2 kbps, Connector: D-Sub9 (plug)
19. Serial (COM2): RS-422/485 Asynchronous Transmission Data Length: 7 or 8 bits, Parity: none, Even or Odd Stop Bit: 1 or 2 bits, Data Transmission Speed: 2,400 bps to 115.2 kbps, 187.5kbps (MPI) Connector: D-Sub9 (plug)
20. Ethernet (LAN): IEEE802.3i/IEEE802.3u, 10BASE-T/100BASE-TX Connector: Modular jack (RJ-45) x 1
21. USB (TYPE-A): Conforms to USB2.0 (TYPE-A) x 1, Power Supply Voltage: DC 5 V ±5 %, Output Current: 500 mA or less, Communication Distance: 5 m [16.4ft.] or less
22. USB (mini-B): Conforms to USB2.0 (mini-B) x 1, Communication Distance: 5 m [16.4ft.] or less
23. SD Card: None
24. Communications: MODBUS over Ethernet.

B. Spares

1. Provide two (2) spares.

C. Manufacturer:

1. Proface HMI # PFXGP4303TADW

## 2.19 UNINTERRUPTIBLE POWER SUPPLY (UPS)

A. Description:

1. Input

- a. Nominal input voltage range: 27.8 V DC
- b. Input voltage range: 18 V DC to 30 V DC
- c. Current consumption (maximum): 19 A (Maximum, mains operation)
- d. Current consumption (idle): 10.4 mA (No load, mains operation)
- e. Current consumption (charging process): 4 A (Charging, mains operation)
- f. Buffer period: 3 h (With battery module 38 AH)

2. Output:

- a. Nominal output voltage: 24 VDC
- b. Output voltage range (depends on the input voltage): 19.2 VDC to 27.6 VDC
- c. Nominal output current: 10 A (-25 °C to 60 °C)
- d. POWER BOOST: 15 A (-25°C to 40°C)

B. Spares

1. Provide two (2) spares.

C. Manufacturers:

1. Phoenix Quint 24Vdc 10A UPS # 2320225

## 2.20 PANEL LAN SWITCH

A. Description:

1. 24 volt Ethernet managed switch with eight 10/100 Mbps RJ45 ports.

2. Interfaces

- a. No. of ports: 8 or 16 (RJ45 ports)
- b. Auto negotiation and auto crossing
- c. Transmission speed: 10/100 MBit/s
- d. Transmission length: 100 m (per segment)
- e. Interface connection: Serial (RS-232), 6-pos. MINI-DIN socket (PS/2)

3. Functions

- a. Basic functions: Store-and-forward switch complies with IEEE 802.3, 4 priority classes according to IEEE 802.1p, TCP/IP protocol, BootP-compatible, port mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), DHCP server, PTCP filter
- b. Management: Web-based management (HTTP)
- c. SNMP: v1/v2
- d. Serial interface (V.24)

- e. Diagnostic functions: 1:1-Portmirroring
- f. Filter functions:
  - 1) Quality of Service
  - 2) VLAN (up to 8 VLANs)
  - 3) IGMP Query
  - 4) Auto-Query-Port
  - 5) Extended Multicast Filtering
- g. Supported browsers: Internet Explorer 5.5 or higher
- h. Redundancy:
  - 1) STP (Spanning Tree Protocol)
  - 2) RSTP (Rapid Spanning Tree Protocol)
  - 3) FRD (Fast Ring Detection)
  - 4) Large Tree Support
- i. Status and diagnostic indicators: LEDs: US1, US2 (power supply), Fail (alarm contact), 2 LEDs per Ethernet port (Link/Activity and Speed)
- j. Signal contact control voltage: 24 V DC (typical)

B. Spares:

- 1. Provide two (2) spares of each type.

C. Manufacturers:

- 1. 8 Port: Phoenix Contact, FL Switch SMCS 8TX, Model # 2989226.
- 2. 16 Port: Phoenix Contact, FL Switch SMCS 16TX, Model # 2700996.

## 2.21 DIN RAILS

A. General:

- 1. Horizontal rails
  - a. Material: Steel
  - b. Coating: Galvanized, passivated with a thick layer
  - c. Color: silver
- 2. Vertical rails
  - a. Material: Aluminum
  - b. Color: Silver

B. Manufacturers

- 1. Phoenix DIN RAIL 35MM #NS35/15 #1208160.
- 2. ABB/Entrelec Model XUS001735 Tall aluminum DIN rail.

## 2.22 DISCONNECT SWITCH

A. General:

- 1. Front operated disconnect switch
- 2. Mounting Type: Door mounting
- 3. Ampere Rating: 25A

B. Manufacturer

- 1. ABB

- a. Switch handle: Type OHY2RJ model 1SCA022353R3060
- b. Disconnect switch: Type OT25FT3 model 1SCA104884R1001

## PART 3 EXECUTION

### 3.01 FABRICATION

#### A. WIRING

1. All wiring shall conform to the following color code:
  - a. 120 VAC power wires 1 phase i.e. lights, heaters - Black hot and white neutral.
  - b. 120 VAC control wires – red
  - c. 120 VAC externally powered – yellow
  - d. +24 VDC – Brown
  - e. 24 VDC common - Blue
  - f. Ground – Green
2. To avoid inductive pickup power wiring or control wiring shall have a maximum possible separation from signal wiring. A practical distance is not less than 6 in. If power wiring has to cross the signal wiring, the crossing should be as close to a right angle as possible.
3. Wires shall be run in open slot vinyl wire duct with covers. Wireduct shall be held to the back plate with 10-32 X ½” Philips pan heads, filled no more than 75% of the manufacturer’s recommended maximum fill capacity. Where it is not practical to use wireduct, wire ties shall be used to bundle the wires together in a neat and professional manner.
4. Where wire is required to flex often (i.e. around door hinges) high strand wire and spiral wrap shall be used.
5. Wires that are not de-energized by the main breaker shall be of the same color and labeled with a warning label stating same.
6. Control power and neutral shall not be jumped from device to device. Power distribution blocks shall be used.
7. Analog signal wiring drain wires shall be grounded at the panel only.
8. All spare RTU input/output points shall be terminated to the terminal blocks.
9. Single wire and cable conductors shall be terminated according to the requirements of the terminal device.
10. For captive screw pressure plate type terminals, ferrules shall be used with the manufacturer recommended crimping tool.
11. No more than two conductors shall be installed in a single terminal/ferrule. Ferrules designed for two conductors shall be used. All strands of the conductor shall be captured in the ferrule.
12. On shielded cables, the drain wire shall be covered with insulating tubing along its full bare length between the cable jacket and the terminal lug or terminal pressure plate.
13. Terminal blocks carrying 120VAC power circuits shall be provided with a transparent, hinged cover for personnel protection and accessibility.

- B. Enclosure shall be equipped with a 120 VAC main power disconnect circuit breaker and power distribution circuit breakers. For each power distribution circuit breaker, a neutral return terminal block shall be installed at the bottom of the breaker rail. The neutral return terminal block shall be standard DIN rail mounted, and shall be rated to carry required amperes and accept up to two 12 AWG wires.
- C. Enclosures shall be provided with grounding GFCI type receptacle power outlets for 120 VAC power supply connections as shown.
- D. Grounding
  - 1. Two 1/4" x 1" copper ground buses shall be supplied with each enclosure.
  - 2. One ground bus shall be a non-isolated ground bus that is electrically bonded to the panel and shall be used to ground all equipment. All equipment ground wires shall be run directly from the equipment to the non-isolated ground bus.
  - 3. The other ground bus shall be an isolated ground bus and shall be use to ground the drain wire of signal wiring. No more than 5 drain wires shall be jumpered together before being run to the isolated ground bus. The isolated ground bus shall be connected to the non-isolated grounded bus with one piece of 10 gauge wire.
  - 4. Connect all TVSS devices to the non-isolated ground bus with a dedicated green colored ground conductor that is a minimum #6 AWG. The TVSS ground conductor shall be as short as possible. Reliance on the TVSS mounting channel alone for the ground connection is not acceptable.
- E. Wire Tagging
  - 1. All panel connection wiring shall be tagged at terminations with machine printed, slip on, tags. Provide wire/cable tag designations on all wiring diagrams.
  - 2. Place within two inches of any wiring termination. The tag shall be fixed to the wire to prevent the tag from sliding more than two inches from the terminal as the result of gravity and vibration.
  - 3. Control Circuits: Each individual connection wire shall be tagged at both ends of the wire with a wire number. The tag shall be placed on the wire within two inches of the terminal to which the wire is terminated. The Contractor shall assign a unique number for each wire within a panel.
  - 4. Power Circuits: All 120 VAC power wires shall be tagged with the designation "120 VAC-" followed by the circuit breaker number shown on the Drawings, then followed by a letter designating whether the wire carries the line (L), neutral (N) or power ground (PG).
  - 5. Positive 24 VDC power circuit and power bus wires shall be tagged with the designation "+24 VDC-" followed by the circuit breaker number shown on the Drawings, and 24 VDC power returns shall be designated with "24 VDC COMMON".
  - 6. Signal circuit multi-conductor cables shall be tagged at each end with the designation shown on the wiring diagram. Each signal conductor shall be tagged at each end with the designation of the terminal block to which it is connected. Individual conductors in each pair of twisted-pair cable shall have distinctly different colors, such as black and white, black and clear. Shield ground common



wires connected between drain wire terminals shall be green and shall be tagged "SG".

7. Each terminal strip shall have a unique identifying alphanumeric code designation at one end and a plastic marking strip running the entire length with a unique number for each terminal. The terminal strip designation shall be the letters "TB" followed by the terminal strip number. The strip and terminal point designations shall be machine printed.

### 3.02 UNWITNESSED FACTORY TESTING

#### A. General:

1. The intent of the Testing is to uncover and correct all wiring errors and defective devices prior to the Functional Factory Acceptance Test (FAT).
2. Supply the test facilities and all necessary hardware to perform the test procedures.
3. After tested and corrected all wiring errors and replaced all defective devices, the Engineer shall witness a complete final factory test of the control panel prior to the Functional Factory Acceptance Test (FAT).
4. An unwitnessed test shall be conducted and results documented before the witnessed testing

#### B. Inspection

1. Verify that all enclosure devices are installed and labeled per the approved control panel drawings and the bill of materials.
2. Verify that the control panel has been fabricated per this section and the approved control panel drawings.
3. Confirm proper grounding of the control panel devices
4. Confirm all component communications cables are installed per the approved control panel drawings.

#### C. Voltage Test

1. Confirm that the required input supply voltage is supplied to the enclosure, by measuring the input voltage, with a voltmeter, across the input terminals.
2. Confirm that all 120 VAC power supplies are functioning properly, by measuring the output voltage, with a voltmeter, across the power terminals.
3. Confirm that the 24/28 volt power supply is functioning properly, by measuring the output voltage, with a voltmeter, across the power terminals reads 27.8 volts.
4. Confirm proper voltage is available at each control panel device, including the I/O modules wetting voltage.

#### D. Input/Output Test

1. At the respective external terminal block, verify each controller analog input with the use of an analog signal generator. Make sure the proper setting is selected for the respective input type (2-wire current, 4-wire current, RTD, T/C). Using the specific programming software tools, verify that the proper value is read by the RTU. At a minimum, check proper value for 0%, 50%, and 100% of input range.

- Using the control panel wiring diagrams as a checklist, mark each analog input as it is checked.
2. At the respective external terminal block, verify each RTU analog output with the use of an ammeter or other current measuring device. Using the RTU programming software tools, force the respective analog output at 0%, 50% and 100% of the output range and verify that the proper value is read by the ammeter. Using the control panel wiring diagrams as a checklist, mark each analog output as it is checked.
  3. At the respective external terminal block, verify each RTU digital input utilizing a copper jumper wire or test switch. Using the RTU programming software tools, verify that the selected input either is turned on or off by the RTU in response to the jumper or test switch position. Using the control panel wiring diagrams as a checklist, mark each digital input as it is checked.
  4. At the respective external terminal block, verify each RTU digital output with the use of an ohmmeter (for isolated outputs) or voltmeter (for non-isolated outputs). Using the RTU programming software tools, force the respective digital outputs on or off and verify that the proper output state is indicated by the ohmmeter/voltmeter. Using the control panel wiring diagrams as a checklist, mark each digital output as it is checked.
  5. If any I/O point does not function as expected, the wiring and hardware shall be examined and the wiring or hardware shall be corrected and the I/O point retested.
- E. Operator Interface Terminal (OIT) Test
1. Confirm proper input voltage is available at the OIT.
  2. Turn on the OIT and verify that the monitor illuminates. Follow the directions in the OIT user's manual to confirm communications with the controller.
- F. Communications
1. Verify that all communication cables are installed as shown on the approved control panel drawings. Verify proper communication between control panel devices, where practical.
- G. Backup Power Test
1. Verify that the installed UPS system delivers power when the normal AC power source is removed. Verify that proper status lights indicate correctly. Provide temporary batteries for this testing.
- H. Hardwired Circuits Test
1. Functionally test all hardwired control circuits as shown on the approved control panel drawings. Verify that all devices (i.e. selector switches, push buttons, pilot lights, relays, etc.) are wired and function correctly.
  2. Functionally test all discrete analog devices and circuits as shown on the approved control panel drawings. Verify that all devices (i.e. signal isolators, process indicators, single loop controllers, direct current alarms, etc.) are wired, calibrated and function correctly.
- I. Test Documentation

1. Maintain a copy of all the test documents used for the testing of the control panel. The test documents should include all notations made during the test. The notations should include all modifications made to the hardware and/or wiring to correct any deficiency.
2. The person performing the test should initial and date any control panel drawings used as a checklist or guide for the control panel testing.
3. Provide a marked copy of the test forms.

### 3.03 FACTORY ACCEPTANCE TEST (FAT)

- A. Provide a test panel wired to the control panels for testing. The test panel shall have toggle switches, 10-turn pots, pilot lights, etc. Provide labeling of the devices on the test panel indicating the field device that they represent.
- B. A dedicated PLC/RTU and OIT may be used in place of the test panel and is not required to be the same make and model as specified for the control panels. The OIT shall have graphic objects that provide the same functionality as described for the test panel with appropriate labeling. The OIT shall read and write directly to the test PLC/RTU I/O and the test PLC/RTU I/O shall be hardwired to the control panel RTU.
- C. FAT shall be conducted as indicated in section 409000.

END OF SECTION

## SECTION 409635

### SCADA PROGRAMMING REQUIREMENTS

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section Includes: The general requirements for HMI, RTU and OIT configuration.
- B. Related Sections
  - 1. Section 409000 – Common Work Results for Process Controls.
  - 2. Section 409650 – Process Control Narratives.
  - 3. Appendix D – HMI Style Guide.
  - 4. Appendix E – Existing HMI Graphics.

##### 1.02 REFERENCES

- A. Refer to Section 409000

##### 1.03 DEFINITIONS

- A. Refer to Section 409000

##### 1.04 COORDINATION AND PRE-INSTALLATION MEETINGS

- A. Functional Description and P&ID Review Workshops as specified in Section 409000.
- B. HMI Graphics/Alarming and OIT Graphics Review Workshops as specified in Section 409000.
- C. RTU Programming Workshops as specified in Section 409000.

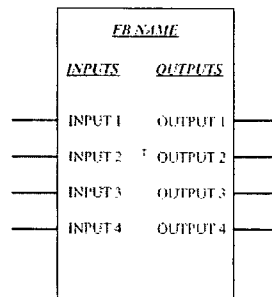
##### 1.05 SYSTEM DESCRIPTION

- A. Refer to Section 409000

##### 1.06 SUBMITTALS

- A. General: Submit in accordance with Section 409000 requirements. Submit in sufficient detail to show full compliance with Contract Documents.
- B. Shop Drawings:
  - 1. HMI Screens
    - a. Provide color graphics of the site specific screens, navigation screen, overview screens, alarm screens, etc.
    - b. Identify animated objects and pop-ups on the screens and how they function.
  - 2. Function Block List

- a. Provide list of function blocks to be used for the project. Provide enough detail to evaluate the function block's operation and use.
- 3. Function Block Documentation.
  - a. After approval of function block list provide the following documentation for each function block.
    - 1) Function Description
      - a) Provide a description of the purpose and function of each FB. Include graphs and calculations as necessary to fully describe the functionality.
    - 2) Graphical representation
      - a) Provide graphical representation of the function block shall be developed and shown in the documentation as follows:



3) Inputs and Outputs

- a) Describe each input and output in a table format

Tag Name	Description
Input 1/Output 1	
Input 2/Output 2	

- b. Revision control
  - 1) The contractor shall revise FB library documentation as necessary throughout the project and keep track of what RTUs have what revision of a particular function block.
- 4. Function Block Code
  - a. Provide fully documented with comments.
- 5. OIT Screens
  - a. Provide color graphics of the site specific OIT screens.
  - b. Note where the OIT differs from HMI screens.
  - c. Identify animated objects and pop-ups on the screens and how they function.
  - d. Provide information on any special setting including communications.
  - e. Provide electronic copy of the source code.
- 6. Remote station/Site specific tag database
  - a. Provide tag database in an MS Excel spreadsheet format. Separate RTU tag databases by tabs or files.
  - b. Include tag name, type of tag (AI, Internal register, etc), Tag description, etc.
  - c. Identify tags used for communications with HMI and other RTUs.
  - d. Tag names shall follow Owner's new tag naming convention.
- 7. Remote Station/Site Specific RTU Programs

- a. Provide fully documented with comments in the body of the program. Provide a loop title and an abstract of the function that particular portion of the code is to perform. This may be an abridged version of the functional description.
  - b. Provide a revision block. The revision block shall contain the date of the change, who made the change, and a brief description of the change made. The revision block shall be removed after the program has been accepted.
  - c. Provide information on any special setting of the RTU including communications settings.
  - d. Provide printed copy and electronic copy of the source code.
8. Complete I/O List
- a. The field verified RTU I/O list shall be used to develop a comprehensive virtual and real I/O list. All virtual I/O required for the RTU and HMI shall be included in the list.
  - b. Provide the list in Excel format. Include tag name, description, location of tag (RTU-site X, HMI, etc) and any other information necessary to fully describe each tag within the system.
  - c. Real I/O shall include the RTU address and memory mapping.

C. Closeout Submittals

- 1. Updated Owner's HMI Style Guide
  - a. Provide updated style guide to reflect actual symbols, convention, and methods used to develop the screens for this project.
- 2. Operations and Maintenance (O&M) Manuals
- 3. RTU and OIT Station/Site specific programs
  - a. Provide source code on CDs to Owner after each SAT.
- 4. RTU Programming Standard
  - a. Provide RTU programming standard for Owner to use for programming additional RTUs.
  - b. Include function block library, recommended communications setting, I/O modules, etc.
  - c. Standard shall provide enough detail to allow Owner staff to program an RTU using only the standard and functional descriptions for a remote station.

1.07 QUALITY ASSURANCE

- 1. HMI and OIT programming shall follow Owner's HMI Style Guide.

1.08 WARRANTY

- A. Refer to Section 409000

1.09 MAINTENANCE AND SUPPORT SERVICES

- A. Refer to Section 409000

## PART 2 PRODUCTS

NOT USED

## PART 3 EXECUTION

### 3.01 GENERAL PROGRAMMING REQUIREMENTS

- A. Startup Initialization:
  - 1. On power-up of the RTU, the default state shall be "Remote Manual". It shall be the responsibility of an operator to manually place the equipment in the desired operating mode.
- B. Equipment Run Time:
  - 1. In an effort to support routine maintenance functions, all motorized equipment (pumps, motors, motorized gates, etc.) shall have its runtime and number of starts monitored. The runtime shall be monitored in tenths of an hour increment (every six minutes). Both the runtime and number of starts shall continue to be collected until reset by an operator with the proper access right from the HMI/OIT. When reset, both values shall be set to zero, and the date/time when it was reset shall be logged in the SCADA historian.
  - 2. Two runtime parameters shall be provided for equipment:
    - a. Accumulated Runtime – Accumulates for the life of the equipment
    - b. Resettable Runtime – Runtime with reset capabilities.
- C. Deviation Alarming:
  - 1. Deviation alarming capability shall be integrated into the equipment monitoring alarming scheme. A deviation alarm occurs when an un-commanded change of state occurs for a particular piece of equipment. For instance, the operator commanded a pump to start and after running for a certain amount of time, the pump turns itself off without any intervention. This condition shall cause a deviation alarm and the equipment failure shall be indicated on the process display.
- D. Signal Conditioning
  - 1. Out of Range Alarm:
    - a. Provide alarm for all analog signals that are out of range. Out of range shall be defined as an analog signal that is above 20 ma or below 4 ma.
  - 2. Filtering
    - a. Provide filtering to reject unwanted noise for example 60 hz power.
  - 3. Engineering Units
    - a. Conversion of signal to engineering units
- E. Tracking and Bumpless Transfer
  - 1. Provide a method of bumpless transfer to prevent unwanted process interruptions during an operational transition from MANUAL-to-AUTO, and AUTO-to-MANUAL modes.

- F. PID control loops tracking:
  - 1. Operation of PID loops in manual shall be configured to have the Automatic Loop Setpoint to track the Process Variable. When the loop is placed in AUTO, the PID loop shall control to the existing setpoint without a process upset. The operator can then set the loop setpoint to the desired value and the PID shall adjust its outputs so that the process variable shall track the setpoint over a period time.
  - 2. The method of transfer from AUTO to MANUAL mode shall be for the MANUAL mode control output to track the AUTO mode output (the PID output from the control strategy) so that there is not a sudden change in the control output after the transition to MANUAL.
  - 3. For transfer of equipment control from LOCAL to REMOTE or REMOTE to LOCAL, the equipment control module shall track the run status to the on/off command (whether in MANUAL OR AUTO) of the equipment control module.
  
- G. Data Quality Check
  - 1. The data quality of all process inputs shall be monitored and alarmed if a bad value status is detected. Typically, if any point associated with a control routine has a bad value status associated with it, then the routine assumes the next lowest operational mode.
  
- H. Control Functions and Alarming
  - 1. Control functions and alarming shall be generated in the RTU. The HMI shall provide supervisory functionality only. In the event of loss of communications from the HMI to the RTU, the RTU shall continue to operate the processes based on the last supervisory command.
  
- I. Supervisory Setting Changes
  - 1. An Operator or Maintenance technician with sufficient security access shall have the capability of changing the following from the HMI
    - a. Alarm Setpoints
    - b. Timers
    - c. Counters
    - d. Process Ranges
    - e. Etc.
  
- J. RTU and OIT monitoring
  - 1. Provide monitoring of OITs and RTUs from the HMI and alarm if communications is lost.
  - 2. Monitor status of RTU status/alarm registers at the HMI.
  - 3. Where RTU to RTU (peer to peer) communications is required, monitor communications loss at the HMI. Monitoring shall be continuous and is not related to the current mode of operation (monitor even if the current mode of operation does not require it).
  
- K. Time Sync
  - 1. Provide time sync between RTUs, OITs, servers and workstations. Time shall be synced at least once every 24 hours.



L. Alarming

1. Priority

a. Alarms generated by the system shall follow the following priority levels.

Priority Level	Response Time	Criteria
1	5 Minutes	Health and Safety critical Damage already done to system (levels over flowed) Requires emergency response
2	15 Minutes	Damage to system is imminent Levels are near maximum
3	30 Minutes	Levels approaching maximum Action needs to be taken to avoid Level 2
4	1 Day	Equipment in need of preventative maintenance or attention Not critical to system

2. Configuration

a. Multiple alarms from a piece of equipment shall be aggregated into a general fault alarm for operations summary alarming. The detailed specific alarms shall be used by operators and/or maintenance to trouble shoot equipment faults. Provide ability for filtering out detailed specific alarms from general fault alarms.

3. Alarm Suppression:

a. Provide master HMI screen that shall allow alarms to be temporarily disabled by station/site or individual and a summary screen showing all alarm that have been disabled in the system. Alarms shall still be logged to the historian when suppressed.

b. Provide an OIT virtual selector switch on the alarm screen to select the alarm mode.

1) NORMAL – All alarms are enabled and are sent to SCADA

2) MASK – All alarms are suppressed and none are sent to SCADA

3) TEST – A test alarm is generated and sent to SCADA

3.02 COMMUNICATIONS

A. Communications between the RTU and HMI shall use DNP3 over UDP/IP Protocol over Ethernet. Coordinate IP addressing scheme with Owner.

B. Communications between machine control devices (TWIDO RTUs), power monitoring devices, protective relays, etc. shall be MODBUS.

C. The SCADA system shall be configured to minimize bandwidth usage by polling the data as follows:

HMI	Data Type
Visualization	Time scheduled polling and/or on-demand
Alarms	Report as time stamped alarms on exception

HMI	Data Type
Trends	Report by event/threshold crossing and/or scheduling
Control	Issued on-demand (binary output – pulse or latch)
Setpoint Adjustment	Issued on-demand (analog output)

D. Data polling shall be configured into the following DNP3 data classifications

Classes of Data	Type of Data	Report By Exception (RBE)	Time Stamp (Event Variation)	Deadband (Threshold value)	Rate of Change [HMI configuration requirement]	Min/Max Values
Class 0	n/a	n/a	n/a	n/a	n/a	n/a
Class 1	Analog Data	Yes	Yes (With Time)	Yes	Yes	Yes
Class 2	Alarms	Yes	Yes (With Time)	No	No	No
Class 3	n/a	n/a	n/a	n/a	n/a	n/a

E. In the event of communications loss between the HMI and the RTU, data shall be time stamped at the RTU and buffered. Time stamped data shall include DI/DO change of states and AI inputs (resolution of 2 minute averages, minimum and maximum values). When communications is restored, buffered data shall automatically be uploaded to the HMI and historian.

### 3.03 RTU PROGRAMMING

A. General programming requirements:

1. RTU programs shall be developed in collaboration with the Owner through a series of workshops.
2. The RTU shall be programmed using Unity Pro and U2V DFB Mngr.
3. The NOR module shall be configured using the RTUConf Tool.
4. It is important that maintenance personnel with little or no familiarity with programming be able to analyze and understand the programs in a minimal amount of time. Therefore, RTU programs shall be written in a simple and straightforward manner and utilize function blocks whenever possible.
5. Site specific RTU code shall be developed based on the approved remote station/site specific process control narratives, P&IDs, and I/O lists.

B. Derived Function Block (DFB):

1. A library of standard RTU function blocks shall be developed for the project. Function blocks shall meet the following criteria:

- a. Troubleshooting shall not require viewing the internal logic of a function block.
  - b. A function block can be used for varying quantities of equipment. For example, a “pump alternation” block can be used with 2, 3 or more pumps and only requires setting the pump quantity input to the function block.
  - c. The use shall facilitate troubleshooting by reducing the amount of logic that must be reviewed to determine the problem.
  - d. If a problem arises with a DFB or additional features are added to a DFB, the DFB can be easily deployed to all sites thereby updating the FB to the most recent version.
2. To the extent possible the RTU manufacturer’s standard function blocks shall be used.

### 3.04 HMI DEVELOPMENT

#### A. General:

1. HMI graphics, alarming, historizing, etc. shall be developed in a collaborative effort with Owner.
2. A sample of the existing HSQ graphics have been provided in Appendix E and are intended to provide general background information, but shall not be used to develop the new HMI graphics. The graphics shall follow High Performance HMI best practices in general and Appendix D in particular.
3. Approved P&IDs and functional descriptions, and information provided during workshops shall be used as the basis for the design of the new graphics.
4. The graphics defined in this Specification Section are generally associated with the display of field conditions. However, troubleshooting, diagnostic and other system informational graphics required to meet the functional requirements shall also be provided. These include, but are not limited to, alarms/events, historical data recall and display, network status, trend setup and other system management functions.
5. Refer to Appendix G for additional HMI requirements. The actual graphics requirements shall be refined during workshops with Owner.

#### B. Displays

1. Displays (operator graphics) shall be designed in a hierarchy with lower level displays providing more information (additional details).
2. Detailed equipment and diagnostic displays shall be at the lowest level of the hierarchy.
3. Diagnostic and some equipment display’s shall only pole data from the RTUs when the display is active. This will allow more data to be polled by the HMI when needed without overloading the radio network.
4. Tank levels shall be shown in feet and gallons in tank.

#### C. Alarm Summary Graphics

1. Provide a general fault alarm summary graphic screen and a separate detailed alarm graphic screen for the distribution system.

2. Provide a general fault alarm summary graphic screen and a separate detailed alarm graphic screen for each service area. The service area graphic screen shall be accessible from the service area overview screen.
3. Provide detailed alarm graphic screen for each remote facility. The remote facility alarm graphic screen shall be accessible from the remote facility overview screen.
4. Alarm information shall adhere to Owner's alarm standards to include alarm priority, color codes that differentiate severity of alarm, general alarm on each remote station, RTU heartbeat communication alarm, alarm grouping, etc..
5. The alarm summary graphic shall be configured using the standard SCADA Alarm subsystem to show a list of the active alarms in the system. As new alarms are detected, entries shall be displayed on the alarm summary graphic with color code indicating the severity of alarms. As the alarm conditions clear and acknowledged, the entries are removed from the list.
6. An operator shall be able to acknowledge alarms from the alarm summary display either individually (by clicking on an alarm acknowledgment field) or for all alarms in the queue.
7. Unacknowledged alarms shall be distinguished from acknowledged alarms by flashing.
8. The alarm summary graphic shall provide sorting and filtering capabilities. The user shall be able to filter on node name, alarm area(s), alarm status and alarm priority. The user must be able to sort on time, tag, alarm area, alarm priority, and alarm status. The user must be able to display alarm block information in a column format and apply complex filtering.
9. Provide the ability to display alarm information through a communication interface with other ancillary equipment such as UPS. Communication protocol such as SNMP shall be supported to display high priority alarms on graphic displays.

D. Trends

1. Trends shall be integrated into process graphics and shall be provided as individual trend displays.
2. Provide trend displays for individual tanks and for summation of tanks in a service area.

E. Reports

1. Reports shall be developed using the report manager software.
2. Contractor shall configure the following reports for the project.
  - a. Chlorine
    - 1) Daily:
      - a) Influent Average
      - b) Effluent Minimum, Average, and Maximum
    - 2) Monthly:
      - a) Influent Average
      - b) Effluent Minimum, Average, and Maximum

- 3) Yearly report displaying each month in the report. The report shall be updated on a monthly bases with all of the preceding month's data filled in. Data shall include:
  - a) Influent Average
  - b) Effluent Minimum, Average, and Maximum
- b. Station Flow
  - 1) For each station and each service area
  - 2) Provide daily, monthly and yearly reports to include
    - a) Total flow
    - b) Minimum, average, and maximum flow
    - c) Minimum, average, and maximum pressure
- c. Equipment Runtime
  - 1) For pumps, generators etc.
  - 2) Provide daily, monthly and yearly reports

F. Color Convention

1. Refer to Appendix D.
2. Modifications to the established color conventions shall not be allowed without prior approval from Owner.

G. Symbols Library

1. A library of standard symbols shall be developed for the project.

H. Security Management

1. Develop a security matrix to implement user login security. A draft matrix shall be developed and submitted for review.
2. After review and approval, implement the SCADA system security based on the approved security matrix as a modification to or expansion of the System-wide SCADA security configuration.

### 3.05 OIT PROGRAMMING

A. General

1. OITs are intended for local display, control and alarming of the remote site or station where they are located.
2. OIT graphics shall mimic the HMI graphics for a particular site to the extent possible and follow the HMI Style guide.
3. Additional diagnostic screens shall be provided to assist with troubleshooting of equipment at each site.

### 3.06 PANEL LAN SWITCH

- A. The LAN switch shall be configured to block unwanted local RTU to OIT traffic from the WAN.
- B. Configure security features including port security tied to the field equipment's MAC address.

### 3.07 REDUNDANT RDP MANAGER

- A. Configure the redundant RDP manager to support multiple monitors and to automatically switch between HMI servers during a failure of one of the servers or associated application.

### 3.08 REMOTE ALARM NOTIFIER

- A. Configure remote alarm notification using WIN911 to send critical alarms via text and SMS messages and unacknowledged alarms after a set time period. Critical general fault alarms shall be sent to specific supervisors and maintenance personnel based on the type of alarm. Provide a calendar type scheduler to enable and disable alarm notification to staff based on day of week, shift and holidays.

### 3.09 NETWORK MANAGEMENT

- A. The Owner shall provide SolarWinds network performance monitoring application to monitor the servers, RTUs, OITs, network switches, etc. Coordinate Owner's work with equipment provided under this contract.

### 3.10 SOP MANAGER

- A. Configure software application to operate with the HMI software application and demonstrate the general functionality to the Owner. The Owner will configure the software for their use.

END OF SECTION

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## SECTION 409650

### PROCESS CONTROL NARRATIVES

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section Includes: Typical process control descriptions for the various unit processes in the distribution system.
- B. Related Sections:
  - 1. Section 409000 – Common Work Results for Process Control

##### 1.02 REFERENCES

- A. Refer to Section 409000.

##### 1.03 ACRONYMS AND DEFINITIONS

- A. Refer to Section 409000 and below.
- B. Acronyms
  - 1. AI Analog Input
  - 2. AO Analog Output
  - 3. CS Constant Speed
  - 4. DI Digital Input
  - 5. DO Digital Output
  - 6. H High
  - 7. HH High-High
  - 8. HMI Human Machine Interface
  - 9. L Low
  - 10. LL Low-Low
  - 11. LOS Local/Off/SCADA
  - 12. MCC Motor Control Center
  - 13. mOIT Machine control Operator Interface Terminal. Located in the equipment's MCC or MS.
  - 14. mRTU Machine Control Remote Terminal Unit is the "Local" RTU used for local control of a piece of equipment.
  - 15. MCP: Motor Control Panel
  - 16. MS Motor Starter
  - 17. OCR Open/Close/Remote
  - 18. OIT Operator Interface Terminal
  - 19. OOA On/Off/Auto
  - 20. RTU Remote Terminal Unit is the stations RTU.
  - 21. SCADA Supervisory Control and Data Acquisition
  - 22. SS Soft Start
  - 23. TOD Time of Day



## 24. VFD Variable Frequency Drive

### 1.04 SYSTEM DESCRIPTION

#### A. General:

1. The typical functional descriptions are not intended to be an all-inclusive description or listing of all required elements to execute the control functions, but along with the typical P&IDs and I/O lists give a general description of unit process operation and function.
2. The typical functional descriptions shall be used by the Contractor to develop station/site specific functional descriptions. The station/site specific functional descriptions shall be developed in enough detail to allow for programming, configuration, testing and commissioning of the SCADA system for the RTUs, HMIs and OITs.
3. Site/station specific functional descriptions shall be developed after the site/station specific P&IDs have been developed during the field survey, as specified in Section 409000.
4. The Typical Functional Descriptions are included at the end of this Section. All typical functional descriptions are based on their respective typical P&IDs.

#### B. Distribution Service Areas

1. The new SCADA system will combine the distributions system into service areas as indicated in the table below.

Service Area	Site Name
Central	Ball Generator/Switchyard
Central	Ball PS & TK
Central	East & West TK
Central	Guenther PS & TK
Central	Leydecker PS
Central	Pine Hill PS & TK
Central	Pleasantview TK
Central	Wehrle TK
Central	Windom PS & TK
Eden	Crestwood TK
Eden	East Church St TK
Eden	Eden 1 PS
Eden	Eden 2 PS & TK
Eden	Eden 3 PS & TK
Eden	Eden 4 TK
Eden	Jennings Road PS

Service Area	Site Name
N/A	Vukelic Station
N/A	Vukelic Station APC UPS
N/A	Windom APC UPS
N/A	Windom Generator/Switchyard
N/A	Windom Pole Barn
N/A	Windom Shelter
Orchard Park	Aurora PS & TK
Orchard Park	Benning Road TK
Orchard Park	Castle Hill TK
Orchard Park	Center Street PS & TK
Orchard Park	Chestnut Ridge PS & TK
Orchard Park	Clark Street PS
Orchard Park	Cole Road TK
Orchard Park	East Aurora PS & TK
Orchard Park	East Hill PS
Orchard Park	Ellis Rd PS

Service Area	Site Name
Eden	Keller Rd PS
Eden	Kulp Road TK
Eden	North Boston PS
Eden	Rice Hill TK
Eden	Trevett Road PS
Eden	Trevett Road TK
Eden	Violet Street PS & TK
Hamburg	Hamburg PS
Hamburg	Janice Street TK
Hamburg	Lakeview PS
Hamburg	Long Street TK
Hamburg	Shadagee Road PS
Lancaster	Broadway PS & TK
Lancaster	Harris Hill PS
Lancaster	Marilla PS
Lancaster	Marilla TK
Lancaster	Newstead TK
Lancaster	Pembroke PS (MCWA)
Lancaster	Sandridge TK
Lancaster	William Street PS

Service Area	Site Name
Orchard Park	Emery PS & TK
Orchard Park	Gartman PS & TK
Orchard Park	Griffin Mills PS
Orchard Park	Horner PS
Orchard Park	Jewett-Holmwood PS
Orchard Park	Scherff Road TK
Orchard Park	Ward Road TK
Orchard Park	Wohlhueter TK
Plant	Sturgeon Point
Plant	Van de Water
Tonawanda	Colvin Blvd PS & TK
Tonawanda	Veterans Park PS & TK

### 1.05 SUBMITTALS

- A. Modify the functional descriptions to make them specific for each remote station/site. Refer to Section 409000 for additional requirements.

### PART 2 PRODUCTS

NOT USED

### PART 3 EXECUTION

NOT USED

## PART 4 TYPICAL PCN FOR MAJOR PROCESS EQUIPMENT

### 4.01 PUMP STATIONS

#### A. Overview

1. Water is transported through the distribution system by the pump stations. Each pump has a hydraulically operated check valve to prevent surging of the system when the pumps are operated. The pump startup and shutdown sequence is generally controlled by a small machine control mRTU or hardwired relay logic.
2. The pumps can be controlled locally or remotely in manual or automatic. Automatic modes of operation include:
  - a. Downstream tank level control with time of use inhibit.
  - b. Discharge pressure control.
  - c. Station flow control.
3. Pumps at the stations are constant speed, variable speed or a combination of the two.
4. Chlorine is added at some of the pump stations while the pumps are running. Refer to miscellaneous chemicals chlorine control PCN for additional information.
5. This section applies to the following sites.

Site Name
Ball PS
Guenther PS
Leydecker PS
Pine Hill PS
Windom PS
Eden 1 PS
Eden 2 PS
Eden 3 PS
Jennings Road PS
Keller Rd PS
North Boston PS
Trevett Road PS
Violet Street PS
Hamburg PS
Lakeview PS
Shadagee Road PS

Site Name
Broadway PS
Harris Hill PS
Marilla PS
William Street PS
Center Street PS
Chestnut Ridge PS
Clark Street PS
East Aurora PS
East Hill PS
Emery PS
Gartman PS
Griffin Mills PS
Horner PS
Jewett-Holmwood PS
Colvin Blvd PS
Veterans Park PS

#### B. Field/Local Control

1. General:
  - a. Field/local control is provided by small machine control RTUs (mRTUs) or hardwired relay logic. In general, the mRTU or hardwired relay logic

provides the startup and shutdown sequence for the pump and associated check valve.

2. Pumps:
  - a. The LOS switch and Start/Stop pushbuttons located on the pump MCC/MS or mOIT can be used by an operator to control the pumps at the station.
3. Check Valve:
  - a. Pump Start: When the pump comes up to desired head pressure, a pressure switch on the pump discharge closes and energizes a three-way valve (The Owner has replaced the stock four-way valves with two solenoid valves that act like the three-way valve) causing the pump check valve to slowly open.
  - b. Pump Stop: When the pump is called to stop the four-way valve is de-energized and the valve begins to slowly close. When the valve reaches 75% to 95% closed, a limit switch trips and de-energizes the pump.
  - c. Emergency Stop: A sudden shutdown of the pump will de-energize all solenoid valves (including a normally open emergency valve) and allow for rapid closure of the check valve.
4. Surge Valve:
  - a. Some stations have a surge valve that opens when the station discharge pressure exceeds a preset value. The surge valve discharges the high pressure surge back into the pump stations incoming water line. Operations sometimes uses the surge valve to control discharge pressure of the station when a downstream tank is out of service.
5. mRTU:
  - a. Some of the pump stations have small RTUs, referred to as Machine control (mRTU) that have been installed in MCC/MS to replace the hardwired motor starter relay logic. Where an mRTU is present, the mRTU communicates over Modbus Ethernet or is hardwired to the station RTU.
6. mOIT:
  - a. Some of the pump stations have machine OITs referred to as mOITs located on the MCC/MS and provide basic alarms and LOS switch functionality.
7. Instrumentation:
  - a. Discharge pressure switch: The discharge pressure switch is used to verify the pump is running and interlocked with the check valve.
  - b. Differential pressure switch: A differential pressure switch across the pump is used to verify the pump is not air bound and is running. This pressure switch is also interlocked with the pump check valve.

#### C. SCADA Manual Control

1. For SCADA Manual Control the following must be true:
  - a. Station LOS switch in the field must be in the SCADA (S) position.
  - b. SCADA MANUAL-AUTO switch at the HMI must be placed in the MANUAL position.
2. If all of the above is true, an operator from the HMI can independently start and stop each pump remotely.

#### D. SCADA Automatic Control

1. For SCADA Automatic Control the following must be true:

- a. Station LOS switch in the field must be in the SCADA (S) position.
  - b. SCADA MANUAL-AUTO switch at the HMI must be placed in the AUTO position.
2. If all of the above is true, the system will operate automatically based on the automatic mode selected. The three types of SCADA automatic operation are:
    - a. TANK LEVEL control
    - b. DISCHARGE PRESSURE control
    - c. STATION FLOW control
  3. The SCADA automatic operation modes are described as follows.
    - a. TANK LEVEL Control Mode:
      - 1) The DISCHARGE PRESSURE- TANK LEVEL – STATION FLOW switch must be in the TANK LEVEL position.
      - 2) TANK LEVEL control mode is based on downstream tank(s) low level START PUMP(s) SETPOINT and a high level STOP PUMP(s) SETPOINT. The number of pumps to operate shall also be selected in this mode, but starting more than one pump shall require operator to initiate. When the tank level drops below the START PUMP(s) setpoint, a pump will be called to start. If multiple pumps have been selected for this mode of operation, the pumps will start in a stepped sequence. After the first pump has completed its startup sequence as indicated by the check valve fully open, then the next pump shall start. This sequence shall continue until all of the pumps selected have started. When the STOP PUMP(s) setpoint has been reached, the pumps will shut down in a stepped sequence similar to the startup stepped sequence. A pump's shutdown sequence shall be completed when the check valve is fully closed and the pump stops.
      - 3) TIME OF USE PUMPING
        - a) Provide a seven day TIME OF USE PUMPING schedule to inhibit TANK LEVEL control mode operations during operator selectable time periods.
      - 4) Loss of Tank Level Signal
        - a) On loss of downstream tank level signal, the control mode shall switch to DISCHARGE PRESSURE mode control automatically and alarm the loss of tank level and indicate that the mode of operation has automatically been changed.
    - b. DISCHARGE PRESSURE control mode:
      - 1) The DISCHARGE PRESSURE- TANK LEVEL – STATION FLOW switch must be in the DISCHARGE PRESSURE position.
      - 2) DISCHARGE PRESSURE control mode is based on the station's discharge pressure. The number of pumps to operate shall be based on maintaining the station's discharge pressure. When the station discharge pressure drops below the DISCHARGE PRESSURE SETPOINT for an operator selectable time period, a pump shall be called to start. After the pump has completed its startup sequence as indicated by the check valve fully open and the pressure is still below the DISCHARGE PRESSURE SETPOINT, an additional pump shall be started. This sequence shall

continue until all of the pumps selected are running or the DISCHARGE PRESSURE SETPOINT has been achieved. When the discharge pressure is above the DISCHARGE PRESSURE SETPOINT for an operator selectable time period, the pumps will shut down in a stepped sequence similar to the startup stepped sequence. A pump's shutdown sequence shall be completed when the check valve is fully closed and the pump stops.

- 3) VFD pumps shall automatically adjust their speed to maintain discharge pressure. If more than one VFD pump is running, the pumps shall maintain the same speed.

c. STATION FLOW control mode:

- 1) The DISCHARGE PRESSURE- TANK LEVEL – STATION FLOW switch must be in the STATION FLOW position.
- 2) STATION FLOW control mode is based on the station's discharge flow. The number of pumps to operate shall be based on maintaining the station's discharge flow. When the station discharge flow drops below the DISCHARGE FLOW SETPOINT for an operator selectable time period, a pump shall be called to start. After the pump has completed its startup sequence as indicated by the check valve fully open and the discharge flow is still below the DISCHARGE FLOW SETPOINT, an additional pump shall be started. This sequence shall continue until all of the pumps selected are running or the DISCHARGE FLOW SETPOINT has been achieved. When the discharge flow is above the DISCHARGE FLOW SETPOINT for an operator selectable time period, the pumps shall shut down in a stepped sequence similar to the startup stepped sequence. A pump's shutdown sequence shall be completed when the check valve is fully closed and the pump stops.
- 3) VFD pumps shall automatically adjust their speed to maintain discharge flow. If more than one VFD pump is running, the pumps shall maintain the same speed.

4. Pump Station and Tank Association: The following table describes how the pump stations are associated with tanks upstream and downstream of the station. The Control Type column in the table describes the typical mode of operation of a pump station, but all modes shall be available at all pump stations.

Pump Station (PS)	Downstream Tank (TK)	Control Type	Upstream Tank Interlock
Ball PS	Main Line	Discharge Pressure	Ball 1 & Ball 2 TKs
Broadway PS	Sandridge & Newstead TK	Tank Level	Broadway TK
Center Street PS	Emery TK	Time of Day (TOD), Tank Level	Center Street & Castle Hill TKs

Pump Station (PS)	Downstream Tank (TK)	Control Type	Upstream Tank Interlock
Chestnut Ridge PS	Gartman TK	TOD, Tank Level	Chestnut Ridge TK
East Aurora PS	Castle Hill & Center Street TKs	Tank Level	East Aurora TK
East Hill PS	Wohlhueter TK	TOD, Tank Level	Ward TK
Eden 1 PS	Eden 2 TK & East Church TK	Tank Level	
Eden 2 PS	Eden 3 TK	Tank Level	Eden 2 TK
Eden 3 PS	Eden 4 TK	Tank Level	Eden 3 TK
Emery	Aurora	Tank Level	Emery
Gartman PS	Ward Road	TOD, Tank Level	Gartman TK
Griffin Mills	Emery TK	Tank Level	
Jennings Road PS	Kulp Road	Tank Level	East Church TK
Jewett-Holmwood PS	Scherff Road, Benning Road, Cole Road (select tank to operate on)	Tank Level	
Keller Road PS	Rice Hill TK	Tank Level	Eden 4 TK
Lakeview PS	Violet Street TK, Janice TK & Long TK (select tank to operate on)	TOD, Tank Level	
Leydecker PS	East & West TKs	TOD, Tank Level	
Marilla PS	Marilla TK	TOD, Tank Level	Sandridge TK
North Boston PS	Crestwood TK	TOD, Tank Level	Eden 2 TK
Shadagee Road PS	Violet Street TK	Tank Level	
Trevett Road PS	Trevett Road TK	TOD, Tank Level	Crestwood
Violet Street PS	East Church Street TK	Tank Level	Violet Street TK
Harris Hill PS	Sandridge & Newstead TK	Tank Level	
William Street PS	Broadway TK	Tank Level	
Windom PS	Main Line	Discharge Pressure	Windom TK

Pump Station (PS)	Downstream Tank (TK)	Control Type	Upstream Tank Interlock
Guenther PS	Main Line	Discharge Pressure	Guenther TK
Horner & Clark PSs	Chestnut Ridge & East Aurora TKs	Tank Level	
Hamburg PS	Janice & Long TKs	Tank Level	
Colvin & Veterans PSs	Colvin TK	Tank Level	
Pine Hill PS	Main Line	Discharge Pressure	Pine Hill TK

E. Adjustable Setpoints

Description	Operator	Supervisor
Upstream tank(s) LOW LEVEL interlock		X
Station LOW SUCTION PRESSURE interlock		X
Station HIGH DISCHARGE PRESSURE interlock		X
START PUMPS SETPOINT	X	
STOP PUMPS SETPOINT	X	
TIME OF DAY PUMPING		X
DISCHARGE PRESSURE SETPOINT	X	
DISCHARGE FLOW SETPOINT	X	
Station Discharge Pressure High-High		X
Station Discharge Pressure High	X	
Station Discharge Pressure Low	X	
Station Discharge Pressure Low-Low		X
Station Suction Pressure High-High		X
Station Suction Pressure High	X	
Station Suction Pressure Low	X	
Station Suction Pressure Low-Low		X

F. Interlocks

1. All of the SCADA automatic modes of operation shall be interlocked with:
  - a. Upstream tank(s) LOW LEVEL: Shall interrupt the automatic mode until the upstream tank is above the LOW LEVEL for an operator selectable time period. On loss of upstream tank level, the control mode shall continue to



operate as normal, but without the upstream LOW LEVEL interlock. Provide alarm indicating the signal has been lost.

- b. Station LOW SUCTION PRESSURE: Shall limit the number of pumps running or the speed of VFD pumps.
- c. Station HIGH DISCHARGE PRESSURE: Shall limit the number of pumps running or the speed of VFD pumps.

G. Special Calculations

- 1. The following sites where tank level is being calculated based on station suction pressure.
  - a. Eden 3
  - b. Chestnut
  - c. Gartman

H. RTU Monitoring Requirements

- 1. The following table describes typical I/O requirements

Equipment	Description	Units	I/O
Check Valve	Closed	N/A	DI
Check Valve	Fault	N/A	DI
Check Valve	Open	N/A	DI
Flow Meter	Discharge Flow	MGD	AI
Pressure Meter	Discharge Pressure	PSI	AI
Pressure Meter	Suction Pressure	PSI	AI
Pump	Inhibit Start Time Remaining	Seconds	AI
Pump	Running	N/A	DI
Pump	Runtime	Hours	AI
Pump	SCADA Mode	N/A	DI
Pump	Start	N/A	DO
Pump	Stop	N/A	DO
VFD/SS	Bypass On	N/A	DI
VFD/SS	Bypass Selected	N/A	DI
VFD	Motor Current	Amps	AI
VFD	Motor Thermal State	Percent	AI
VFD	Power On	N/A	DI
VFD	Speed Control	Percent	AO
VFD	Speed Feedback	Percent	AI
VFD	Thermal State	Percent	AI
VFD	Voltage to Motor	Volts	AI

I. Alarming Requirements

- 1. The following table describes typical alarm requirements

Description	Priority
Upstream tank(s) LOW LEVEL interlock (Active)	4
Station LOW SUCTION PRESSURE interlock (Active)	4
Station HIGH DISCHARGE PRESSURE interlock (Active)	4
Station Discharge Pressure High-High	2
Station Discharge Pressure High	3
Station Discharge Pressure Low	3
Station Discharge Pressure Low-Low	2
Station Suction Pressure High-High	2
Station Suction Pressure High	3
Station Suction Pressure Low	3
Station Suction Pressure Low-Low	2
Pump Fault	3
Pump Fail to Start	2
Pump Fail to Stop	2
Pump Un-Commanded Change of State	2
VFD Temperature High	4
Valve Fault	2

#### 4.02 PUMP STATION WITH HYDRO-PNEUMATIC TANK

##### A. Overview

1. Water is pumped from the distribution system to smaller closed systems that do not have a tank or standpipe to maintain the pressure in the system. Instead, these pump stations have hydro-pneumatic tanks that help to maintain system pressure and reduce pump cycling.
2. The pump stations operate autonomously on discharge pressure with the ability to operate the pumps remote manually.
3. This section applies to the following sites.

Site Name
Aurora PS & TK
Ellis Rd PS

##### B. Field/Local Control

1. General:

- a. Field/local control is provided by small machine control RTUs (mRTUs) or hardwired relay logic. In general, the mRTU or hardwired relay logic provides discharge pressure control and automatically operates the pumps.
- 2. Pump:
  - a. The LOS switch and Start/Stop pushbuttons located on the pump MCC/MS or mOIT can be used by an operator to control the pumps at the station.
- 3. Check Valve:
  - a. Check valves are manual swing valves to prevent reverse flow through the pump.
- 4. Secondary Control Panel (SCP):
  - a. Relay Logic for System Pressure control for the pumps. Allowing local system pressure automatic control.
- 5. mRTU:
  - a. Some of the pump stations have small RTUs, referred to as Machine control (mRTU) that have been installed in MCC/MS to replace the hardwired motor starter relay logic. Where an mRTU is present, the mRTU communicates serially to the station RTU.
- 6. mOIT:
  - a. Some of the pump stations have mOITs located on the MCC/MS and provide basic alarms and LOS switch functionality.

#### C. SCADA Manual Control

- 1. For SCADA Manual Control the following must be true:
  - a. Station LOS switch in the field must be in the SCADA (S) position.
  - b. SCADA MANUAL-AUTO switch at the HMI must be placed in the MANUAL position.
- 2. If all of the above is true an operator from the HMI, can independently start and stop each pump remotely.

#### D. SCADA Automatic Control

- 1. For SCADA Automatic Control the following must be true:
  - a. Station LOS switch in the field must be in the SCADA (S) position.
  - b. SCADA MANUAL-AUTO switch at the HMI must be placed in the AUTO position.
- 2. If all of the above is true, the system will operate automatically based on the automatic mode selected. The types of SCADA automatic operation are:
  - a. DISCHARGE PRESSURE control
- 3. The SCADA automatic operation mode is described as follows.
  - a. DISCHARGE PRESSURE control mode:
    - 1) DISCHARGE PRESSURE control mode is based on the station's discharge pressure. The number of pumps to operate shall be based on maintaining the station's discharge pressure. When the station discharge pressure drops below the DISCHARGE PRESSURE SETPOINT for an operator selectable time period, a pump shall be called to start. After the pump has completed its startup sequence as indicated by the check valve fully open and the pressure is still below the DISCHARGE PRESSURE SETPOINT, an additional pump shall be started. This sequence shall

continue until all of the pumps selected are running or the DISCHARGE PRESSURE SETPOINT has been achieved. When the discharge pressure is above the DISCHARGE PRESSURE SETPOINT for an operator selectable time period, the pumps will shut down in a stepped sequence similar to the startup stepped sequence. A pump's shutdown sequence shall be completed when the check valve is fully closed and the pump stops.

4. Pump Station and Tank Association: The following table describes how the pump stations are associated with tanks upstream.

Pump Station (PS)	Interlock
Aurora PS	Aurora TK

#### E. Adjustable Setpoints

Description	Operator	Supervisor
Upstream tank(s) LOW LEVEL interlock		X
Station LOW SUCTION PRESSURE interlock		X
Station HIGH DISCHARGE PRESSURE interlock		X
DISCHARGE PRESSURE SETPOINT	X	
Station Discharge Pressure High-High		X
Station Discharge Pressure High	X	
Station Discharge Pressure Low	X	
Station Discharge Pressure Low-Low		X
Station Suction Pressure High-High		X
Station Suction Pressure High	X	
Station Suction Pressure Low	X	
Station Suction Pressure Low-Low		X

#### F. Interlocks

1. All of the SCADA automatic modes of operation shall be interlocked with:
  - a. Upstream tank(s) LOW LEVEL: Shall interrupt the automatic mode until the upstream tank is above the LOW LEVEL for an operator selectable time period.
  - b. Station LOW SUCTION PRESSURE: Shall limit the number of pumps running.
  - c. Station HIGH DISCHARGE PRESSURE: Shall limit the number of pumps running.

#### G. Special Calculations

1. Not Applicable.

## H. RTU Monitoring Requirements

1. The following table describes typical I/O requirements

Equipment	Description	Units	I/O
Pressure Meter	Discharge Pressure	PSI	AI
Pressure Meter	Suction Pressure	PSI	AI
Pump	Inhibit Start Time Remaining	Seconds	AI
Pump	Running	N/A	DI
Pump	Runtime	Hours	AI
Pump	SCADA Mode	N/A	DI
Pump	Start	N/A	DO
Pump	Stop	N/A	DO

## I. Alarming Requirements

1. The following table describes typical alarm requirements

Description	Priority
Upstream tank(s) LOW LEVEL interlock (Active)	4
Station LOW SUCTION PRESSURE interlock (Active)	4
Station HIGH DISCHARGE PRESSURE interlock (Active)	4
Station Discharge Pressure High-High	2
Station Discharge Pressure High	3
Station Discharge Pressure Low	3
Station Discharge Pressure Low-Low	2
Station Suction Pressure High-High	2
Station Suction Pressure High	3
Station Suction Pressure Low	3
Station Suction Pressure Low-Low	2
Pump Fault	3
Pump Fail to Start	2
Pump Fail to Stop	2
Pump Un-Commanded Change of State	2

## 4.03 TANKS AND STANDPIPES

### A. Overview

1. The tanks are used to store water and maintain pressure in the distribution system. Tank level is monitored by a level (pressure) transmitter. Most tanks have an

altitude valve that can be closed to isolate the tank. Some tanks have a butterfly valve that can be used to control tank fill rate.

2. This Section applies to the following sites

Site Name	Site Name
Ball TKs	Janice Street TK
Benning Road TK	Kulp Road TK
Broadway TK	Long Street TK
Castle Hill TK	Marilla TK
Center Street TK	Newstead TK
Chestnut Ridge TK	Pine Hill PS & TK
Cole Road TK	Pleasantview TK
Colvin Blvd TK	Rice Hill TK
Crestwood TK	Sandridge TK
East & West TK	Scherff Road TK
East Aurora TK	Trevett Road TK
East Church St TK	Veterans Park PS & TK
Eden 2 TK	Violet Street PS & TK
Eden 3 TK	Ward Road TK
Eden 4 TK	Wehrle TK
Emery TK	Windom TK
Gartman TK	Wohlhueter TK
Guenther TK	

B. Field/Local Control

1. Altitude Valve:
  - a. The altitude valves can be closed locally by energizing a solenoid valve. In the not closed state, the valve will automatically close when the tank is full.
2. Control valves:
  - a. The control valves can be closed or opened locally.
  - b. Gunther has two control valves, one is used to fill the tank and the second valve is used to throttle distribution water from Sturgeon Point and push the water into the tank.
  - c. Windom has one control valve used to fill the tank.
  - d. Pine Hill has a control valve that allows water to be supplied from the City of Buffalo.

C. SCADA Manual Control

1. There are no LOS switches in the field for altitude valves, but an operator can close the altitude valve from SCADA.
2. The butterfly valves can be adjusted to a specific fill rate of a tank.

D. SCADA Automatic Control

- Altitude Valve Tanks Level Control: When SCADA AUTO mode is selected, the system will close the altitude valve just before the level reaches the overflow level (set point).

E. Adjustable Setpoints

Description	Operator	Supervisor
Tank Overflow Level		X
Tank High-High Level		X
Tank High Level	X	
Tank Low Level	X	
Tank Low-Low Level		X

F. Interlocks

- Altitude Valve shall close at Tank Overflow Level

G. Special Calculations

- Tank volume in millions of gallons shall be calculated and based on tank level.

H. RTU Monitoring Requirements

- The following table describes typical I/O requirements.

Equipment	Description	Units	I/O
Altitude Valve	Closed	N/A	DI
Altitude Valve	Opened	N/A	DI
Altitude Valve	Position	Percent	AI
Altitude Valve (Emergency Sol.)	Close	N/A	DO
Altitude Valve (Normal Sol.)	Open	N/A	DO
Beacon	On	N/A	DI
Heat Tape	On	N/A	DI
Heat Tape	Power Available	N/A	DI
Tank/Standpipe	Level	Feet	AI

I. Alarming Requirements

- The following table describes typical alarm requirements

Description	Priority
Tank Level Rate of Change	2
Tank Overflow Level	1

<b>Description</b>	<b>Priority</b>
Tank High-High Level	2
Tank High Level	3
Tank Low-Level	3
Tank Low-Low Level	2
Heat Tape Fault (No Power or not on in Winter)	2
Beacon not on	3



PART 5 PCN FOR MINOR PROCESS EQUIPMENT

5.01 GENERATOR AND TRANSFER SWITCH

A. Overview

1. Some of the remote facilities have standby diesel or LP generators and automatic transfer switches that provide backup power to the facility. In the event of loss of utility power, the stations will automatically switch to standby generator power

B. Field/Local Control

1. Generators can be operated manually through an OOA switch.

C. SCADA Manual Control

1. Not Applicable

D. SCADA Automatic Control

1. Not Applicable

E. Adjustable Setpoints

Description	Operator	Supervisor
Diesel tank level low (refill required)		X
Diesel tank level low-low		X
Phase voltages low		X
Phase voltages imbalance (different by more than X%)		X

F. Interlocks

1. Not Applicable

G. Special Calculations

1. Not Applicable

H. RTU Monitoring Requirements

1. The following table describes typical I/O requirements. The I/O is through a Modbus serial interface to the Generator/Transfer switch for large generators and hardwired for small generators.

Equipment	Description	Units	I/O
Fuel Tank	Level	Gallons	AI
Generator	Current Phase A	Amps	AI

Generator	Current Phase B	Amps	AI
Generator	Current Phase C	Amps	AI
Generator	Fault	N/A	DI
Generator	Not In Auto	N/A	DI
Generator	Real Power	KW	AI
Generator	Running	N/A	DI
Transfer Switch	Genset Status	N/A	DI
Transfer Switch	On Generator Power	N/A	DI
Transfer Switch	On Utility Power	N/A	DI
Transfer Switch	Utility Power Available	N/A	DI
Transfer Switch	Voltage A-B	Volts	AI
Transfer Switch	Voltage B-C	Volts	AI
Transfer Switch	Voltage C-A	Volts	AI

I. Alarming Requirements

1. The following table describes typical alarm requirements

Description	Priority
Generator Fault	3
Facility Running On Generator	3
Current Phase High	3
Current Phase Low	3
Voltage Phase High	3
Voltage Phase Low	3
Diesel tank level low (refill required)	3
Diesel tank level low-low	2
Phase voltages imbalance (different by more than X%)	2
Utility Power not available and Generator Fault	1

5.02 CHLORINE

A. Overview

1. Sodium hypochlorite is added at some pump stations to maintain chlorine residual levels.

B. Field/Local Control

1. The chemical feed pump is interlocked with the pump station pumps and a influent/effluent chlorine analyzer.

- C. SCADA Manual Control
  - 1. Not Applicable
- D. SCADA Automatic Control
  - 1. Not Applicable
- E. Adjustable Setpoints

Type	Operator	Supervisor
Upstream residual chlorine low		X
Upstream residual chlorine high		X
Downstream residual chlorine low-low		X
Downstream residual chlorine low		X
Downstream residual chlorine high		X
Downstream residual chlorine high-high		X

- F. Interlocks
  - 1. Not Applicable
- G. Special Calculations
  - 1. Not Applicable
- H. RTU Monitoring Requirements
  - 1. The following table describes typical I/O requirements.

Equipment	Description	Units	I/O
Chlorine Containment Sump	Leak	N/A	DI
Chlorine System	Fault	N/A	DI
Chlorine System	Pause	N/A	DO
Chlorine System	Feed Rate	PPM	AI
Day Tank	Level (Future)	Lbs.	AI
Downstream Chlorine Analyzer	Chlorine Residual	Mg/L	AI
Upstream Chlorine Analyzer	Chlorine Residual	Mg/L	AI

- I. Alarming Requirements
  - 1. The following table describes typical alarm requirements

Description	Priority
Upstream residual chlorine low	3
Upstream residual chlorine high	3
Downstream residual chlorine low-low	2
Downstream residual chlorine low	3
Downstream residual chlorine high	2
Downstream residual chlorine high-high	3
Chlorine Containment Leak	1

### 5.03 FACILITIES

- A. Overview
  - 1. General facilities environment monitored.
- B. Field/Local Control
  - 1. Not Applicable
- C. SCADA Manual Control
  - 1. Door locks
    - a. Allows an operator to unlock a door when requested.
- D. SCADA Automatic Control
  - 1. Not Applicable
- E. Adjustable Setpoints
  - 1. Not Applicable
- F. Setpoints Security Levels
  - 1. Not Applicable
- G. Interlocks
  - 1. Not Applicable
- H. Special Calculations
  - 1. Not Applicable
- I. RTU Monitoring Requirements
  - 1. The following table describes typical I/O requirements

Equipment	Description	Units	I/O
Building	Flood	N/A	DI

Building	High/Low Temp.	N/A	DI
Doors & Hatches	Door Open	N/A	DI
Doors & Hatches	Open Door	N/A	DO
Pit	Flood	N/A	DI
Building or Room	Temperature	°F	AI

J. Alarming Requirements

- The following table describes typical alarm requirements

Description	Priority
Intrusion Alarm (Door Open)	3
Sump High Level	2
Building High Temp	3
Building Low Temp.	2

5.04 POWER MONITORING AND PROTECTIVE (SCHWEITZER) RELAYS

A. Overview

- Power Monitoring is used to monitor electrical service to a facility and the protective relays are used to protect the facilities from electrical anomalies.

B. Field/Local Control

- Not Applicable

C. SCADA Manual Control

- Not Applicable

D. SCADA Automatic Control

- Not Applicable

E. Adjustable Setpoints

- The following alarms are operator adjustable with proper security access:
  - Current imbalance when any phase's current is 10% greater or less than any other phases current.
  - Voltage imbalance when any phase's voltage is 10% greater or less than any other phases voltage.
  - Voltage is 10% less than nominal voltage.
  - Total power or total reactive power is higher than XX KW or KVA.

F. Setpoint Security

1. The following table describes what level of access is required to change setpoints

Type	Operator	Supervisor
Current imbalance		X
Voltage imbalance		X
Total Power Exceeded		X
Total Reactive Power Exceeded		X
Low Voltage		X
High Voltage		X

G. Interlocks

1. Shutdown pumps if there is a voltage imbalance or low voltage.

H. Special Calculations

1. Not Applicable

I. RTU Monitoring Requirements

1. The following table describes typical I/O requirements

Equipment	Description	Units	I/O
Power Meter	Phase A Current	Amps	AI
Power Meter	Phase B Current	Amps	AI
Power Meter	Phase C Current	Amps	AI
Power Meter	Reactive Power	KVAR	AI
Power Meter	Real Power	KW	AI
Power Meter	Voltage A-B	Volts	AI
Power Meter	Voltage B-C	Volts	AI
Power Meter	Voltage C-A	Volts	AI

J. Alarm Requirements

1. The following table describes typical alarm requirements

Description	Priority
Current imbalance	3

Voltage imbalance and pumps shutdown	1
Total Power Exceeded	3
Total Reactive Power Exceeded	3
Low Voltage and pumps shutdown	1

## 5.05 EYE WASH AND SHOWERS

### A. Overview

- The eye wash stations and showers are used to flush chemicals and contaminants from personnel.
- Provide controls for future capability.

### B. Field/Local Control

- The eye wash stations and showers are operated manually. Currently there is no monitoring of the equipment, but Owner will be adding flow sensors.

### C. SCADA Manual Control

- Not Applicable

### D. SCADA Automatic Control

- Not Applicable

### E. Adjustable Setpoints

- Not Applicable

### F. Setpoint Security

- Not Applicable

### G. Interlocks

- Not Applicable

### H. Special Calculations

- Not Applicable

### I. RTU Monitoring Requirements

- The following table describes typical I/O requirements

Equipment	Description	Units	I/O
Eyewash stations and showers	In Use	N/A	DI

### J. Alarm Requirements

- The following table describes typical alarm requirements

Description	Priority
Chemical Contamination Emergency	1

## 5.06 RTU CONTROL PANEL

- A. Overview
  - 1. Station or tank RTU control panel. All I/O represent status alarm bits from the devices within the control panel.
- B. Field/Local Control
  - 1. Not Applicable
- C. SCADA Manual Control
  - 1. Not Applicable
- D. SCADA Automatic Control
  - 1. Not Applicable
- E. Adjustable Setpoints

Description	Operator	Supervisor
Battery Voltage Low		X

- F. Interlocks
  - 1. Not Applicable
- G. Special Calculations
  - 1. Not Applicable
- H. RTU Monitoring Requirements
  - 1. The following table describes typical I/O requirements

Equipment	Description	Units	I/O
PMCR	120 VAC Present	N/A	DI
UPS	Battery Mode	N/A	DI
UPS	Charging Mode	N/A	DI
24 Volt PS	DC OK	N/A	DI
TVSS	Fault	N/A	DI
UPS	Fault	N/A	DI
Door	Open	N/A	DI
Batteries	Voltage	Volts	AI



I. Alarm Requirements

1. The following table describes typical alarm requirements

Description	Priority
120 VAC Lost	2
Battery Mode	3
DC Lost	2
TVSS Fault	4
UPS Fault	3
RTU CP Intrusion	3
Battery Voltage Low	2

5.07 STATION UPS

A. Overview

1. Several large UPSs are used as backup power for communications equipment, SCADA servers and workstations.

B. Field/Local Control

1. Not Applicable

C. SCADA Manual Control

1. Not Applicable

D. SCADA Automatic Control

1. Not Applicable

E. Adjustable Setpoints

Description	Operator	Supervisor
Battery Voltage Low		X
Low Runtime Remaining		X

F. Interlocks

1. Not Applicable

G. Special Calculations

1. Not Applicable

H. RTU Monitoring Requirements

1. The following table describes typical I/O requirements. The UPSs communicate directly to the HMI Server(s) over Ethernet SNMP.

<b>Equipment</b>	<b>Description</b>	<b>Units</b>	<b>I/O</b>
UPS	Battery Temp.	°F	AI
UPS	Fault	N/A	DI
UPS	Input Frequency	Hz	AI
UPS	Input Max Voltage	Volts	AI
UPS	Input Minimum Voltage	Volts	AI
UPS	Input Volts	Volts	AI
UPS	On UPS	N/A	DI
UPS	Output Current	Amps	AI
UPS	Output Frequency	Hz	AI
UPS	Output Voltage	Volts	AI
UPS	Percent of full load	%	AI
UPS	Remaining Charge	%	AI
UPS	Remaining Time	Seconds	AI
UPS	Time On Battery	msecs	AI

I. Alarm Requirements

1. The following table describes typical alarm requirements

<b>Description</b>	<b>Priority</b>
UPS Fault	2
On UPS	3
Low Runtime Remaining	3

END OF SECTION

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APPENDIX A

WOMEN AND MINORITY BUSINESS ENTERPRISE POLICY

ERIE COUNTY WATER AUTHORITY

## APPENDIX A

### WOMEN AND MINORITY BUSINESS ENTERPRISE POLICY

#### ERIE COUNTY WATER AUTHORITY

It is the policy of the Authority to foster and encourage minority business enterprise participation in the construction contracts of the Authority. Through the setting of Minority Business Enterprise goals and careful monitoring of CONTRACTOR compliance, the Authority will ensure the fullest possible participation in construction activities by qualified minority and women-owned firms.

Some of the federal and state laws that provide the basis for Equal Employment Opportunity and Affirmative Action are:

1. Title VII, Civil Rights Act of 1964 (as amended by the Equal employment Opportunity Act of 1972): Prohibits employment discrimination because of race, color, sex, religion or national origin.
2. Executive Order 11246 (as amended by the Executive Order 11375): Requires Affirmative Action by all Federal CONTRACTORS and subcontractors and requires that all firms with Contracts over \$50,000.00 and 50 or more employees develop and implement written programs.
3. Equal Act of 1963: Requires employers to provide equal pay for men and women performing similar work.
4. New York State Human Rights Law: Prohibits discrimination based on race, color, sex, age, creed, disability, national origin and marital status in employment matters.
5. Flynn Act: Guarantees disabled citizens protection against discrimination in housing, employment, public accommodations, training programs and non-sectarian education due to mental, physical or medical disability.
6. Title VI, Civil Rights Act of 1964: Prohibits discrimination based on race, color or national origin in all programs which receive Federal aid.
7. Title IX, Education Amendments Act of 1972: Prohibits sex discrimination against students of any educational institution receiving Federal financial aid.

#### **A. MINORITY BUSINESS UTILIZATION COMMITMENT**

The Erie County Water Authority has established the following business utilization rules which requires all prime CONTRACTORS awarded construction contracts let by the Erie County Water Authority to exemplify Affirmative Action to sub-contract to minority business enterprise (MBE). For the purpose of these regulations, the term "Minority Business Enterprise" refers to a business at least fifty-one percent (51%) of which is owned and controlled by minority group members. Minority group members are citizens of the United States who are Women, Blacks, Hispanics and Native Americans. MBE's must demonstrate current certification of a government agency.

The Authority has determined that a goal of ten percent (10%) of the total contract value represents a fair share of minority business utilization on each construction contract awarded.

Recipients of Authority construction Contracts must utilize minority-owned business sources for supplies, services and professional services, allowing these sources the maximum feasible opportunity to compete for Contracts, Subcontracts and third-tier Contracts to be performed. All prime CONTRACTORS awarded Authority Contracts estimated to exceed \$100,000.00 must take positive steps to "afford fair opportunities to MBE's". Positive steps shall include, but not be limited to, (a) utilizing a source list of bona fide minority business enterprises, (b) solicitations of bids from MBE's particularly of those located in Erie County, (c) giving minority firms sufficient time to submit proposals in response to solicitations and (d) maintaining records showing minority business enterprises and specific efforts to identify and award Contracts to these Companies.

Each CONTRACTOR bidding on an Erie County Water Authority contract is to contact MBE's and solicit bids for various aspects of each project. The CONTRACTOR is to supply the Authority with information regarding contracts for services and products with minority business enterprises and the dollar amount of each contract on the Minority Business Utilization Report.

The Successful Bidder shall submit to the Authority the Minority Business Enterprise Utilization Report - Part A within one week of the bid opening. Part A includes a list of MBE's from whom the CONTRACTOR has solicited bids, or with whom the CONTRACTOR has signed a binding contractual agreement. The Authority will not consider a CONTRACTOR's bid where the CONTRACTOR fails to submit this report or where an examination of the report evidences failure by the CONTRACTOR to comply with the affirmative action requirements of the Contract.

In the event of a joint venture participating in this MBE Program, the Joint Venture Disclosure Affidavit must be submitted with Part A by all parties involved. Only to the extent that a minority business enterprise contributes to and is paid for its participation in a joint venture will that dollar be credited towards the 10% goal of minority participation in the Erie County Water Authority MBE Program.

MBE's must be approved by the Erie County Water Authority before their participation may be credited toward the 10% goal. Where the proposed MBE is not approved by the Authority, an Authority MBE/Disclosure Affidavit must be filed with the Contract Compliance office. Forms and lists of certified MBE's can be obtained by calling Lavonya Lester, Director of Equal Employment Opportunity at (716) 685-8223.

A Minority Business Enterprise Utilization Waiver Request may be completed and submitted with the Minority Business Enterprise Utilization Report - Part A to the Authority within one week of the bid opening. Waivers shall be granted only where the availability of MBE's in the market area of the project is less than the 10% goal.

Sufficient information must be provided on the Minority Business Enterprise Utilization Waiver Request to ascertain whether a waiver should be approved, conditionally approved or rejected by advice of the Equal Opportunity Office.

A waiver approval limits the CONTRACTOR's obligation to solicit MBE's for this particular project. It does not relieve the CONTRACTOR of MBE utilization for any other Erie County Water Authority project on which he submits a bid.

Conditional approval of the waiver request makes it necessary for the CONTRACTOR to continue soliciting MBE's for contracting purposes, after he has been declared the low bidder.

A MBE Utilization Waiver Request will be rejected if the CONTRACTOR:

1. fails to provide information on the Minority Business Enterprise Utilization Report with his bid.
2. provides fraudulent information of the MBE reports.
3. fails to make an honest good faith effort to recruit and contract with MBE's or
4. takes any other action which is contrary to the spirit and intent of the law.

THE INFORMATION PROVIDED ON THE MBE WAIVER REQUEST AND THE MBE UTILIZATION REPORT WILL BE CONSIDERED CONCURRENTLY TO DETERMINE IF A WAIVER SHOULD BE APPROVED, CONDITIONALLY APPROVED OR REJECTED.

The low bidder shall submit to the Authority, within one week of the bid opening, a schedule for minority business enterprise participation, with whom the CONTRACTOR intends to Subcontract, specifying the agreed price to be paid for such work, and identifying in detail the Contract item(s) or parts to be performed by each minority business enterprise. A letter of intent to enter into a Subcontract or purchase agreement, signed by the minority business, contingent upon the contract award, indicating the agreed upon price and scope of work, shall be provided, signed by both the CONTRACTOR and the minority business enterprise. The prime CONTRACTOR shall not substitute or delete the listed minority business enterprise without the written consent of the Erie County Water Authority.

In the event that the MBE goal for the contract is not met, the CONTRACTOR shall provide sufficient documentation to establish that every positive effort was made to identify, solicit and negotiate with MBE's in pursuit of the goal. Such documentation includes, but is not limited to, advertisement in minority-focused media, written contract with minority businesses indicating sufficient bidder's price along with evidence showing the work to be performed is the same, and not a reduced portion thereof.

The CONTRACTOR shall provide to the Erie County Water Authority copies of all subcontracts and/or purchase agreements with minority business enterprises within one week of the bid opening. A notice to proceed with construction shall not be issued until acceptable documentation is received.

When the project is thirty (30%) percent complete, the CONTRACTOR shall submit to the Authority the Minority Business Enterprise Utilization Report - Part B. Part B lists the MBE's on the project, the dollar amounts paid to that date and the estimated amount remaining to be spent.

The Minority Business Enterprise Utilization Report - Part C certifies the actual dollar amount expended to MBE's. Part C must be completed by the prime CONTRACTOR and submitted at the seventy-five (75%) percent payment level.

The Minority Business Enterprise Utilization Report - Part D certifies the total dollar amount expended to MBE's. Part D is to be submitted with the request for final payment.

In the event a CONTRACTOR fails to comply with these provisions the Authority may:

1. Summon the CONTRACTOR to a hearing
2. Withhold progress payments in part or in full
3. Cancel the contract.
4. Bar award of future Contracts until the CONTRACTOR can demonstrate that he will comply.

It is hereby the Erie County Water Authority's commitment to assure that on all contracts awarded, prime CONTRACTORS expend a fair share of the contract with bona fide minority businesses in accordance with the goals set forth by the Authority. Failure to comply with these provisions shall disqualify the bidder and shall constitute a breach of contract subject to all remedies available to the Authority.

The Prime CONTRACTOR and all minority Subcontractors are bound by all requirements as put forth in the Erie County Water Authority standard General Conditions and all modifications thereto contained in these Contract Specifications.



Listing of **AFFIRMATIVE ACTION FORMS ATTACHED:**

<u>NAME OF FORM</u>	<u>PAGE NUMBER(S)</u>
Minority Business Utilization Report- Part A	6 & 7
Waiver Request	8
Erie County Water Authority Minority Business Enterprise Joint Venture Disclosure Affidavit	9
Erie County Water Authority Minority Business Enterprise Utilization Report - Part B	10 & 11
Minority Business Enterprise Utilization Report - Part C	12
Minority Business Enterprise Utilization Report - Part D	13

**ERIE COUNTY WATER AUTHORITY  
MINORITY BUSINESS ENTERPRISE  
UTILIZATION REPORT - PART A**

This information must be submitted by the successful bidder within one week of bid opening.

COMPANY KAMAN AUTOMATION, INC.

AUTHORIZED REPRESENTATIVE MATTHEW KANE

ADDRESS 295 COOPER AVE SUITE 100 TONAWANDA, NY 14150

TELEPHONE NUMBER 716 206 0858

PROJECT NAME ECWA DISTRIBUTION SCADA UPGRADE

PROJECT NUMBER 201400160

I. List actions taken to identify, solicit, and contact Minority Business Enterprises (MBE) to bid on subcontracts on this project.

1. REVIEW MBE/MBE ERIE COUNTY LISTS
2. CONTACTED AND OBTAINED PROPOSAL FROM WEYDMAN
3. DISCUSSED WITH ECWA IF NY STATE CERT APPLICABLE
4. CONTACTED SOTERIA-IT TIM HENDERSON. ONLY HAS
5. FEDERAL CERT.
6. \_\_\_\_\_

II. List all bona fide Minority Business Enterprise, subcontractors, professional personnel, solicited, contracted, or presently negotiating a contract in accordance with the minority business utilization goal set forth by the Erie County Water Authority. (Attach additional sheets if necessary.)

MINORITY OWNED FIRM	SUPPLY/ SERVICE	AMOUNT OF PROPOSAL	PRIOR CERTIFICATION	CONTRACT EXECUTED	REASON NOT AWARDED
NAME: <u>WEYDMAN</u> ADDRESS: <u>747 YOUNG</u> TELE NO: <u>716 692-7667</u> IRS NO: <u>16-0803337</u>	<u>ELECTRICAL</u> <u>INSTALL</u>	<u>455,500</u>	<u>WEYDMAN</u> <u>INDICATES</u> <u>YES</u>	YES <u>X</u> NO _____	
NAME: <u>BSV METAL</u> ADDRESS: <u>750 HULL ST ROCHESTER, NY</u> TELE NO: <u>585 4540550</u> IRS NO: _____	<u>PANEL</u> <u>BUILDS</u>	<u>N/A</u>	<u>NO</u>	YES _____ NO <u>X</u>	<u>ONLY NYS</u> <u>CERT NOT</u> <u>ERIE</u> <u>COUNTY</u>
NAME: <u>SOTERIA-IT</u> ADDRESS: <u>2495 MAIN ST, BUFFALO</u> TELE NO: <u>716 523</u> IRS NO: <u>7160</u>	<u>SCADA IT</u> <u>SETUP</u>	<u>N/A</u>	<u>NO</u>	YES _____ NO <u>X</u>	<u>ONLY</u> <u>FEDERAL</u> <u>CERT. NYS</u> <u>PENDING</u>
NAME: _____ ADDRESS: _____ TELE NO: _____ IRS NO: _____				YES _____ NO _____	

PART A CONTINUED

III. Assistance offered by CONTRACTOR to MBE's as to bonding, union requirements, obtaining work capital etc...

1. BONDING -- THEIR WORK AND AMOUNT COVERED BY BOND AMOUNT.
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_

IV. Total Dollar Amount to be subcontracted to Minority Business Enterprise(s): \$ 55,500

V. Total Amount of Bid: \$ 1,221,760

VI. MBE Percent (%) of project bid: 4.54 %

VII. YOU MUST ATTACH COPIES OF RELEVANT CORRESPONDENCE AND DOCUMENTS INCLUDING RETURN RECEIPTS.

6/13/2016  
DATE

*Mattie Kane*  
SIGNATURE OF AUTHORIZED REPRESENTATIVE

Note: Within one week of the bid opening, this original form, together with a letter of intent to enter into a subcontract or purchase agreement, contingent upon the contract award, indicating the agreed upon price and scope of work, signed by both the CONTRACTOR and the Minority Business Enterprise, must be submitted to:

Lavonya Lester, Director of Equal Employment Opportunities (ECWA)  
Erie County Water Authority  
3030 Union Road  
Buffalo, New York 14227

WAIVER

COMPANY KAMIAN AUTOMATION, INC.

ADDRESS 245 COOPER AVE SUITE 100 TONAWANDA, NY 14150

TELEPHONE NUMBER 716 206 0858  
(AREA CODE) (NUMBER)

1. CONTRACTOR has made a good faith effort to adopt subcontracting on this project to those trades, professions, supplies, etc. for which minority business enterprises bids could be solicited; and
2. The total percentage of the bids which could be Subcontracted in trades, professions, supplies, etc. for which minority business enterprises bids could be solicited is less than 10%.

A waiver, as provided for by the Erie County Water Authority is hereby requested on the grounds that there are no/insufficient (circle the appropriate term) minority business enterprise in the market area of this project which do subcontracting in the following fields (list all trades, professions, supplies, etc. which could be subcontracted on this project):

- |                                 |           |
|---------------------------------|-----------|
| 1. <u>iFix Programming</u>      | 6. _____  |
| 2. <u>UNITY Programming</u>     | 7. _____  |
| 3. <u>SCHNEIDER PLC BUILDS</u>  | 8. _____  |
| 4. <u>SCHNEIDER PLC STARTUP</u> | 9. _____  |
| 5. <u>SCADA PC SETUP</u>        | 10. _____ |

(use additional sheets if necessary)

If a partial waiver is granted the CONTRACTOR will make a good faith effort to meet the reduced goal.

6/13/2016  
DATE

*Matthew [Signature]*  
SIGNATURE OF AUTHORIZED REPRESENTATIVE OF COMPANY

Granted in whole \_\_\_\_\_

Granted in part yes, see below

Comments: due to the nature of the contract only partial  
is able to be subcontracted out. (FP)

Jawonyn Yester Director of EEO 6/16/16  
EQUAL OPPORTUNITY OFFICIAL TITLE DATE

\_\_\_\_\_  
LETTING DEPARTMENT REPRESENTATIVE TITLE DATE

# KAMAN

Automation, Control & Energy

MINARIK | ZELLER | GOF

Kaman Automation, Inc.  
1900 University Ave  
Rochester, NY 14607  
P: 585.254.8840

[www.kamanace.com](http://www.kamanace.com)

June 13, 2016

Kaman Automation Contract #161101

To: Marty Carollo  
Weydman Electric  
747 Young Street  
Tonawanda, NY 14150  
716 692-7667

Subject: Erie County Water Authority Distribution SCADA Upgrade

Dear Marty,

Thank you for your proposal in regards to the ECWA Distribution SCADA Upgrade Project.

This letter is to inform you that, pending and contingent upon our contract award, we intend to subcontract you for the following scope of work on this project (and will place a purchase order to you after award):

Work Scope:

Provide electrical installation (labor and material) for installation of 20 PLC backplates for the sites where Kaman Automation, Inc will supply M340 PLC backplates (as listed on your proposal and in the plans and specifications as work scope associated with bid item #3 "Installation of twenty (20) Replacement RTU Control Panel, including field testing, startup and cutover".

Your proposal amount dated 6/13/2016 indicated a price for this work of \$55,500.

Thank you for the opportunity to subcontract you on this project. Please sign and date below the form and return to me asap. Please don't hesitate to call if you have questions or concerns 716-206-0858.

Sincerely,

Matt Kane Date: 6/13/2016

Matt Kane  
Buffalo Division Manager AC&E  
Kaman Automation, Inc.

Acknowledge order intent:

Marty Carollo

Marty Carollo Date: 6/13/16  
Weydman Electric  
Corp Secretary



747 Young Street  
 Tonawanda, New York 14150  
 Phone: (716) 692-7667 Fax: (716) 692-7982

**A certified "WBE Contractor"**

## PROPOSAL

PROPOSAL SUBMITTED TO: Kaman Automation, Inc. (Zeller)	SUBMITTED BY: <b>MARTY CAROLLO</b>	DATE: 6/13/2016
STREET 1000 University Ave # 800	JOB NAME: <b>Erie County Water Authority Distribution SCADA Upgrade</b>	
CITY, STATE AND ZIP CODE: Rochester, NY 14607	JOB LOCATION: <b>20 Sites, Erie County, NY</b>	
ATTENTION: Matt Kane	CUSTOMER PHONE: 716 206-0858	Customer Email: Matthew.Kane@kaman.com

WE ARE PLEASED to provide a quotation for the following scope of work:  
 Weydman Electric & Communications to furnish labor, material, and supervision for electrical work  
 for 20 ECWA sites for SCADA Upgrades per drawings and scope of work

**Scope of work: (Base Bid)**

- \* Provide SCADA upgrades for 20 sites listed below (Instrumentation devices & programming by others)
- \* Sites #39 (Benning rd), #16 (Castle Hill), #38 (Cole Rd), #33 (Crestwood), #12 (East & West Tank), #09 (East Church St)
- \* Sites #30 (Eden 4), #24 (Janice St.), #84 (Kulp Rd), #23 (Long St), #47 (Marilla), #87 (Newstead), #05 (Pleasantview)
- \* Sites #18 (Rice-Hill), #07 (Sandridge), #37 (Scherff Rd), #88 (Trevett Rd), #36 (Ward Rd), #01 (Wehrle), #82 (Wohlheuter)

**Electrical Proposal Total = \$ 55,500.00**

**Exclusions:**

- \* Saw cutting and repair of concrete floors for conduits.
- \* No bond, no permits or no special insurance cost included in pricing.
- \* Cutting, Patching & Painting of any kind are excluded
- \* All costs associated with hazardous materials (i.e. asbestos, PCB, etc.) are excluded

**"Certified WBE Electrical Contractor"**

WE PROPOSE to provide the work described above for the net sum of :  
**See Above Price** Dollars **See Above**

Authorized Signature MARTY CAROLLO This proposal may be with drawn by us if not accepted within 30 days

ACCEPTANCE OF PROPOSAL The above prices, specifications and conditions are satisfactory and hereby accepted. You are authorized to do the work specified.

Signature X \_\_\_\_\_

Name of Acceptance: \_\_\_\_\_ Representing: \_\_\_\_\_

**ERIE COUNTY WATER AUTHORITY  
MINORITY BUSINESS ENTERPRISE  
JOINT VENTURE DISCLOSURE AFFIDAVIT**

To Be Submitted With Part A  
Where Applicable

Joint Ventures: \_\_\_\_\_  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Principal Office: \_\_\_\_\_  
Office Phone: \_\_\_\_\_  
Home Phone: \_\_\_\_\_

Percent of minority ownership in terms of profit and loss sharings:

Capital contributions by each joint venture and accounting therefore:

Equipment and supply contributions by each joint venturer and accounting therefore:

Any ownership options for ownership or loans between the joint venturers - identify terms thereof:

How and by whom the on-site work will be supervised and administered:

I, \_\_\_\_\_, as representative of \_\_\_\_\_ Company, do hereby swear or affirm that I am authorized to act on its behalf and that in this capacity and to the best of my knowledge and belief, the information provided herewith relevant to the joint venture of \_\_\_\_\_ is accurate, complete and current, and fairly represents the joint venture; further, that I have personally reviewed the material and assured myself of its accuracy. It is recognized and acknowledged that the statements herein are being given under oath and any material misrepresentation will be grounds for terminating any contract which may be awarded in reliance hereon.

\_\_\_\_\_  
SIGNATURE

**ERIE COUNTY WATER AUTHORITY  
MINORITY BUSINESS ENTERPRISE UTILIZATION REPORT - PART B**

CONTRACTOR \_\_\_\_\_ CONTRACT NAME \_\_\_\_\_

- I. List all bona fide minority business enterprises, Subcontractors, suppliers, professional personnel, or joint venture firms, with whom you have entered into a binding agreement in accordance with the Minority Business Utilization Goal set forth by the Erie County Water Authority. Include minority trucking firms that will be utilized and included and estimated dollar amount. This information must be submitted to the Erie County Water Authority when the project is 30% complete.

<b>(USE REVERSE SIDE IF MORE SPACE IS NEEDED) MINORITY OWNED FIRMS</b>	<b>TYPE OF WORK</b>	<b>DATE CONTRACT EXECUTED</b>	<b>TOTAL EXPENDED TO DATE</b>	<b>AMOUNT REMAINING</b>
NAME: _____ ADDRESS: _____ IRS #: _____				
NAME: _____ ADDRESS: _____ IRS #: _____				

\*Erie County Water Authority reserves the right to require documentation including, but not limited to, canceled checks to verify these amounts:

- II. Total Dollar Amount to be Subcontracted to minority Business Enterprise(s):  
\$ \_\_\_\_\_
- III. Total dollar amount expended to date: \$ \_\_\_\_\_
- IV. Total amount of bid: \$ \_\_\_\_\_
- V. MBE Percent (%) of project bid: \$ \_\_\_\_\_

I, \_\_\_\_\_ as an official representative of \_\_\_\_\_, do hereby certify that the information listed above is correct and complete.

\_\_\_\_\_  
NAME

\_\_\_\_\_  
DATE

\_\_\_\_\_  
TITLE



PART B CONTINUED

<p>(USE REVERSE SIDE IF MORE SPACE IS NEEDED) MINORITY OWNED FIRMS</p>	<p>TYPE OF WORK</p>	<p>DATE CONTRACT EXECUTED</p>	<p>TOTAL EXPENDED TO DATE</p>	<p>AMOUNT REMAINING</p>
<p>NAME: _____ ADDRESS: _____ _____</p> <p>IRS #: _____</p>				
<p>NAME: _____ ADDRESS: _____ _____</p> <p>IRS #: _____</p>				
<p>NAME: _____ ADDRESS: _____ _____</p> <p>IRS #: _____</p>				
<p>NAME: _____ ADDRESS: _____ _____</p> <p>IRS #: _____</p>				
<p>NAME: _____ ADDRESS: _____ _____</p> <p>IRS #: _____</p>				
<p>NAME: _____ ADDRESS: _____ _____</p> <p>IRS #: _____</p>				
<p>NAME: _____ ADDRESS: _____ _____</p> <p>IRS #: _____</p>				
<p>NAME: _____ ADDRESS: _____ _____</p> <p>IRS #: _____</p>				
<p>NAME: _____ ADDRESS: _____ _____</p> <p>IRS #: _____</p>				

**MINORITY BUSINESS ENTERPRISE UTILIZATION REPORT - PART C  
CERTIFICATION OF EXPENDITURES TO MBE's**

(To be completed by the prime CONTRACTOR and  
submitted at the 75% payment level)

CONTRACTOR \_\_\_\_\_

CONTRACT: \_\_\_\_\_

MBE	PART B CONTRACT AMOUNT OF ESTIMATE	TOTAL EXPENDED TO DATE	ESTIMATED AMOUNT REMAINING

\* Erie County Water Authority reserves the right to require documentation including, but not limited to, canceled checks to verify these amounts.

I, \_\_\_\_\_  
\_\_\_\_\_ as an official representative of \_\_\_\_\_,

do hereby certify that the information listed above is correct and complete.

\_\_\_\_\_  
NAME

\_\_\_\_\_  
TITLE

\_\_\_\_\_  
DATE

**MINORITY BUSINESS ENTERPRISE UTILIZATION REPORT - PART D**

**FINAL CERTIFICATION OF EXPENDITURES TO MBE's**

(to be completed by the prime CONTRACTOR and submitted with the request for final payment)

CONTRACTOR: \_\_\_\_\_

CONTRACT: \_\_\_\_\_

MBE	TOTAL AMOUNT EXPENDED

TOTAL OF ALL MBE  
SUB-CONTRACTS \$ \_\_\_\_\_

AMOUNT OF  
CONTRACT \_\_\_\_\_

FINAL MBE  
PERCENTAGE \_\_\_\_\_

I, \_\_\_\_\_, as an official  
representative of \_\_\_\_\_,

do hereby certify that the information listed above is correct and complete.

\_\_\_\_\_  
NAME

\_\_\_\_\_  
TITLE

\_\_\_\_\_  
DATE

## ACCOUNTABILITY

The CONTRACTOR shall be fully accountable for its performance under this contract and agrees to answer under oath all questions relevant to the performance thereof and to any transaction, act, or omission had, done or omitted in connection therewith if called before the Erie County Water Authority, any Judicial, County or State Officer or agency empowered to investigate the Contract or its performance.

**(This Page Intentionally Left Blank)**

**APPENDIX B**

**INSURANCE REQUIREMENTS**

**ERIE COUNTY WATER AUTHORITY**

Erie County Water Authority Insurance Requirements for Professional Services

Project Number: 201400106 / 201400160

Description: Management and Operations Enhancements  
Assistance in Optimizing Operations and Maintenance /  
Distribution SCADA Replacement - Contract: EMA-03A

The following minimum insurance requirements shall apply to professional service providers under agreement with the Erie County Water Authority (ECWA). If at anytime, in the opinion of ECWA, there is an unusual or exceptional risk, ECWA may establish additional insurance requirements for the duration of the agreement. All insurance required herein shall be obtained at the sole cost and expense of the professional service provider, including deductibles and self-insured retentions. These requirements include but are not limited to the minimum insurance requirements.

An X indicates insurance coverage is required.

X **Commercial General Liability Insurance:** (including, but not limited to, Bodily (Personal) Injury, Premises Operations, Property Damage Liability (broad form), Contractual Liability, Advertising Injury, Independent Contractors, Product Liability, Completed Operations Liability and Explosion, Collapse and Underground Coverage) – in an amount not less than \$1,000,000 combined single limit and \$2,000,000 in the aggregate:

- Per Policy
- Per Project or Job
- Per Location

There should be no exclusions for any claims filed, actual or alleged, for violation of any applicable statute including, but not limited to, the New York State or federal labor laws, ordinances, administrative orders, executive orders, rules, regulations, or decrees of any court of competent jurisdiction.

X **Comprehensive Business Automobile Insurance** in an amount of not less than \$1,000,000 each accident and shall cover liability arising out of any automobile owned, leased, hired, borrowed and non-owned automobiles. Additionally, if vehicles are used for transporting hazardous materials, the contractor shall obtain and maintain the "broadened" coverage (endorsement CA 99 48 10 01 or CA 99 48 12 93), as well as proof of MCS 90 04 00.

X **Excess Umbrella Liability Insurance:**

- \$1,000,000 in the aggregate
  - \$2,000,000 in the aggregate
  - \$3,000,000 in the aggregate
  - \$4,000,000 in the aggregate
  - \$5,000,000 in the aggregate
- Per Policy
  - Per Project or Job
  - Per Location

X **Professional Liability Insurance:** Per each occurrence and in the aggregate. Continuous coverage shall be maintained, or on an extended discovery period (“tail coverage”), for a period of not less than two years from the time the agreement has been completed in an amount of not less than:

- \_\_\_ \$1,000,000 in the aggregate
- \_\_\_ \$2,000,000 in the aggregate
- \_\_\_ \$3,000,000 in the aggregate
- \_\_\_ \$4,000,000 in the aggregate
- X \$5,000,000 in the aggregate

X **Workers’ Compensation and Employers’ Liability and New York State Disability Benefits Insurances,** as required by New York State statute.

Certificates of Insurance and renewals, on forms approved by the New York State Department of Insurance, must be submitted to ECWA prior to the award of contract. Each insurance carrier issuing a Certificate of Insurance shall be rated by A. M. Best no lower than “A-” with a Financial Strength Code (FSC) of at least VII. The professional service provider shall name ECWA, its officers, agents and employees as additional insured on a Primary and Non-Contributory Basis, including a Waiver of Subrogation endorsement (form CG 20 26 11 85 or equivalent), on all applicable liability policies.

Any liability coverage on a “claims made” basis should be designated as such on the Certificate of Insurance.

To avoid confusion with similar insurance company names and to properly identify the insurance company, please make sure that the insurer’s National Association of Insurance Commissioners (N.A.I.C.) identifying number or A. M. Best identifying number appears on the Certificate of Insurance.

Acceptance of a Certificate of Insurance and/or approval by ECWA shall not be construed to relieve the professional service provider of any obligations, responsibilities or liabilities.

Certificates of Insurance should be e-mailed to [AALESSI@ECWA.ORG](mailto:AALESSI@ECWA.ORG) or mailed to Mr. Anthony Alessi, ECWA Claims Representative/Risk Manager, Erie County Water Authority, 295 Main Street – Room 350, Buffalo, New York 14203-2494, or If you have any questions you can contact Mr. Alessi by e-mail or phone (716) 849-8477.

Please refer to the bid and the contract document(s) for additional information regarding insurance requirements.





# CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

**IMPORTANT:** If the certificate holder is an **ADDITIONAL INSURED**, the policy(ies) must be endorsed. If **SUBROGATION IS WAIVED**, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
	PHONE (A/C, No, Ext):	FAX (A/C, No):
INSURED	E-MAIL ADDRESS:	
	PRODUCER CUSTOMER ID #:	
	INSURER(S) AFFORDING COVERAGE	
	INSURER A:	NAIC #
	INSURER B:	
	INSURER C:	
	INSURER D:	
	INSURER E:	
	INSURER F:	

**COVERAGES**                      **CERTIFICATE NUMBER:**                      **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR TR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
	<b>GENERAL LIABILITY</b> <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR	X	X				EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC						
	<b>AUTOMOBILE LIABILITY</b> <input checked="" type="checkbox"/> ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS HIRED AUTOS NON-OWNED AUTOS	X	X				COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR EXCESS LIAB CLAIMS-MADE	X	X				EACH OCCURRENCE \$ AGGREGATE \$
	DEDUCTIBLE <input checked="" type="checkbox"/> RETENTION \$ 10,000						\$ \$
	<b>WORKERS COMPENSATION AND EMPLOYERS' LIABILITY</b> ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below		N/A				WC STATU-TORY LIMITS OTH-ER E.L. EACH ACCIDENT \$ E.L. DISEASE - EA EMPLOYEE \$ E.L. DISEASE - POLICY LIMIT \$
	Professional Liability Claims Made:                      Retroactive Date: Occurrence:						Per Specific Agreement Each Claim: Aggregate:

SAMPLE

**DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES** (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

Additional Insured on a Primary and non-contributory basis (General and Auto Liability): Erie County Water Authority  
Additional Insured form CG 20 26 or equivalent.

<b>CERTIFICATE HOLDER</b> Erie County Water Authority 295 Main St, Suite 350 Buffalo, NY 14203  Attn: Anthony Alessi	<b>CANCELLATION</b> SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.  AUTHORIZED REPRESENTATIVE
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# Understanding New York Workers Compensation Board Workers Compensation and N.Y.S Disability Benefits Liability

This is a brief description for governmental organizations to validate vendor workers compensation and NYS Disability Benefits coverage. These requirements should be used when applying for permits, licenses or secure contracts. Copies should be obtained not only at the initial issuance but at renewal as well. A full instruction manual can be obtained from the Workers Comp Board.

The forms discussed are:

- 1) Form CE-200- Affidavit of Exemption (obtain at: [www.wcb.state.ny.us/content/ebiz/wc\\_db\\_exemptions/requestExemptionOverview.jsp](http://www.wcb.state.ny.us/content/ebiz/wc_db_exemptions/requestExemptionOverview.jsp))
  - Acceptable proof that the business listed is exempt from providing workers' compensation and/or disability insurance coverage.
  
- 2) Workers Compensation
  - Form C-105.2: Certificate of Workers Compensation (WC) (Obtain from your insurance agent)
    - All private NYS licensed workers' compensation carriers are required to issue the C-105.2.
  
  - Form SI- 12: Certificate of WC when self-insured. (Obtain from workers compensation board)
    - Only the Self-Insurance Office of the Workers' Compensation Board issues the SI-12. The Self-Insurance Office can be contacted at **518-402-0247**. **Only one legal name and Federal Employer Identification Number can be listed on each Form SI-12. (Multiple legal entities must not be listed.)**
  
  - Form GSI- 105.2: Certificate of WC when participating in a group self-insured program.
    - The self-insurance administrator of the group completes the form.
  
  - Form U-26.3: Certificate of WC
    - Acceptable proof that the business has workers' compensation coverage through the New York State Insurance Fund. Only available through (NYSIF).
  
- 3) New York State Disability Benefits Law (DBL)
  - Form DB-120.1: Certificate of DBL Insurance (obtain from workers compensation board)
    - The DB-120.1 must be completed by either the NYS statutory disability benefits insurance carrier, or a licensed NYS insurance agent of that carrier. The form can be obtained by contacting the Bureau of Compliance. ([certificates@wcb.state.ny.us](mailto:certificates@wcb.state.ny.us))
  
  - Form DB-155: Certificate of DBL Self-Insurance
    - The Self-Insurance Office of the Workers' Compensation Board issues the DB-155. The Board's secretary will approve the DB-155. The Self-Insurance Office can be contacted at **518-402-0247**.
  
- 4) Exemption 1, 2, 3, or 4 Family, Owner Occupied residence (<http://www.wcb.state.ny.us/content/main/forms/bp-1.pdf>)

NOTE: ACORD Certificates of Insurance are not acceptable proof. Must use one of the forms noted above:

Form CE-200



Certificate of Attestation of Exemption From New York State Workers' Compensation and/or Disability Benefits Insurance Coverage

\*\*This form cannot be used to waive the workers' compensation rights or obligations of any party.\*\*

The applicant may use this Certificate of Attestation of Exemption ONLY to show a government entity that New York State specific workers' compensation and/or disability benefits insurance is not required. The applicant may NOT use this form to show another business or that business's insurance carrier that such insurance is not required.

Please provide this form to the government entity from which you are requesting a permit, license or contract. This Certificate will not be accepted by government officials one year after the date printed on the form.

<p><b>In the Application of</b> (Legal Entity Name and Address):</p> <p>JOHN SMITH 123 MAIN STREET ALBANY, NY 12207 111-111-1111 Federal ID Number: XXXXX6789</p>	<p><b>Business Applying For:</b> <b>BUILDING PERMIT</b></p> <p>From: CITY OF ALBANY, DEPT OF BUILDING AND CODES</p> <p>The location of where work will be performed is 123 ACME AVENUE, ALBANY, NY 12203.</p> <p>Estimated dates necessary to complete work associated with the building permit are from October 14, 2008 to March 31, 2009.</p> <p>The estimated dollar amount of project is \$25,001 - \$50,000</p>
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**Workers' Compensation Exemption Statement:**

The above named business is certifying that it is **NOT REQUIRED TO OBTAIN NEW YORK STATE SPECIFIC WORKERS' COMPENSATION INSURANCE COVERAGE** for the following reason:

The business is owned by one individual and is not a corporation. Other than the owner, there are no employees, day labor, leased employees, borrowed employees, part-time employees, unpaid volunteers (including family members) or subcontractors.

**Disability Benefits Exemption Statement:**

The above named business is certifying that it is **NOT REQUIRED TO OBTAIN NEW YORK STATE STATUTORY DISABILITY BENEFITS INSURANCE COVERAGE** for the following reason:

The business is owned by one individual or is a partnership (LLC, LLP, PLLP or a RLLP) under the laws of New York State and is not a corporation; or is a one or two person owned corporation, with those individuals owning all of the stock and holding all offices of the corporation (in a two person owned corporation, each individual must be an officer and own at least one share of stock) or is a business with no NYS location. In addition, the business does not require disability benefits coverage at this time since it has not employed one or more individuals on at least 30 days in any calendar year in New York State. (Independent contractors are not considered to be employees under the Disability Benefits Law.)

I, JOHN SMITH, am the Sole Proprietor with the above-named legal entity. I affirm that due to my position with the above-named business I have the knowledge, information and authority to make this Certificate of Attestation of Exemption. I hereby affirm that the statements made herein are true, that I have not made any materially false statements and I make this Certificate of Attestation of Exemption under the penalties of perjury. I further affirm that I understand that any false statement, representation or concealment will subject me to felony criminal prosecution, including jail and civil liability in accordance with the Workers' Compensation Law and all other New York State laws. By submitting this Certificate of Attestation of Exemption to the government entity listed above I also hereby affirm that if circumstances change so that workers' compensation insurance and/or disability benefits coverage is required, the above-named legal entity will immediately acquire appropriate New York State specific workers' compensation insurance and/or disability benefits coverage and also immediately furnish proof of that coverage on forms approved by the Chair of the Workers' Compensation Board to the government entity listed above.

<b>SIGN HERE</b>	Signature:	Date:
Exemption Certificate Number <b>2008-00197</b>		Received <b>October 2, 2008</b> NYS Workers' Compensation Board

STATE OF NEW YORK  
WORKERS' COMPENSATION BOARD

**CERTIFICATE OF NYS WORKERS' COMPENSATION INSURANCE COVERAGE**

<p><b>1a. Legal Name &amp; Address of Insured (Use street address only)</b></p>   <p><i>Work Location of Insured (Only required if coverage is specifically limited to certain locations in New York State, i.e., a Wrap-Up Policy)</i></p>	<p><b>1b. Business Telephone Number of Insured</b></p> <p><b>1c. NYS Unemployment Insurance Employer Registration Number of Insured</b></p> <p><b>1d. Federal Employer Identification Number of Insured or Social Security Number</b></p>
<p><b>2. Name and Address of the Entity Requesting Proof of Coverage (Entity Being Listed as the Certificate Holder)</b></p>   	<p><b>3a. Name of Insurance Carrier</b></p> <p><b>3b. Policy Number of entity listed in box "1a"</b></p> <p><b>3c. Policy effective period</b> _____ to _____</p> <p><b>3d. The Proprietor, Partners or Executive Officers are included. (Only check box if all partners/officers included) all excluded or certain partners/officers excluded.</b></p>

This certifies that the insurance carrier indicated above in box "3" insures the business referenced above in box "1a" for workers' compensation under the New York State Workers' Compensation Law. **(To use this form, New York (NY) must be listed under Item 3A on the INFORMATION PAGE of the workers' compensation insurance policy).** The Insurance Carrier or its licensed agent will send this Certificate of Insurance to the entity listed above as the certificate holder in box "2".

*The Insurance Carrier will also notify the above certificate holder within 10 days IF a policy is canceled due to nonpayment of premiums or within 30 days IF there are reasons other than nonpayment of premiums that cancel the policy or eliminate the insured from the coverage indicated on this Certificate. (These notices may be sent by regular mail.) Otherwise, this Certificate is valid for one year after this form is approved by the insurance carrier or its licensed agent, or until the policy expiration date listed in box "3c", whichever is earlier.*

**Please Note: Upon the cancellation of the workers' compensation policy indicated on this form, if the business continues to be named on a permit, license or contract issued by a certificate holder, the business must provide that certificate holder with a new Certificate of Workers' Compensation Coverage or other authorized proof that the business is complying with the mandatory coverage requirements of the New York State Workers' Compensation Law.**

**Under penalty of perjury, I certify that I am an authorized representative or licensed agent of the insurance carrier referenced above and that the named insured has the coverage as depicted on this form.**

Approved by: \_\_\_\_\_  
(Print name of authorized representative or licensed agent of insurance carrier)

Approved by: \_\_\_\_\_  
(Signature) (Date)

Title: \_\_\_\_\_

Telephone Number of authorized representative or licensed agent of insurance carrier: \_\_\_\_\_

**Please Note: Only insurance carriers and their licensed agents are authorized to issue Form C-105.2. Insurance brokers are NOT authorized to issue it.**

## Workers' Compensation Law

### Section 57. Restriction on issue of permits and the entering into contracts unless compensation is secured.

1. The head of a state or municipal department, board, commission or office authorized or required by law to issue any permit for or in connection with any work involving the employment of employees in a hazardous employment defined by this chapter, and notwithstanding any general or special statute requiring or authorizing the issue of such permits, shall not issue such permit unless proof duly subscribed by an insurance carrier is produced in a form satisfactory to the chair, that compensation for all employees has been secured as provided by this chapter. Nothing herein, however, shall be construed as creating any liability on the part of such state or municipal department, board, commission or office to pay any compensation to any such employee if so employed.
2. The head of a state or municipal department, board, commission or office authorized or required by law to enter into any contract for or in connection with any work involving the employment of employees in a hazardous employment defined by this chapter, notwithstanding any general or special statute requiring or authorizing any such contract, shall not enter into any such contract unless proof duly subscribed by an insurance carrier is produced in a form satisfactory to the chair, that compensation for all employees has been secured as provided by this chapter.

**SAMPLE**

Form SI-12



STATE OF NEW YORK  
WORKERS' COMPENSATION BOARD  
SELF-INSURANCE OFFICE  
20 PARK STREET - ROOM 206  
ALBANY, NY 12207



(518) 402-0247  
FAX (518) 402-6199

COMPLIANCE WITH DISABILITY BENEFITS LAW  
(Pursuant To Section 220, subd. 8 of the Disability Benefits Law)

EMPLOYER	FEDERAL EMPLOYER IDENTIFICATION NUMBER
	LOCATION OF OPERATION
ADDRESS (HOME OR MAIN OFFICE)	OPERATIONS TO BE REPORTED OR ABOUT:

There are on file with the Workers' Compensation Board, documents indicating that the above-named employer has complied with the Disability Benefits Law with respect to all of his or her employees in the following manner:

- By approved self-insurance pursuant to Section 211, subdivision 3 of the Disability Benefits Law.
- By a combination of approved self-insurance pursuant to Section 211, subdivision 3 of the Disability Benefits Law and insurance with authorized insurance carrier(s).

Date:

By: \_\_\_\_\_  
Gina Wagoner  
WC Examiner

DB-135 (3/04)

THIS AGENCY EMPLOYS & SERVES PEOPLE WITH DISABILITIES WITHOUT DISCRIMINATION



# New York State Insurance Fund

Workers' Compensation & Disability Benefits Specialists Since 1914

199 CHURCH STREET, NEW YORK, N.Y. 10007-1100

Phone: (888) 997-3863

## CERTIFICATE OF WORKERS' COMPENSATION INSURANCE

AAAAAA

POLICYHOLDER	CERTIFICATE HOLDER
--------------	--------------------

POLICY NUMBER	CERTIFICATE NUMBER	PERIOD COVERED BY THIS CERTIFICATE 01/01/2009 TO 05/01/2010	DATE 1/8/2009
---------------	--------------------	--	------------------

THIS IS TO CERTIFY THAT THE POLICYHOLDER NAMED ABOVE IS INSURED WITH THE NEW YORK STATE INSURANCE FUND UNDER POLICY NO. 2058 840-6 UNTIL 05/01/2010, COVERING THE ENTIRE OBLIGATION OF THIS POLICYHOLDER FOR WORKERS' COMPENSATION UNDER THE NEW YORK WORKERS' COMPENSATION LAW WITH RESPECT TO ALL OPERATIONS IN THE STATE OF NEW YORK, EXCEPT AS INDICATED BELOW.

IF SAID POLICY IS CANCELLED, OR CHANGED PRIOR TO 05/01/2010 IN SUCH MANNER AS TO AFFECT THIS CERTIFICATE, 10 DAYS WRITTEN NOTICE OF SUCH CANCELLATION WILL BE GIVEN TO THE CERTIFICATE HOLDER ABOVE. NOTICE BY REGULAR MAIL SO ADDRESSED SHALL BE SUFFICIENT COMPLIANCE WITH THIS PROVISION. THE NEW YORK STATE INSURANCE FUND DOES NOT ASSUME ANY LIABILITY IN THE EVENT OF FAILURE TO GIVE SUCH NOTICE.

THIS CERTIFICATE DOES NOT APPLY TO BUILDING DEMOLITION.

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS NOR INSURANCE COVERAGE UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICY.

NEW YORK STATE INSURANCE FUND

DIRECTOR, INSURANCE FUND UNDERWRITING

This certificate can be validated on our web site at <https://www.nysif.com/cert/certval.asp> or by calling (888) 875-5790  
VALIDATION NUMBER: 107031806

STATE OF NEW YORK  
WORKERS' COMPENSATION BOARD

**CERTIFICATE OF PARTICIPATION IN WORKERS' COMPENSATION  
GROUP SELF-INSURANCE**

1a. Legal Name and Address of Business Participating in Group Self-Insurance (Use Street Address Only)	1d. Business Telephone Number of Business referenced in box "1a"  1e. NYS Unemployment Insurance Employer Registration Number of Business referenced in box "1a"
1b. Effective Date of Membership in the Group	
1c. The Proprietor, Partners or Executive Officers are <input type="checkbox"/> included (Only check box if all partners/officers included) <input checked="" type="checkbox"/> all excluded or certain partners/officers excluded	1f. Federal Employer Identification Number of Business referenced in box "1a"
2. Name and Address of the Entity Requesting Proof of Coverage (Entity Being Listed as Certificate Holder)	3. Name and Address of Group Self-Insurer

This certifies that the business referenced above in box "1a" is complying with the mandatory coverage requirements of the New York State Workers' Compensation Law as a participating member of the Group Self-Insurer listed above in box "3" and participation in such group self-insurance is still in force. The Group Self-Insurer's Administrator will send this Certificate of Participation to the entity listed above as the certificate holder in box "2".

The Group Self-Insurer's Administrator will notify the above certificate holder within 10 days IF the membership of the participant listed in box "1a" is terminated. (These notices may be sent by regular mail.) Otherwise, this Certificate is valid for a maximum of one year from the date certified by the group self-insurer.

*If this certificate is no longer valid according to the above guidelines and the business referenced in box "1a" continues to be named on a permit, license or contract issued by the certificate holder, the business must provide the certificate holder either with a new certificate or other authorized proof the business is complying with the mandatory coverage requirements of the New York State Workers' Compensation Law.*

**Under penalty of perjury, I certify that I am an authorized representative of the Group Self-Insurer referenced above and that the business referenced in box "1a" has the coverage as depicted on this form.**

Certified by: \_\_\_\_\_  
(Print name of authorized representative of the Group Self-Insurer)

Certified by: \_\_\_\_\_  
(Signature) (Date)

Title: \_\_\_\_\_

Telephone Number: \_\_\_\_\_



STATE OF NEW YORK  
WORKERS' COMPENSATION BOARD

CERTIFICATE OF INSURANCE COVERAGE UNDER THE NYS DISABILITY BENEFITS LAW

**PART 1. To be completed by Disability Benefits Carrier or Licensed Insurance Agent of that Carrier**

1a. Legal Name and Address of Insured (Use street address only)	1b. Business Telephone Number of Insured  1c. NYS Unemployment Insurance Employer Registration Number of Insured  1d. Federal Employer Identification Number of Insured or Social Security Number
2. Name and Address of the Entity Requesting Proof of Coverage (Entity Being Listed as the Certificate Holder)  State University of New York Room 302 1400 Washington Avenue Albany, NY 12222	3a. Name of Insurance Carrier  3b. Policy Number of entity listed in box "1a":  3c. Policy effective period: _____ to _____

4. Policy covers:
- a.  All of the employer's employees eligible under the New York Disability Benefits Law
  - b.  Only the following class or classes of the employer's employees:

Under penalty of perjury, I certify that I am an authorized representative or licensed agent of the insurance carrier referenced above and that the named insured has NYS Disability Benefits insurance coverage as described above

Date Signed \_\_\_\_\_ By \_\_\_\_\_  
(Signature of insurance carrier's authorized representative or NYS Licensed Insurance Agent of that insurance carrier)

Telephone Number \_\_\_\_\_ Title \_\_\_\_\_

**IMPORTANT:** If box "4a" is checked, and this form is signed by the insurance carrier's authorized representative or NYS Licensed Insurance Agent of that carrier, this certificate is COMPLETE. Mail it directly to the certificate holder.  
If box "4b" is checked, this certificate is NOT COMPLETE for purposes of Section 220, Subd. 8 of the Disability Benefits Law. It must be mailed for completion to the Workers' Compensation Board, DB Plans Acceptance Unit, 20 Park Street, Albany, New York 12207.

**PART 2. To be completed by NYS Workers' Compensation Board (Only if box "4b" of Part 1 has been checked)**

**State Of New York  
Workers' Compensation Board**

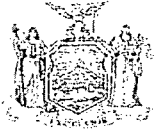
According to information maintained by the NYS Workers' Compensation Board, the above-named employer has complied with the NYS Disability Benefits Law with respect to all of his/her employees

Date Signed \_\_\_\_\_ By \_\_\_\_\_  
(Signature of NYS Workers' Compensation Board Employee)

Telephone Number \_\_\_\_\_ Title \_\_\_\_\_

*Please Note: Only insurance carriers licensed to write NYS disability benefits insurance policies and NYS licensed insurance agents of those insurance carriers are authorized to issue Form DB-120.1. Insurance brokers are NOT authorized to issue this form.*

FORM DB-155



STATE OF NEW YORK  
WORKERS' COMPENSATION BOARD  
SELF-INSURANCE OFFICE  
20 PARK STREET - ROOM 206  
ALBANY, NY 12207



(518) 402-0247  
FAX (518) 402-6199

COMPLIANCE WITH DISABILITY BENEFITS LAW  
(Pursuant To Section 220, subd. 8 of the Disability Benefits Law)

EMPLOYER	FEDERAL EMPLOYER IDENTIFICATION NUMBER
	LOCATION OF OPERATION
ADDRESS (HOME OR MAIN OFFICE)	
	OPERATIONS TO BEGIN FOR OR ABOUT:

There are on file with the Workers' Compensation Board, documents indicating that the above-named employer has complied with the Disability Benefits Law with respect to all of his or her employees in the following manner:

- By approved self-insurance pursuant to Section 211, subdivision 3 of the Disability Benefits Law.
- By a combination of approved self-insurance pursuant to Section 211, subdivision 3 of the Disability Benefits Law and insurance with authorized insurance carrier(s).

Date:

By: \_\_\_\_\_  
Gina Wagoner  
WC Examiner

DB-155 (3/04)

THIS AGENCY EMPLOYS & SERVES PEOPLE WITH DISABILITIES WITHOUT DISCRIMINATION

# Affidavit of Exemption to Show Specific Proof of Workers' Compensation Insurance Coverage for a 1, 2, 3 or 4 Family, Owner-occupied Residence

**\*\*This form cannot be used to waive the workers' compensation rights or obligations of any party.\*\***

**Under penalty of perjury**, I certify that I am the owner of the 1, 2, 3 or 4 family, **owner-occupied** residence (including condominiums) listed on the building permit that I am applying for, and I am not required to show specific proof of workers' compensation insurance coverage for such residence because (please check the appropriate box):

- I am performing all the work for which the building permit was issued.
- I am not hiring, paying or compensating in any way, the individual(s) that is(are) performing all the work for which the building permit was issued or helping me perform such work.
- I have a homeowners insurance policy that is currently in effect and covers the property listed on the attached building permit AND am hiring or paying individuals a total of less than 40 hours per week (aggregate hours for all paid individuals on the jobsite) for which the building permit was issued.

I also agree to either:

- ◆ acquire appropriate workers' compensation coverage and provide appropriate proof of that coverage on forms approved by the Chair of the NYS Workers' Compensation Board to the government entity issuing the building permit if I need to hire or pay individuals a total of 40 hours or more per week (aggregate hours for all paid individuals on the jobsite) for work indicated on the building permit, or if appropriate, file a CE-200 exemption form; OR
- ◆ have the general contractor, performing the work on the 1, 2, 3 or 4 family, **owner-occupied** residence (including condominiums) listed on the building permit that I am applying for, provide appropriate proof of workers' compensation coverage or proof of exemption from that coverage on forms approved by the Chair of the NYS Workers' Compensation Board to the government entity issuing the building permit if the project takes a total of 40 hours or more per week (aggregate hours for all paid individuals on the jobsite) for work indicated on the building permit.

\_\_\_\_\_  
(Signature of Homeowner)

\_\_\_\_\_  
(Date Signed)

\_\_\_\_\_  
(Homeowner's Name Printed)

Home Telephone Number \_\_\_\_\_

Property Address that requires the building permit:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

<p><i>Sworn to before me this _____ day of</i></p> <p>_____</p> <p>_____ <i>(County Clerk or Notary Public)</i></p>
---

Once notarized, this BP-1 form serves as an exemption for both workers' compensation and disability benefits insurance coverage.

LAWS OF NEW YORK, 1998  
CHAPTER 439

The general municipal law is amended by adding a new section 125 to read as follows:

125. ISSUANCE OF BUILDING PERMITS. NO CITY, TOWN OR VILLAGE SHALL ISSUE A BUILDING PERMIT WITHOUT OBTAINING FROM THE PERMIT APPLICANT EITHER:

1. PROOF DULY SUBSCRIBED THAT WORKERS' COMPENSATION INSURANCE AND DISABILITY BENEFITS COVERAGE ISSUED BY AN INSURANCE CARRIER IN A FORM SATISFACTORY TO THE CHAIR OF THE WORKERS' COMPENSATION BOARD AS PROVIDED FOR IN SECTION FIFTY-SEVEN OF THE WORKERS' COMPENSATION LAW IS EFFECTIVE; OR

2. AN AFFIDAVIT THAT SUCH PERMIT APPLICANT HAS NOT ENGAGED AN EMPLOYER OR ANY EMPLOYEES AS THOSE TERMS ARE DEFINED IN SECTION TWO OF THE WORKERS' COMPENSATION LAW TO PERFORM WORK RELATING TO SUCH BUILDING PERMIT.

## Implementing Section 125 of the General Municipal Law

### 1. General Contractors -- Business Owners and Certain Homeowners

For businesses and certain homeowners listed as the general contractors on building permits, proof that they are in compliance with Section 57 of the Workers' Compensation Law (WCL) is **ONE** of the following forms that indicate that they are:

- ◆ insured (C-105.2 or U-26.3),
- ◆ self-insured (SI-12), or
- ◆ are exempt (CE-200),

under the mandatory coverage provisions of the WCL. Any residence that is not a **1, 2, 3 or 4 Family, Owner-occupied Residence** is considered a business (income or potential income property) and must prove compliance by filing one of the above forms.

### 2. Owner-occupied Residences

For homeowners of a **1, 2, 3 or 4 Family, Owner-occupied Residence**, proof of their exemption from the mandatory coverage provisions of the Workers' Compensation Law when applying for a building permit is to file form BP-1.

- ◆ Form BP-1 shall be filed if the homeowner of a **1, 2, 3 or 4 Family, Owner-occupied Residence** is listed as the general contractor on the building permit, and the homeowner:
  - ◇ is performing all the work for which the building permit was issued him/herself,
  - ◇ is not hiring, paying or compensating in any way, the individual(s) that is(are) performing all the work for which the building permit was issued or helping the homeowner perform such work, or
  - ◇ has a homeowner's insurance policy that is currently in effect and covers the property for which the building permit was issued AND the homeowner is hiring or paying individuals a total of less than 40 hours per week (aggregate hours for all paid individuals on the jobsite) for the work for which the building permit was issued.
- ◆ If the homeowner of a **1, 2, 3 or 4 Family, Owner-occupied Residence** is hiring or paying individuals a total of **40 hours or MORE** in any week (aggregate hours for all paid individuals on the jobsite) for the work for which the building permit was issued, then the homeowner may not file the "Affidavit of Exemption" form, BP-1(11/04), but shall either:
  - ◇ acquire appropriate workers' compensation coverage and provide appropriate proof of that coverage on forms approved by the Chair of the NYS Workers' Compensation Board to the government entity issuing the building permit (the C-105.2 or U-26.3 form), OR
  - ◇ have the general contractor, (performing the work on the 1, 2, 3 or 4 family, **owner-occupied** residence (including condominiums) listed on the building permit) provide appropriate proof of workers' compensation coverage, or proof of exemption from that coverage on forms approved by the Chair of the NYS Workers' Compensation Board to the government entity issuing the building permit.



NOTICE OF COMPLIANCE  
DISABILITY BENEFITS LAW  
TO EMPLOYEES

AVISO DE CUMPLIMIENTO  
LEY DE BENEFICIOS POR INCAPACIDAD  
A LOS EMPLEADOS

If you are unable to work because of an illness or injury not work-related, you may be entitled to receive weekly benefits from your employer, or his or her insurance company, or from the Special Fund for Disability Benefits.

To claim benefits You must file a claim form, within 30 days from the first date of your disability, but in no event more than 26 weeks from such date.

- Use one of the following claim forms:
    - if, when your disability begins you are employed or are unemployed for four weeks or less, use WHITE claim form (Form DB-450), which you may obtain from your employer, his or her insurance carrier, your health provider or any office of the Workers' Compensation Board, and send it to your employer or the insurance carrier named below.
    - If, when your disability begins, you have been unemployed more than four weeks, use the GREEN claim form (Form DB-300), which you may obtain from any Unemployment Insurance Office, your health provider, or any office of the Workers' Compensation Board. Send completed claim form to the Workers' Compensation Board, Disability Benefits Bureau Albany, New York 12241.
- IMPORTANT** Before filing your claim, your health provider must complete the "Health Care Provider's Statement" on the claim form, showing your period of disability.

You are entitled to be treated by any physician, chiropractor, dentist, nurse-midwife, podiatrist or psychologist of your choice. However, unlike workers' compensation, your medical bills will not be paid unless your employer and/or union provide for the payment of such bills under a Disability Benefits Plan or Agreement.

- If you are ill or injured during the time you are receiving Unemployment Insurance Benefits, file a claim for Disability Benefits as soon as you sustain the injury or illness, by following the instructions outlined above.

If you are out of work in excess of seven days, your employer is required to send you a Disability Benefits Statement of Rights (Form DB-271).

Other information about Disability Benefits may be obtained by writing or calling the nearest Workers' Compensation Board Office.

WORKERS' COMPENSATION BOARD OFFICES

- Albany, 12241 - 100 Broadway-Menands - (518) 474-6681
- Binghamton, 13901 - State Office Bldg - 44 Hawley St. - (607) 721-8333
- Buffalo, 14203-State Office Bldg -125 Main St - (716) 847-3111
- Hempstead, 11550 -175 Fulton Avenue - (516) 560-7145
- Rochester, 14614 - 130 Main Street West - (716) 248-5500
- Syracuse, 13202 - State Office Bldg.-333 E. Washington St. - (315) 428-4466

- Si usted no puede trabajar debido a enfermedad o lesión no relacionada con el trabajo, podría tener derecho a recibir, beneficios semanales de su patrón o de la compañía de seguros de él/ella o del Fondo Especial para Beneficios por Incapacidad.

- Para reclamar beneficios usted debe Presentar una forma de reclamación, dentro de 30 días a Partir de la Primera fecha de su incapacidad, pero en ningún caso más de 26 semanas de dicha fecha.

- Use una de las siguientes formas de reclamación:
  - Si, cuando comience su incapacidad usted está empleado o ha estado desempleado por cuatro semanas o menos, use la forma de reclamación BLANCA (form DB-450), la cual puede obtener de su patrón o de la compañía de seguros de él/ella, o de su proveedor de cuidados de salud, o bien de cualquier oficina de la Junta de Compensación Obrera, y envíela a su patrón o a la compañía de seguros nombrada abajo.
  - Si, cuando comience su incapacidad, usted ha estado desempleado más de cuatro semanas, use la forma de reclamación VERDE (form DB-300), la cual puede obtener en cualquier Oficina de Seguro de Desempleo, de su proveedor de salud, o bien de cualquier oficina de la Junta de Compensación Obrera Envíe la forma de reclamación, debidamente terminada, a Workers' Compensation Board, Disability Benefits Bureau, Albany, New York 12241.

**IMPORTANT** Antes de presentar usted su reclamación, es necesario que su proveedor de salud complete la declaración del médico ("Health Care Provider's Statement") en la forma de reclamación, indicando el periodo de su incapacidad.

- Usted tiene derecho a ser tratado por cualquier medico, quiropráctico, dentista, enfermera-partera, podiatra o psicologo que usted elija. Pero, con excepción a la compensación obrera, sus cuentas médicas no serán pagadas a menos que su patrón y/o Unión haga el pago de tales cuentas médicas bajo un Plan o Convenio de Beneficios por Incapacidad.

Si usted era usted enfermo o lesionado durante el tiempo que esté recibiendo beneficios del Seguro de Desempleo, presente una reclamación para Beneficios por Incapacidad, siguiendo las instrucciones arriba descritas, tan pronto como sufra la lesión o la enfermedad.

Si usted está desempleado por más de siete días, su patrón está obligado a enviarle la declaración de Derechos de Beneficios por incapacidad (Form DB-271).

- Otras informaciones relativas a Beneficios por incapacidad pueden obtenerse escribiendo o llamando a la oficina mas cercana de la Junta de Compensación Obrera.

*Robert R. Snashall*  
Robert R. Snashall  
Chairman (Presidente)

The undersigned employer is in compliance with the provisions of the Disability Benefits Law (El patrón abajo firmante esta en conformidad con las disposiciones de la ley de Beneficios por Incapacidad).

Disability Benefits, when due, will be paid by ( Los Beneficios por Incapacidad, cuando debidos, serán pagados por):

SAMPLE

Effective: From ( \_\_\_\_\_ ) To UNTIL CANCELLED  
(En Vigor Desde) (HASTA)

Policy No \_\_\_\_\_  
(Poliza No.)

The benefits provided are (Los beneficios provistos son)

<input type="checkbox"/>	Statutory (Estatutarios)	<input type="checkbox"/>	Under a Plan or Agreement ( Bajo un Plan o Convenio)
--------------------------	-----------------------------	--------------------------	---

Class(es) of employees covered (Clasé(s) de empleados amparados)

ALL EMPLOYEES ELIGIBLE UNDER NY DBL

Name of employer (Nombre del Patrón)

By *[Signature]*

**Erie County Water Authority  
ACORD Endorsement Samples**

POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

**ADDITIONAL INSURED – OWNERS, LESSEES OR  
CONTRACTORS – (FORM B)**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART.

**SCHEDULE**

Name of Person or Organization:

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

WHO IS AN INSURED (Section II) is amended to include as an insured the person or organization shown in the Schedule, but only with respect to liability arising out of "your work" for that insured by or for you.



POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

## ADDITIONAL INSURED – DESIGNATED PERSON OR ORGANIZATION

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART.

SCHEDULE

Name of Person or Organization:

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

WHO IS AN INSURED (Section II) is amended to include as an insured the person or organization shown in the Schedule as an insured but only with respect to liability arising out of your operations or premises owned by or rented to you.

SAMPLE ISO FORM



# CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)  
06/20/2016

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

**IMPORTANT:** If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

<b>PRODUCER</b> MARSH USA, INC. 20 CHURCH STREET HARTFORD, CT 06103 Attn: Fax # 860-243-7932		<b>CONTACT NAME:</b> PHONE (A/C, No, Ext): E-MAIL ADDRESS: FAX (A/C, No):	
052019-ALL-UMB-16-17      AUT		<b>INSURER(S) AFFORDING COVERAGE</b> NAIC #	
<b>INSURED</b> KAMAN CORPORATION AND ITS SUBSIDIARIES* ATTN: ANNETTE TAMALIS RISK MANAGER 1332 BLUE HILLS AVENUE BLOOMFIELD, CT 06002		INSURER A : Travelers Prop. Casualty Co. Of America      25674 INSURER B : Travelers Indemnity Company of America      25666 INSURER C : ACE Property and Casualty Insurance Company      20699 INSURER D : INSURER E : INSURER F :	

**COVERAGES**      **CERTIFICATE NUMBER:** NYC-008477210-12      **REVISION NUMBER:** 7

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL SUBR INSD WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR  GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PROJECT <input type="checkbox"/> LOC OTHER:		TC2JGLSA177D8426-16  <i>04461</i> <i>25674</i> <i>A++ XV</i>	02/01/2016	02/01/2017	EACH OCCURRENCE \$ 2,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000 MED EXP (Any one person) \$ 10,000 PERSONAL & ACV INJURY \$ 2,000,000 GENERAL AGGREGATE \$ 3,000,000 PRODUCTS - CCMPI/OP AGG \$ 3,000,000 \$
A	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS		TC2JCAP177D8414-16  SELF INSURED FOR PHYSICAL DAMAGE <i>04461</i> <i>25674</i> <i>A++ XV</i>	02/01/2016	02/01/2017	COMBINED SINGLE LIMIT (Ea accident) \$ 2,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
C	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED    RETENTION \$		X00 G2794839A001  <i>01996</i> <i>20699</i> <i>A++ XV</i>	02/01/2016	02/01/2017	EACH OCCURRENCE \$ 5,000,000 AGGREGATE \$ 5,000,000 \$
B A	<input checked="" type="checkbox"/> WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N <input type="checkbox"/> N/A	TC2HUB8196A264-16 (AOS) TRJUB8196A276-16 (AZ, MA, OR, WI)	02/01/2016	02/01/2017	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000
			<i>04003</i> <i>25666</i> <i>A++ XV</i>			

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

\*Includes Kaman Automation, Inc.  
Erie County Water Authority, its officers, agents and employees are included as additional insureds (except workers' compensation) on a primary and non-contributory basis but only as required by written contract with the Named Insured. Waiver of subrogation in favor of Erie County Water Authority, its officers, agents and employees on the workers' compensation, general liability and automobile liability policies but only as required by written contract with the Named Insured.

Project # 201400106 / 201400160

APPROVED JUN 21 2016

<b>CERTIFICATE HOLDER</b> Erie County Water Authority 295 Main Street, Suite 350 Buffalo, NY 14203	<b>CANCELLATION</b> SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.  AUTHORIZED REPRESENTATIVE of Marsh USA Inc. Manashi Mukherjee <i>Manashi Mukherjee</i>
---	---

POLICY NUMBER: TC2J-GLSA-17708426-TIL-16

COMMERCIAL GENERAL LIABILITY  
ISSUE DATE: 02-01-16

**THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.**

**ADDITIONAL INSURED – DESIGNATED PERSON OR  
ORGANIZATION**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

**SCHEDULE**

**Name of Additional Insured Person(s) or Organization(s):**

Any person or entity with whom you have agreed in a written contract, executed prior to loss to name as an additional insured, but only for the limits agreed to in such contract or the limits of insurance of this policy, whichever is less.

**Section II – Who Is An Insured** is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury", "property damage", "personal injury" or "advertising injury" caused, in whole or in part, by your acts or omissions or the acts or omissions of those acting on your behalf:

- A. In the performance of your ongoing operations; or
- B. In connection with your premises owned by or rented to you.

# A.M. Best Rating Services

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- » Issue Rating Guide
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- » Country Risk Information
- » Market Segment Outlook

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### Industry Research

### Industry & Market Centers

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## Travelers Property Casualty Company of America (2)

A.M. Best #: 004461 NAIC #: 25674 FEIN #: 362719165

### Domiciliary Address

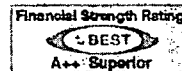
One Tower Square  
Hartford, CT 06183  
[United States](#)

Web: [www.travelers.com](http://www.travelers.com)

Phone: 860-277-0111

Fax: 860-277-7002

Assigned to insurance companies.



that have, in our opinion, a superior ability to meet their ongoing insurance obligations.

Based on A.M. Best's analysis, 058470 - [Travelers Companies, Inc.](#) is the AMB Ultimate Parent and identifies the topmost entity of the corporate structure. View a list of [operating insurance entities](#) in this structure.

### Best's Credit Ratings

Financial Strength Rating <a href="#">View Definition</a>	
Rating:	A++ (Superior)
Affiliation Code:	g (Group)
Financial Size Category:	XV (\$2 Billion or greater)
Outlook:	Stable
Action:	Affirmed
Effective Date:	May 28, 2015
Initial Rating Date:	June 30, 1972

Best's Credit Rating Analyst	
Rating Issued by:	A.M. Best Rating Services, Inc.
Senior Financial Analyst:	Michael W. Russo
Assistant Vice President:	Jennifer Marshall, CPCU, ARM

Long-Term Issuer Credit Rating <a href="#">View Definition</a>	
Long-Term:	aa+
Outlook:	Stable
Action:	Affirmed
Effective Date:	May 28, 2015
Initial Rating Date:	April 18, 2005

Disclosure Information	
	<a href="#">View A.M. Best's Rating Disclosure Statement</a>
	<a href="#">A.M. Best Affirms Ratings of The Travelers Companies, Inc. and Its Subsidiaries</a> May 28, 2015

u Denotes [Under Review Best's Rating](#)

### Rating History

A.M. Best has provided ratings & analysis on this company since 1972.

Financial Strength		Long-Term Issuer Credit	
Effective Date	Rating	Effective Date	Rating
5/28/2015	A++	5/28/2015	aa+
5/23/2014	A++	5/23/2014	aa+
5/30/2013	A+	5/30/2013	aa
5/10/2012	A+	5/10/2012	aa
5/26/2011	A+	5/26/2011	aa
6/8/2010	A+	6/8/2010	aa

### AMB Credit Reports

**AMB Credit Report** - Includes Best's Financial Strength Rating and rationale along with comprehensive analytical commentary, detailed business overview and key financial data.

Report Revision Date: 3/18/2016 (represents the latest significant change).

Historical Reports are available in [AMB Credit Report Archive](#).

View additional [news, reports and products](#) for this company.

Press Releases	
Date	Title







# CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)  
05/20/2016

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

**IMPORTANT:** If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

<b>PRODUCER</b> MARSH USA, INC. 20 CHURCH STREET, 8TH FLOOR HARTFORD, CT 06103	<b>CONTACT NAME:</b> _____	
	<b>PHONE (A/C No. Ext):</b> _____	<b>FAX (A/C No):</b> _____
<b>E-MAIL ADDRESS:</b> _____		
<b>INSURER(S) AFFORDING COVERAGE</b>		<b>NAIC #</b>
052019-ALL-E&O-16-17	<b>INSURER A:</b> Columbia Casualty Company	31127
<b>INSURED</b> KAMAN CORPORATION AND ITS SUBSIDIARIES ATTN: ANNETTE TAMALIS 1332 BLUE HILLS AVENUE BLOOMFIELD, CT 06002	<b>INSURER B:</b>	
	<b>INSURER C:</b>	
	<b>INSURER D:</b>	
	<b>INSURER E:</b>	
	<b>INSURER F:</b>	

**COVERAGES**      **CERTIFICATE NUMBER:** NYC-008477209-01      **REVISION NUMBER:** 5

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL SUBR INSR	WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
	<b>COMMERCIAL GENERAL LIABILITY</b> <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> OCCUR  GENL AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC <input type="checkbox"/> OTHER						EACH OCCURRENCE \$ DAMAGE TO RENTED PREMISES (Ea occurrence) \$ MED EXP (Any one person) \$ PERSONAL & ADV INJURY \$ GENERAL AGGREGATE \$ PRODUCTS - COM/PROP AGG \$ \$
	<b>AUTOMOBILE LIABILITY</b> <input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS						COMBINED SINGLE LIMIT (Ea accident) \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
	<b>UMBRELLA LIAB</b> <input type="checkbox"/> OCCUR <b>EXCESS LIAB</b> <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> DED <input type="checkbox"/> RETENTION \$						EACH OCCURRENCE \$ AGGREGATE \$ \$
	<b>WORKERS COMPENSATION AND EMPLOYERS' LIABILITY</b> ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below.						<input type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ E.L. DISEASE - EA EMPLOYEE \$ E.L. DISEASE - POLICY LIMIT \$
A	<b>ERRORS &amp; OMISSIONS</b> SIR: \$100,000 EACH CLAIM			425540237 03538 31127 AXV	02/01/2016	02/01/2017	EACH CLAIM: 5,000,000 AGGREGATE: 5,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)  
\*Includes Kaman Automation, Inc.  
Re: Erie County Water Authority Contract No: EMA-03A; Project No. 201400160; Distribution SCADA Replacement

APPROVED JUN 21 2016

<b>CERTIFICATE HOLDER</b> Erie County Water Authority 295 Main Street, Suite 350 Buffalo, NY 14203	<b>CANCELLATION</b> SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.  AUTHORIZED REPRESENTATIVE of Marsh USA Inc. Manashi Mukherjee <i>Manashi Mukherjee</i>
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**Workers' Compensation Board**

**CERTIFICATE OF  
NYS WORKERS' COMPENSATION INSURANCE COVERAGE**

<p>1a. Legal Name &amp; Address of Insured (use street address only) KAMAN AUTOMATION, INC. 1000 UNIVERSITY AVENUE, SUITE 800 ROCHESTER, NY 14607</p> <p>Work Location of Insured (Only required if coverage is specifically limited to certain locations in New York State, i.e., a Wrap-Up Policy)</p>	<p>1b. Business Telephone Number of Insured (585) 254-8840</p> <p>1c. NYS Unemployment Insurance Employer Registration Number of Insured</p> <p>1d. Federal Employer Identification Number of Insured or Social Security Number 46-0713181</p>
<p>2. Name and Address of the Entity Requesting Proof of Coverage (Entity Being Listed as the Certificate Holder) Erie County Water Authority 295 Main Street, Room 350 Buffalo, NY 14203</p>	<p>3a. Name of Insurance Carrier The Charter Oak Fire Insurance Company</p> <p>3b. Policy Number of entity listed in box "1a" 02516 25615 TC2HUB-8196A26-4-16</p> <p>3c. Policy effective period 02-01-2016 to 02-01-2017 A+ XV</p> <p>3d. The Proprietor, Partners or Executive Officers are <input checked="" type="checkbox"/> included. (Only check box if all partners/officers included) <input type="checkbox"/> all excluded or certain partners/officers excluded.</p>

This certifies that the insurance carrier indicated above in box "3" insures the business referenced above in box "1a" for workers' compensation under the New York State Workers' Compensation Law. (To use this form, New York (NY) must be listed under **Item 3A** on the **INFORMATION PAGE** of the workers' compensation insurance policy). The Insurance Carrier or its licensed agent will send this Certificate of Insurance to the entity listed above as the certificate holder in box "2".

Will the carrier notify the certificate holder within 10 days of a policy being cancelled for non-payment of premium or within 30 days if cancelled for any other reason or if the insured is otherwise eliminated from the coverage indicated on this certificate prior to the end of the policy effective period?  YES  NO

This certificate is issued as a matter of information only and confers no rights upon the certificate holder. This certificate does not amend, extend or alter the coverage afforded by the policy listed, nor does it confer any rights or responsibilities beyond those contained in the referenced policy.

This certificate may be used as evidence of a Workers' Compensation contract of insurance only while the underlying policy is in effect.

**Please Note:** Upon cancellation of the workers' compensation policy indicated on this form, if the business continues to be named on a permit, license or contract issued by a certificate holder, the business must provide that certificate holder with a new Certificate of Workers' Compensation Coverage or other authorized proof that the business is complying with the mandatory coverage requirements of the New York State Workers' Compensation Law.

Under penalty of perjury, I certify that I am an authorized representative or licensed agent of the insurance carrier referenced above and that the named insured has the coverage as depicted on this form.

Approved by: Debra Browning  
(Print name of authorized representative or licensed agent of insurance carrier)

Approved by: *Debra Browning* 05-20-2016  
(Signature) (Date)

Title: Compliance Specialist

Telephone Number of authorized representative or licensed agent of insurance carrier: 214-570-6521

**Please Note:** Only insurance carriers and their licensed agents are authorized to issue Form C-105.2. Insurance brokers are NOT authorized to issue it.

**APPROVED JUN 21 2016**

# A.M. Best Rating Services

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- Recent Rating Activity
- Search for a Rating

### Regional Centers

### Rating Process & Definitions

- Understanding Best's Ratings
- Guide to Best's Ratings
- Financial Strength Rating Guide
- Issuer Credit Rating Guide
- Issue Rating Guide
- National Scale Rating Guide
- Country Risk Information
- Market Segment Outlook

### Rating Methodology

### Industry Research

### Industry & Market Centers

### Contact an Analyst

### Conferences & Events

### Awards & Recognitions

### Data Submission Center

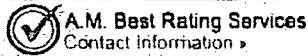
### Regulatory Information

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## The Charter Oak Fire Insurance Company (7)

A.M. Best #: 002516 NAIC #: 25615 FEIN #: 060291290

**Domiciliary Address**  
One Tower Square  
Hartford, CT 06183  
[United States](#)

**Web:** [www.travelers.com](http://www.travelers.com)  
**Phone:** 860-277-0111  
**Fax:** 860-277-7002

Assigned to insurance companies that have, in our opinion, a superior ability to meet their ongoing insurance obligations



Based on A.M. Best's analysis, 058470 - [Travelers Companies, Inc.](#) is the AMB Ultimate Parent and identifies the topmost entity of the corporate structure. View a list of [operating insurance entities](#) in this structure.

### Best's Credit Ratings

Financial Strength Rating <a href="#">View Definition</a>	
Rating:	A++ (Superior)
Affiliation Code:	g (Group)
Financial Size Category:	XV (\$2 Billion or greater)
Outlook:	Stable
Action:	Affirmed
Effective Date:	May 28, 2015
Initial Rating Date:	June 30, 1936

Best's Credit Rating Analyst	
Rating issued by:	A.M. Best Rating Services, Inc.
Senior Financial Analyst:	Michael W. Russo
Assistant Vice President:	Jennifer Marshall, CPCU, ARM

Disclosure Information	
	<a href="#">View A.M. Best's Rating Disclosure Statement</a>
	<a href="#">A.M. Best Affirms Ratings of The Travelers Companies, Inc. and its Subsidiaries</a> May 28, 2015

Long-Term Issuer Credit Rating <a href="#">View Definition</a>	
Long-Term:	aa+
Outlook:	Stable
Action:	Affirmed
Effective Date:	May 28, 2015
Initial Rating Date:	April 18, 2005

Denotes [Under Review Best's Rating](#)

### Rating History

A.M. Best has provided ratings & analysis on this company since 1936.

Financial Strength		Long-Term Issuer Credit	
Effective Date	Rating	Effective Date	Rating
5/28/2015	A++	5/28/2015	aa+
5/23/2014	A++	5/23/2014	aa+
5/30/2013	A+	5/30/2013	aa
5/10/2012	A+	5/10/2012	aa
5/26/2011	A+	5/26/2011	aa
6/8/2010	A+	6/8/2010	aa

### AMB Credit Reports

- AMB Credit Report** - includes Best's Financial Strength Rating and rationale along with comprehensive analytical commentary, detailed business overview and key financial data  
Report Revision Date: 3/16/2016 (represents the latest significant change)
- Historical Reports are available in [AMB Credit Report Archive](#).

View additional [news, reports and products](#) for this company

### Press Releases

Date	Title

STATE OF NEW YORK  
WORKERS' COMPENSATION BOARD  
CERTIFICATE OF INSURANCE COVERAGE UNDER THE NYS DISABILITY BENEFITS LAW

**PART 1. To be completed by Disability Benefits Carrier or Licensed Insurance Agent of that Carrier**

<p>1a. Legal Name and Address of Insured (Use street address only)</p> <p>Kaman Automation, Inc. 1000 University Avenue, Suite 800 Rochester, NY 14607</p>	<p>1b. Business Telephone Number of Insured 585-254-8840</p> <p>1c. NYS Unemployment Insurance Employer Registration Number of Insured</p> <p>1d. Federal Employer Identification Number of Insured or Social Security Number 46-0713181</p>
<p>2. Name and Address of the Entity Requesting Proof of Coverage (Entity Being Listed as the Certificate Holder)</p> <p>Erie County Water Authority 295 Main Street, Room 350 Buffalo, NY 14203</p>	<p>3a. Name of Insurance Carrier First Unum Life Insurance Company <span style="float: right;">06514 64297</span></p> <p>3b. Policy Number of entity listed in box "1a": 96848 <span style="float: right;">A XV</span></p> <p>3c. Policy effective period: 05/23/2016 to 05/23/2017</p>

4. Policy covers:

- a.  All of the employer's employees eligible under the New York Disability Benefits Law
- b.  Only the following class or classes of the employer's employees:

Under penalty of perjury, I certify that I am an authorized representative or licensed agent of the insurance carrier referenced above and that the named insured has NYS Disability Benefits insurance coverage as described above.

Date Signed 05/23/2016

By Candace Morrison  
(Signature of insurance carrier's authorized representative or NYS Licensed Insurance Agent of that insurance carrier)

Digitally signed by cmorrison@unum.com  
Date: 2016.05.23 10:56:13 -04'00'

Telephone Number 1-207-575-6723

Title DBL Specialist

**IMPORTANT:** If box "4a" is checked, and this form is signed by the insurance carrier's authorized representative or NYS Licensed Insurance Agent of that carrier, this certificate is COMPLETE. Mail it directly to the certificate holder.

If box "4b" is checked, this certificate is NOT COMPLETE for purposes of Section 220, Subd. 8 of the Disability Benefits Law. It must be mailed for completion to the Workers' Compensation Board, DB Plans Acceptance Unit, 328 State Street, Schenectady, NY 12305.

**PART 2. To be completed by NYS Workers' Compensation Board (Only if box "4b" of Part 1 has been checked)**

**State Of New York  
Workers' Compensation Board**

According to information maintained by the NYS Workers' Compensation Board, the above-named employer has complied with the NYS Disability Benefits Law with respect to all of his/her employees.

Date Signed \_\_\_\_\_

By \_\_\_\_\_

(Signature of NYS Workers' Compensation Board Employee)

Telephone Number \_\_\_\_\_

Title \_\_\_\_\_

*Please Note: Only insurance carriers licensed to write NYS disability benefits insurance policies and NYS licensed insurance agents of those insurance carriers are authorized to issue Form DB-120 1. Insurance brokers are NOT authorized to issue this form.*

DB-120.1 (12-13)

APPROVED JUN 2 1 2016

*[Handwritten Signature]*



Erie County Water Authority Insurance Requirements for Professional Services

Project Number: 201400106 / 201400160

Description: Management and Operations Enhancements  
Assistance in Optimizing Operations and Maintenance /  
Distribution SCADA Replacement - Contract: EMA-03A

The following minimum insurance requirements shall apply to professional service providers under agreement with the Erie County Water Authority (ECWA). If at anytime, in the opinion of ECWA, there is an unusual or exceptional risk, ECWA may establish additional insurance requirements for the duration of the agreement. All insurance required herein shall be obtained at the sole cost and expense of the professional service provider, including deductibles and self-insured retentions. These requirements include but are not limited to the minimum insurance requirements.

An X indicates insurance coverage is required.

X **Commercial General Liability Insurance:** (including, but not limited to, Bodily (Personal) Injury, Premises Operations, Property Damage Liability (broad form), Contractual Liability, Advertising Injury, Independent Contractors, Product Liability, Completed Operations Liability and Explosion, Collapse and Underground Coverage) – in an amount not less than \$1,000,000 combined single limit and \$2,000,000 in the aggregate:

- Per Policy
- Per Project or Job
- Per Location

There should be no exclusions for any claims filed, actual or alleged, for violation of any applicable statute including, but not limited to, the New York State or federal labor laws, ordinances, administrative orders, executive orders, rules, regulations, or decrees of any court of competent jurisdiction.

X **Comprehensive Business Automobile Insurance** in an amount of not less than \$1,000,000 each accident and shall cover liability arising out of any automobile owned, leased, hired, borrowed and non-owned automobiles. Additionally, if vehicles are used for transporting hazardous materials, the contractor shall obtain and maintain the "broadened" coverage (endorsement CA 99 48 10 01 or CA 99 48 12 93), as well as proof of MCS 90 04 00.

X **Excess Umbrella Liability Insurance:**

- \$1,000,000 in the aggregate
  - \$2,000,000 in the aggregate
  - \$3,000,000 in the aggregate
  - \$4,000,000 in the aggregate
  - \$5,000,000 in the aggregate
- Per Policy
  - Per Project or Job
  - Per Location

X **Professional Liability Insurance:** Per each occurrence and in the aggregate. Continuous coverage shall be maintained, or on an extended discovery period ("tail coverage"), for a period of not less than two years from the time the agreement has been completed in an amount of not less than:

- \$1,000,000 in the aggregate
- \$2,000,000 in the aggregate
- \$3,000,000 in the aggregate
- \$4,000,000 in the aggregate
- \$5,000,000 in the aggregate

X **Workers' Compensation and Employers' Liability and New York State Disability Benefits Insurances,** as required by New York State statute.

Certificates of Insurance and renewals, on forms approved by the New York State Department of Insurance, must be submitted to ECWA prior to the award of contract. Each insurance carrier issuing a Certificate of Insurance shall be rated by A. M. Best no lower than "A-" with a Financial Strength Code (FSC) of at least VII. The professional service provider shall name ECWA, its officers, agents and employees as additional insured on a Primary and Non-Contributory Basis, including a Waiver of Subrogation endorsement (form CG 20 26 11 85 or equivalent), on all applicable liability policies.

Any liability coverage on a "claims made" basis should be designated as such on the Certificate of Insurance.

To avoid confusion with similar insurance company names and to properly identify the insurance company, please make sure that the insurer's National Association of Insurance Commissioners (N.A.I.C.) identifying number or A. M. Best identifying number appears on the Certificate of Insurance.

Acceptance of a Certificate of Insurance and/or approval by ECWA shall not be construed to relieve the professional service provider of any obligations, responsibilities or liabilities.

Certificates of Insurance should be e-mailed to [AALESSI@ECWA.ORG](mailto:AALESSI@ECWA.ORG) or mailed to Mr. Anthony Alessi, ECWA Claims Representative/Risk Manager, Erie County Water Authority, 295 Main Street - Room 350, Buffalo, New York 14203-2494, or If you have any questions you can contact Mr. Alessi by e-mail or phone (716) 849-8477.

Please refer to the bid and the contract document(s) for additional information regarding insurance requirements.

## **Anthony Alessi**

---

**From:** Anthony Alessi  
**Sent:** Friday, June 17, 2016 1:09 PM  
**To:** 'Dugan, Terence'  
**Cc:** Annette Tamalis; San-Vong, Sinath; Shannon Heneghan; 'Kane, Matthew'; John J. Mogavero; Paul H. Riester; Leonard F. Kowalski  
**Subject:** RE: Kaman / Zeller Contract with Erie County

Thanks Terry. I will conditionally approve the Certificate of Insurance pending the receipt of the originals.

Very truly yours,

### **ERIE COUNTY WATER AUTHORITY**

#### ***Anthony J. Alessi***

Claims Representative / Risk Manager

295 Main Street - Room 350

Buffalo, New York 14203

(716) 849-8477 - Direct Telephone Number

(716) 849-8480 - Fax

E-Mail: [aalessi@ecwa.org](mailto:aalessi@ecwa.org)

**From:** Dugan, Terence [mailto:Terence.Dugan@marsh.com]  
**Sent:** Friday, June 17, 2016 1:03 PM  
**To:** Anthony Alessi  
**Cc:** Annette Tamalis; San-Vong, Sinath; Shannon Heneghan; 'Kane, Matthew'; John J. Mogavero; Paul H. Riester; Leonard F. Kowalski  
**Subject:** Re: Kaman / Zeller Contract with Erie County

Tony,

I agree that the Certificate of Insurance provided (or to be amended confirming Per Project Limits of \$6m) meets the Insurance requirements outlined in the attachment provided in your email.

Terry Dugan

Sent from my BlackBerry 10 smartphone.

**From:** Anthony Alessi  
**Sent:** Friday, June 17, 2016 12:48 PM  
**To:** Dugan, Terence  
**Cc:** Annette Tamalis; San-Vong, Sinath; Shannon Heneghan; 'Kane, Matthew'; John J. Mogavero; Paul H. Riester; Leonard F. Kowalski  
**Subject:** RE: Kaman / Zeller Contract with Erie County

Terry,

I have attached the ECWA Insurance Requirements for this project.

Please confirm that the Certificate of Insurance to be provided for your insured will meet or exceed our requirements.

Thank you.

Very truly yours,

**ERIE COUNTY WATER AUTHORITY**

*Anthony J. Alessi*

Claims Representative / Risk Manager

295 Main Street - Room 350

Buffalo, New York 14203

(716) 849-8477 - Direct Telephone Number

(716) 849-8480 - Fax

E-Mail: [aalessi@ecwa.org](mailto:aalessi@ecwa.org)

**From:** Dugan, Terence [<mailto:Terence.Dugan@marsh.com>]

**Sent:** Friday, June 17, 2016 12:37 PM

**To:** Anthony Alessi

**Cc:** Annette Tamalis; San-Vong, Sinath

**Subject:** Kaman / Zeller Contract with Erie County

**Importance:** High

Tony,

Per our conversation, Kaman's primary liability has agreed to add the Per Project endorsement to the policy at their primary limits \$2m / \$3m. The Umbrella schedules the primary CGL and will provide excess limits above to satisfy the overall \$6m requirement.

I have not had the ability to review all of the other insurance requirements for this project but understand this is the only remaining insurance requirement issue per my conversations with Kaman.

Please email or call me 401-965-3391 with any questions.

Regards,

Terry Dugan

Marsh USA

Sent from my BlackBerry 10 smartphone.

\*\*\*\*\*  
This e-mail transmission and any attachments that accompany it may contain information that is privileged, confidential or otherwise exempt from disclosure under applicable law and is intended solely for the use of the individual(s) to whom it was intended to be addressed.



APPENDIX C

PREVAILING WAGE RATE SCHEDULE

ERIE COUNTY WATER AUTHORITY

**INSTRUCTIONS AND SCHEDULE OF MINIMUM WAGE RATES ISSUED BY  
NEW YORK STATE LABOR DEPARTMENT**

No laborer, worker or mechanic in the employ of the CONTRACTOR or a Subcontractor or other person doing or contracting to do a whole or a part of the work contemplated by this agreement, shall be permitted or required to work more than eight (8) hours in any calendar day, or more than five (5) days in any one week, except in cases of extraordinary emergency caused by fire, flood, or damages to life and property.

The wages to be paid for a legal day's work to laborers, workmen or mechanics under this agreement, shall not be less than the prevailing rate of wages as defined and determined by the Industrial Commissioner of the State of New York, a schedule of which is attached to this contract and made a part thereof, with the same force and effect as though set forth in full herein.

In the performance of the work the CONTRACTOR shall give preference to citizens of the State of New York who have been residents for at least twelve (12) months immediately prior to the commencement of their employment, and persons other than citizens may be employed when citizens of the State of New York are not available. If the above provisions of this contract and the provisions of Sec. 222 of the Law of the State of New York are not complied with, this contract Labor shall be void.

In the hiring of employees for the performance of work under this contract or by subcontract hereunder, the CONTRACTOR or subcontractor, or any persons acting on behalf of the CONTRACTOR or subcontractor, shall not by any reason of race or color discriminate against or intimidate any employee hired for the performance of work under this contract on account of race or color.

There may be deducted from the amount payable to the CONTRACTOR by the Water Authority, under this contract, a penalty of five dollars (\$5.00) for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of this contract.

This contract may be cancelled or terminated by the Water Authority and all monies due or to become due hereunder may be forfeited for a second or subsequent violation of the terms or conditions of the preceding paragraph of this contract.

**PUBLIC WORKS - FAILURE TO PAY PREVAILING WAGE  
EXCLUSION FROM CONTRACTING OR SUBCONTRACTING**

**CHAPTER 147**

A. 7314-A

Memorandum relating to this chapter, see Legislative Memoranda, post.

Approved may 24, 1991, effective as provided in Section 3.

An act to amend the labor law, in relation to debarment of public building service CONTRACTORS

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1:

Paragraph b of Subdivision 3 of Section 220-b of the Labor Law, as amended by Chapter 651 of the Laws of 1989, is amended to read as follows:

- b. When two final determinations have been rendered against a CONTRACTOR or subcontractor and/or its successor within any consecutive six-year period determining that such CONTRACTOR or subcontractor and/or its successor has willfully failed to pay the prevailing rate of wages or to provide supplements in accordance with this article, whether such failures were concurrent or consecutive and whether or not such final determinations concerning separate public work projects are rendered simultaneously, such CONTRACTOR or subcontractor and/or its successor shall be ineligible to submit a bid on or be awarded any public work contract with the state, any municipal corporation or public body for a period of five years from the second final determination. For purposes of this article, a successor shall mean an employer engaged in work substantially similar to that of the predecessor, where there is substantial continuity of operation with that of the predecessor.

SECTION 2:

Subdivision 7 of Section 235 of the labor Law, as added by Chapter 777 of the Laws of 1971, is amended to read as follows:

7. When, pursuant to the provisions of this section two final orders have been entered against a CONTRACTOR or subcontractor and/or its successor within any consecutive six-year period determining that such CONTRACTOR or subcontractor and/or its successor has willfully failed to pay the prevailing wages in accordance with the provisions of this article, whether such failures were concurrent or consecutive and whether or not such final determinations concerning separate public building service contracts are rendered simultaneously, such CONTRACTOR or subcontractor and/or its successor, and if the CONTRACTOR or subcontractor and/or its successor is a corporation, any officer of such corporation who knowingly participated in such failure, shall be ineligible to submit a bid on or be awarded any public building service work for a period of five years from the date of the second order. For purposes of this article, a successor shall mean an employer engaged in work substantially similar to that of the predecessor, where there is substantial continuity of operation with that of the predecessor. Nothing of this subdivision shall be construed as affecting any provision of any other law or regulation relating to the awarding of public contracts.

SECTION 3:

This act shall take effect 60 days after the date upon which it shall have become a law and shall apply to any conduct occurring after such date.

STATE OF NEW YORK  
DEPARTMENT OF LABOR

NOTICE TO ALL PUBLIC OFFICIALS IN CHARGE OF  
PUBLIC WORK CONSTRUCTION AND ALL CONTRACTORS  
AND SUBCONTRACTORS ENGAGED IN PUBLIC WORKS  
CONSTRUCTION IN THE STATE OF NEW YORK

Article 8, Section 220 of the Labor Law, as amended by Chapter 750 of the Laws of 1956, provides, among other things, that it shall be the duty of the fiscal officer to make a determination of the schedule of wages to be paid to all laborers, workmen and mechanics employed on public work projects including supplements for welfare, pension, vacation and other benefits. These supplements may include hospital, surgical or medical insurance or benefits; life insurance or death benefits; accidental death or dismemberment insurance; and pension or retirement benefits. If the amount of supplements provided by the employer is less than the total supplements shown on the wage schedule, the difference shall be paid in cash to employees.

Article 8, Section 220 of the Labor Law, as amended by Chapter 750 of the Laws of 1956, also provides that the supplements to be provided to laborers, workmen and mechanics upon public works "shall be in accordance with the prevailing practices in the locality..." The amount for supplements listed on the enclosed schedule does not necessarily include all types of prevailing supplements in the locality, and a future determination of the Industrial Commissioner may require the CONTRACTOR to provide additional supplements.

The CONTRACTOR shall provide statutory benefits for disability benefits, workmen's compensation, unemployment insurance and Social Security.

The substance of this notice should be included in your contract.

Signed - Dr. Philip Ross  
INDUSTRIAL COMMISSIONER

PW-39 (5-56)

Article 8 of the New York State Labor Law was amended on July 15, 1983 to provide that wages for Public Projects are to be paid pursuant to the existing Bargaining Agreement in the area where the work is to be performed.

Wages are to be paid on this project as hereinafter set forth or pursuant to the Collective Bargaining Agreement in effect in Erie County, whichever are higher.

During the performance of this contract, the CONTRACTOR agrees as follows:

- (a) The CONTRACTOR will not discriminate against any employee or applicant for employment because of race, creed, sex, age, color or national origin, and will take affirmative action to insure that they are afforded equal employment opportunities without discrimination because of race, creed, sex, age, color or national origin or because a person has opposed any practices forbidden under these sections or because he filed a complaint, testified, or assisted in any proceeding under these sections. Such action shall be taken with reference, but not limited to: recruitment, employment, classification, job assignment, promotion, upgrading, demotion, transfer, layoff, discharge, expulsion or termination, rates of pay or other forms of compensation, and selection for training or retraining, including apprenticeship and on-the-job training.
- (b) The CONTRACTOR will send to each labor union or representative of workers with which he has or is bound by a collective bargaining or other agreement or understanding, a notice, to be provided by the State Commission for Human Rights, advising such labor union or representative of the CONTRACTOR'S agreement under clauses (a) through (h) (hereinafter called "non-discrimination clauses) and requesting such labor union or representative to agree in writing, whether in such collective bargaining or other agreement or understanding or otherwise, that such labor union or representative will not discriminate against any member or applicant for membership because of race, creed, sex, age, color or national origin, and will take affirmative action to insure that they are afforded equal membership opportunities without discrimination because of race, creed, sex, age, color or national origin. Such action shall be taken with reference, but not limited to: recruitment, employment, job assignment, promotion, upgrading, classification, demotion, transfer, layoff, discharge, expulsion or termination, rates of pay or other forms of compensation, and selection for training or retraining, including apprenticeship and on-the-job training. Such notice shall be given by the CONTRACTOR prior to the commencement of performance of this contract. Such written agreement shall be made by such labor union or representative prior to the commencement of performance of this contract, unless such labor union or representative fails or refuses so to agree in writing, in which event the CONTRACTOR shall promptly notify the State Commission for Human Rights of such failure or refusal.
- (c) The CONTRACTOR will post and keep posted in conspicuous places, available to employee's and applicants for employment, notices to be provided by the State Commission for Human Rights setting forth the substance of the provisions of clauses (a) and (b) and such provisions of the State's laws against discrimination as the State Commission for Human Rights shall determine.

- (d) The CONTRACTOR will state, in all solicitations or advertisements for employees placed by or on behalf of the CONTRACTOR, that all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, sex, age, color or national origin.
- (e) The CONTRACTOR will comply with the provisions of Sections 291-299 of the Executive Law and the Civil Rights Law, will furnish all information and reports deemed necessary by the State Commission for Human Rights under these non-discrimination clauses and such sections of the Executive Law, and will permit access to his books, records and accounts by the State Commission for Human Rights, the Attorney General and the Industrial Commissioner for purposes of investigation to ascertain compliance with these non-discrimination clauses and such sections of the Executive Law and Civil Rights Law.
- (f) This contract may be forthwith cancelled, terminated or suspended, in whole or in part, by the contracting agency upon the basis of a finding made by the State Commission for Human Rights that the CONTRACTOR has not complied with these non-discrimination clauses, and the CONTRACTOR may be declared ineligible for future contracts made by or on behalf of the State or a public authority or agency of the State, until he satisfied the State Commission for Human Rights that he has established and is carrying out a program in conformity with the provisions of these non-discrimination clauses. Such finding shall be made by the State Commission for Human Rights after conciliation efforts by the Commission have failed to achieve compliance with these non-discrimination clauses and after a verified complaint has been filed with the Commission, notice thereof has been given to the CONTRACTOR and an opportunity has been afforded him to be heard publicly before three members of the Commission. Such sanctions may be imposed and remedies invoked independently of or in addition to sanctions and remedies otherwise provided by law.
- (g) If this contract is cancelled or terminated under clause (f), in addition to other rights of the Erie County Water Authority provided in this contract upon its breach by the CONTRACTOR, the CONTRACTOR will hold the Erie County Water Authority harmless against any additional expenses or costs incurred by the Authority in completing the work or in purchasing the services, materials, equipment or supplies contemplated by this contract, and the Erie County Water Authority may withhold payments from the CONTRACTOR in an amount sufficient for this purpose and recourse may be had against the surety on the performance bond if necessary.
- (h) The CONTRACTOR will include the provisions of clauses (a) through (g) in every subcontract or purchase order in such manner that provisions will be binding upon each subcontractor or vendor as to operations to be performed within the State of New York. The CONTRACTOR will take such action in enforcing such provisions of such subcontract or purchase order as the contracting agency may direct, including sanctions or remedies for noncompliance. If the CONTRACTOR becomes involved in or is threatened with litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the CONTRACTOR shall promptly so notify the Attorney General and Attorney

for the Erie County Water Authority, requesting them to intervene and protect the interest of the State of New York and the Erie County Water Authority.



# Appendix D

## HMI Style Guide



***Distribution System***  
***HMI Style Guideline***

*No Part Of This Document May Be  
Altered Without The Express Written Consent  
From Erie County Water Authority.*

*Produced with assistance from*



# 1 TABLE OF CONTENTS

1. INTRODUCTION.....	1
1.1. Purpose.....	1
1.2. Scope.....	1
1.3. HMI Product.....	1
1.4. Principles and Attributes.....	1
2. SETUP.....	3
2.1. Naming Convention.....	3
2.2. Tag Group Files (.Tgd).....	3
2.3. User Global Files (User.FXG).....	4
2.4. Dynamos (.FDS).....	4
3. HMI SCREEN NAVIGATION.....	4
3.1. Hierarchy.....	4
3.2. Navigation.....	5
4. DISPLAY CHARACTERISTICS.....	6
4.1. Symbol Color Usage.....	6
4.2. Alarm Window Colors.....	7
4.3. Color Definitions.....	9
5. TEXT.....	10
6. ALARMS.....	12
7. EQUIPMENT REPRESENTATION.....	13
7.1. Process Lines:.....	13
7.2. Tanks:.....	13
7.3. Process Flow:.....	14
7.4. Control Valves:.....	14

7.5. Pumps:	15
7.6. Controllers	16
8. MISCELLANEOUS	16
8.1. Control Faceplates	16
8.2. Navigation Targets	16
9. TRENDING	17
9.1. Embedded Trends	17
9.2. Scratchpad Trends	17
9.3. Historical Trends	17
10. HISTORICAL DATA	17
10.1. Events	17
11. SECURITY	18
APPENDIX A EXAMPLE SCREENS	1

## Revision History

Revision	Date	Comments
0.0	July 2015	1st Draft
1.0	December 2015	Final Draft
1.1	February 2016	Final

## 1. INTRODUCTION

### 1.1. Purpose

The purpose of this document is to define the requirements and standards for the development of SCADA HMI graphics, alarms, reports and trending for Erie County Water Authority's (ECWA's) distribution system.

### 1.2. Scope

This HMI style guide presents the system-wide, graphic display requirements for the Control System. The standards presented herein are intended to set a framework for application development that supports proactive operator situational awareness and efficient and effective interaction with the HMI. This philosophy follows the general principles of the High Performance HMI Handbook<sup>1</sup>, adapted for the specific needs of ECWA.

The HMI style guide should apply to all projects incorporating process control in ECWA's distribution SCADA systems. These standards should be used as guidance for new, or retrofit, facility designs conducted by, or for, ECWA.

ECWA has standardized the base software components required to ensure a consistent approach is taken throughout distribution system's facilities. The general components are documented in the following sections. If there are any changes that require a deviation from this standard, the ECWA SCADA team must be consulted to ensure consistency throughout the system.

### 1.3. HMI Product

ECWA has standardized on GE's iFIX HMI product at the water treatment plants and for the distribution system.

### 1.4. Principles and Attributes

The HMI is an operational tool that enables proactive monitoring and identification of problems within the distribution system. As an operational tool, the HMI must be designed and implemented in such a way as to support the following operational philosophies:

- Continually meet or exceed compliance requirements.
- Optimize the operations of utility systems in order to reduce operating and maintenance costs.
- Minimize the occurrence of abnormal situations that could lead to safety or quality issues.

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<sup>1</sup> Hollifield, Bill, Dana Oliver, Ian Nimmo, and Eddie Habibi. *The High Performance HMI Handbook*, Kalamazoo: 360 Digital Books, 2008, Print.

To support those operational goals, the operator must be provided with information in a clear and intuitive format that minimizes the possibility of mistakes. The following three primary principles should be followed when creating HMI applications and displays:

- Clarity
  - Operator graphics should be intuitive and easy to understand
  - Graphics should clearly show process state and conditions
  - Graphic elements used to control the process should be clearly distinguishable and consistently implemented
  - Graphics should not contain unnecessary detail or clutter
  - Graphics should convey relevant information to operators
  - Process information should have prominence based upon relative importance
  - Alarms and indications of abnormal situations should be clear, prominent, and consistently distinguishable
- Consistency
  - Graphic functions should be standardized, intuitive, straightforward, and involve minimal keystrokes or pointer manipulations
  - Graphic display navigation should be logical, hierarchical, and performance-oriented
- Feedback
  - Graphics elements and control objects must behave and function consistently on all graphics in all situations
  - Important operator actions with significant consequences should have confirmation mechanisms to avoid inadvertent activation
  - Operator graphics should be designed to minimize user fatigue for operations staff that constantly use these displays

Designing the HMI around these standard principles should deliver graphics applications that have the following attributes:

- The operator's attention is drawn to the most critical information, such as:
  - Urgent and high priority alarms
  - Impending compliance violations
  - Health and safety issues
  - Sub-optimal operating conditions that increase operating costs
- The HMI is designed to eliminate confusion and mistakes by providing consistent, easy to read, intuitive information with the proper feedback



- Operator reaction time is optimized by providing needed information in a simple, logically progressive, performance-oriented display structure

## 2. SETUP

### 2.1. Naming Convention

The screen file names should be as follows:

**FFFFT\_BBB\_ProcessName.grf**

Where:

**FFFF** = Distribution System

**T** = Screen Type

O = Overview Screen

C = Control Screen

T = Trend Screen

N = Navigation Screen

R = Report Screen

A = Alarm Screen

F = Faceplate Screen

**BBB** = Service Area or Facility/site.

**ProcessName** is the name of process and/or equipment and is not limited in length. The process name may be the name of a device for control faceplates.

Screen file names are limited to 31 characters by iFIX.

### 2.2. Tag Group Files (.Tgd)

Tag groups provide a way for one picture to be used multiple times with different tags. For example, a valve control faceplate uses a single valve pop-up to control any number of different valves by opening the faceplate with a different tag group file.

Tag groups support in-line substitution, which allows a picture to be opened with a different tag file group. With in-line substitution, if only a small part of a tag name changes between any two data

sources, only that part has to be replaced. For example, the valve number. Tag Group files must follow naming conventions, facility/site, service area, etc.

### 2.3. User Global Files (User.FXG)

User global files should be used to help regulate many of the display functions used throughout the application. These files contain user-defined variables and color threshold tables that are globally available to all pictures.

### 2.4. Dynamos (.FDS)

Dynamos should be used to provide consistency among graphic objects and symbols. They are reusable graphics stored in a Dynamo set that contains object properties. The dynamos may be dragged and dropped onto any graphic screen. When this is done, the dynamo will open a dialog box to enter the appropriate animation values for the current picture on the screen. Dynamos should be tied to the existing custom lookup table in the user global files. For Example, a pump dynamo will use the color threshold table in the user global files to define its animation colors depending on the pump's status.

## 3. HMI SCREEN NAVIGATION

### 3.1. Hierarchy

Operator graphics are designed in a hierarchy for progressive disclosure of process detail to handle specific tasks. The purpose of hierarchical displays is two-fold:

- Provide different amounts of operating detail to aid the operator in performing different tasks
- Allow for easier navigation

The hierarchy for process graphic displays is dependent on operator location and responsibility. These levels of display represent increasing levels of complexity and detail to the operator as he navigates from level 1 displays to level 3 and 4. The disclosure of complexity and detail is meant to represent the operator's mental model of the process. The hierarchy operates like a tree structure, where lower-level displays are associated with higher-level displays. The following display levels, or types, should be used.

- Level 1:
  - Overview displays
  - Key Performance Indicators (KPIs)
  - Alarm summary display(s)
  - Trends
  - Reports
- Level 2:
  - Service area displays

- Level 3:
  - Station or site displays
- Level 4:
  - Equipment displays
  - Diagnostic displays.
  - Etc.

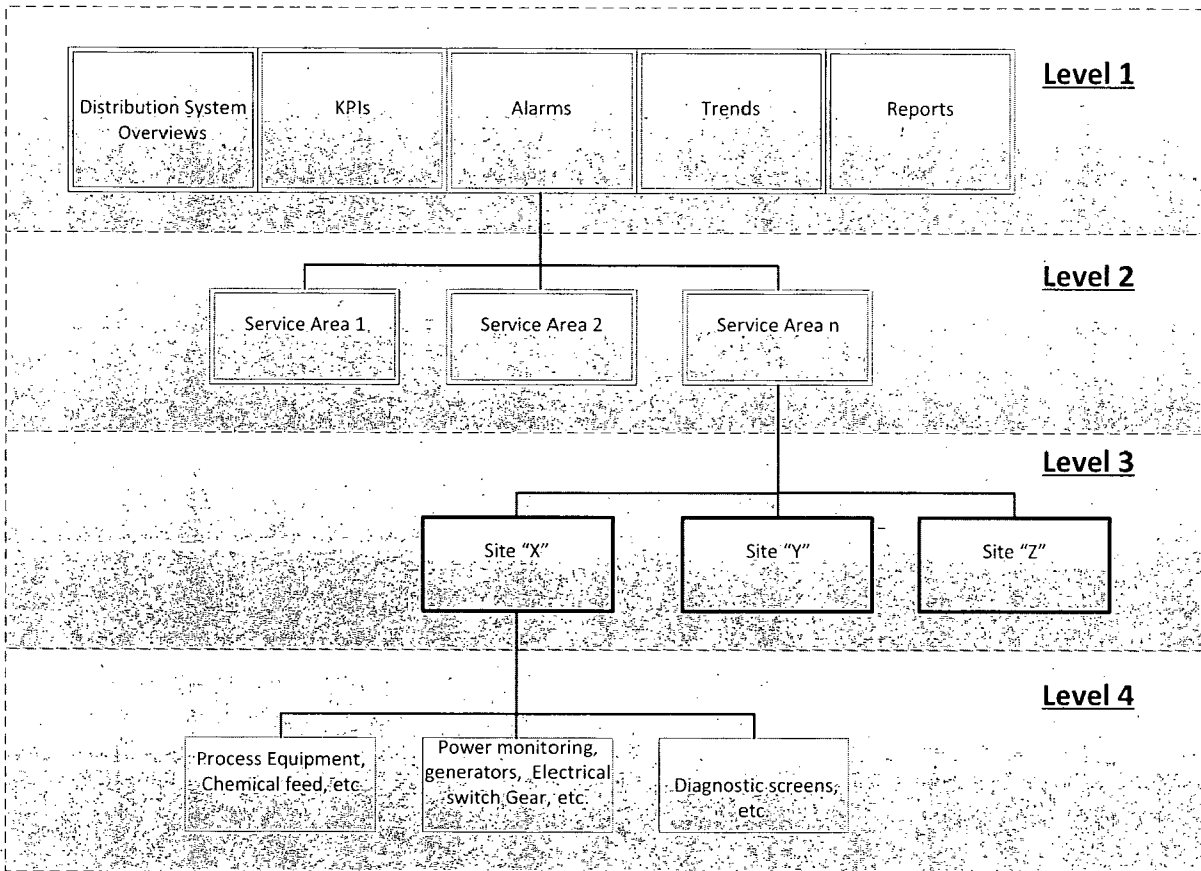
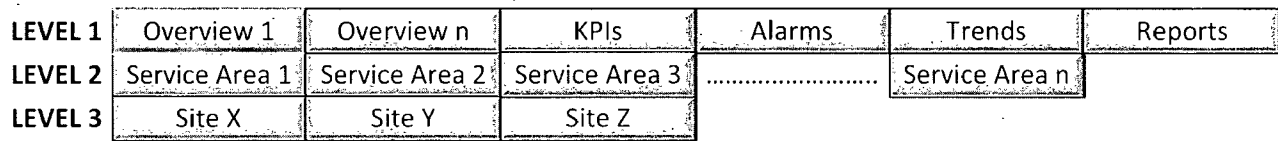


Figure 1 Navigation Hierarchy

### 3.2. Navigation

The navigation between displays should utilize navigation bars. Navigation bars should be provided for level 1, 2 and 3 navigation. Level 4 should be navigated from a level 3 display by selecting a piece of equipment on the display. The level 1 and level 2 navigation bars should remain the same on all graphics, but the level 3 navigation bar should dynamically change based on the level 2 selection, refer to example below.



Level 3 navigation bar changes for selected level 2 display

Figure 2 Navigation Bars

## 4. DISPLAY CHARACTERISTICS

### 4.1. Symbol Color Usage

The following colors should be used for foreground, background, process equipment and alarm displays.

Object/Element	Color Name	Animation
Display Background	Light Gray	
Static Text Display Title Equipment Title General Text Process Material Tag names	Dark Gray	
Engineering Units	Gray	
Dynamic Text Analog Values Discrete States	Dark Blue	
Setpoint Text Setpoint Values	Dark Green	
Process Flow Lines	Black	
Process Equipment (Outline) Vessels Tanks Pumps Valves	Black	

Object/Element	Color Name	Animation
Static Process Equipment (Fill) Vessels Tanks Pumps Valves	Light Gray	
Active/Energized State (Fill) Valve Opened Pump Running Motor On	White	
Inactive/De-energized State (Fill) Valve Closed Pump Stopped Motor Off	Dark Gray	
Alarm Priority 1 – Urgent (Unack)	Red	Blink Medium
Alarm Priority 1 – Urgent (Ack)	Red	
Alarm Priority 2 – High (Unack)	Yellow	Blink Medium
Alarm Priority 2 – High (Ack)	Yellow	
Alarm Priority 3 – Medium (Unack)	Orange	Blink Medium
Alarm Priority 3 – Medium (Ack)	Orange	
Alarm Priority 4 – Low (Unack)	Magenta	Blink Medium
Alarm Priority 4 – Low (Ack)	Magenta	
Alarm – All Priorities (Return)	White	

Table 1 Symbol Color Usage

#### 4.2. Alarm Window Colors

Object/Element	Color Name	Animation
Background Column Headings Row Selection Details Pane Toolbar	Light Gray	

Object/Element	Color Name	Animation
Text Column Headings Row Selection Details Pane Toolbar	Dark Gray	
Grid Line	Dark Gray	
Grid Background	White	
Alarm Priority 1 – Urgent (Unack)	Red Text Dark Gray Background	Blink Medium
Alarm Priority 1 – Urgent (Ack)	Red Text White Background	
Alarm Priority 1 – Urgent (Return)	Dark Gray Text White Background	
Alarm Priority 2 – High (Unack)	Yellow Text Dark Gray Background	
Alarm Priority 2 – High (Ack)	Yellow Text White Background	
Alarm Priority 2 – High (Return)	Dark Gray Text White Background	
Alarm Priority 3 – Medium (Unack)	Orange Background Dark Gray Background	
Alarm Priority 3 – Medium (Ack)	Dark Gray Text White Background	
Alarm Priority 3 – Medium (Return)	Dark Gray Text White Background	
Alarm Priority 4 – Low (Unack)	Magenta Text Dark Gray Background	
Alarm Priority 4 – Low (Ack)	Dark Gray Text White Background	
Alarm Priority 4 – Low (Return)	Dark Gray Text White Background	

Table 2 Alarm Window Colors

Trend window colors

Object/Element	Color Name
Trend Background	Light Gray
Grid Lines	Dark Gray
Text	Dark Gray
Pens	
Pen 1	Dark Gray
All other Pens	Any basic color not used for alarms

Table 3 Trend Window Colors

4.3. Color Definitions

Colors are defined as follows:

Color Name	Color Definition		
	Red	Green	Blue
Blue	0	167	247
Dark Blue	0	0	255
Dark Gray	63	63	63
Dark Green	0	140	0
Gray	100	100	100
Light Gray	224	224	224
Magenta	255	0	255
Red	255	0	0
White	255	255	255
Yellow	255	255	0

Table 4 Color Definitions

## 5. TEXT

The display of static text on process graphics and other displays should follow the following principles:

- The amount of text should be minimized but not eliminated. Text should be used to identify items when their placement or shape does not make their identity obvious.
- Text on process graphics should be dark gray.
- Text on alarm or event displays should be the color associated with the priority.
- All display lettering should use non-serif fonts (Arial).
- For isolated words, titles, short labels, and equipment designations, use all uppercase. For all other instances, use mixed case lettering to improve legibility.
- Text size should be standardized for operator workstation displays.
- Ensure consistency with abbreviations.

Text should be standardized for operator workstation use, or a typical viewing distance of 24 inches, from the screen. ANSI recommends text heights of a minimum 2.8 mm, nominal of 3.5 mm, maximum of 4.1 mm. This roughly corresponds to TrueType point sizes of 8pt, 10pt, and 12pt respectively.

Table 5 below includes a list of TrueType font and size for process graphic, alarm, and trend displays.



<b>Object/Element</b>	<b>Font</b>	<b>Size</b>
<b><i>Process Graphics</i></b>		
Display Title	Arial, Bold	14
Equipment Titles	Arial	12
Instrumentation, Control Device Titles, Process Material	Arial	12
Off Page Connectors	Arial	12
Analog and Discrete values	Arial	10
Engineering units	Arial	10
<b><i>Faceplates</i></b>		
Title	Arial	10
Instrumentation and Control Device Titles	Arial	10
Analog and Discrete values	Arial	10
Engineering units	Arial	10
<b><i>Alarm Displays</i></b>		
Column Headings, Details, Toolbar, Status Bar	Arial, Bold	12
Alarm Text	Arial, Bold	12

Table 5 Text Style

## 6. ALARMS

On process graphic displays, alarms should be indicated by unique colors, text, and shapes. For the alarm priorities and alarm states in use, the following indication methods should be used:





Priority Level	Symbol	Color	Description
1		Red	Urgent
2		Yellow	High
3		Orange	Medium
4		Magenta	Low

Table 6 Alarm Symbols

For equipment that may have multiple alarms, the highest priority level should be shown. For example, if a pump has priority level 1 and 4 alarms active, only the level 1 alarm should be shown for the pump.

Unacknowledged alarms should be distinguished from acknowledged alarms by flashing of the symbol. The location of the alarm symbol should be consistently placed on or near equipment in alarm on all displays.

Suppressed alarms should also be displayed on process graphics. The symbol should be as follows and not cover up alarm symbols:


Symbol	Color	Description
	White	Suppressed Alarm

Table 7 Suppressed Alarm Symbol

## 7. EQUIPMENT REPRESENTATION

### 7.1. Process Lines:

Process lines on graphic displays should adhere to the following

- Process lines should be black.
- Thickness should be used to differentiate between major and minor lines.
  - Main process lines should be 3 pixels in width
  - Secondary process lines should be 1 pixel in width
- Use arrows sparingly to indicate flow direction.
- Use static text to identify material when needed.
- There should be two different line types, solid (process flows and equipment) and dashed (used for grouping or separating objects on the graphic display).

### 7.2. Tanks:

Tanks display on graphic displays should follow the following requirements:

- Tanks should be depicted as two dimensional symbols.
- The interior of the tank should be uniformly shaded without gradients and be the same color as the background color.
- The tank should be outlined in a dark gray line 1 pixel in width.
- The tank's shape should be shown, but without much detail.

The size of the tank should be relative to the process importance of the vessel and, when practical, related to the physical size. The tank level should be shown with a level indicator shown below the tank. A trend should be shown superimposed on the tank with the trend duration shown on the bottom. Tank alarm levels such as Low-Low, Low, High-High, High should be shown

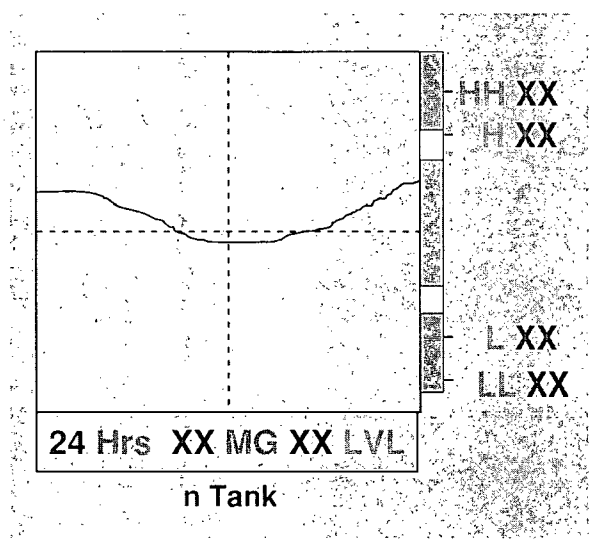


Figure 33 Tank Symbol

### 7.3. Process Flow:

Process flows should adhere to the following:

- Process flows should be depicted consistently.
- Process flows should be from left to right.
- Recycle flows may be depicted logically right to left.
- Vapors generally flow up and liquids flow down unless directly associated with a pump or compressor.

Process lines should enter and leave the screen in consistent ways and should be neatly arranged to allow for easy recognition. Entry and exit points used as navigation targets should be presented and differentiated from non-navigation points.

### 7.4. Control Valves:

Motor operated or pneumatic valves should be shown using a white fill for opened, dark gray for closed, and dark gray and white for mid position as shown. Valve alarms should be identified by standard alarm indication methods.

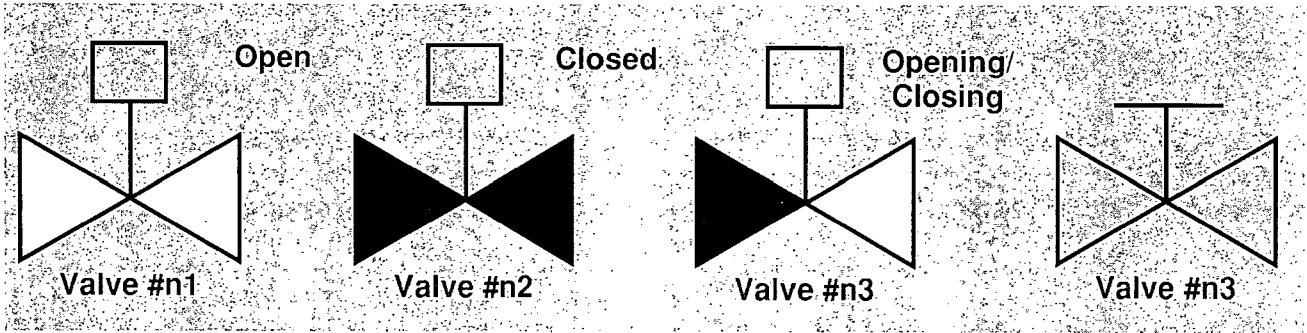


Figure 4 Open/Close Valve Symbols

Modulating valves should be shown dark gray when closed. When the valve is open the valve should be shown with a white fill and the percent open indication.

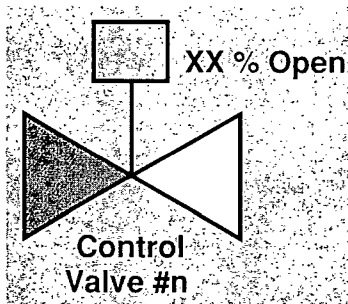


Figure 5 Control Valve Symbol

### 7.5. Pumps:

Pump status should be shown using a white fill when running and dark gray when stopped. Variable speed pumps should be shown similarly with the percent speed shown below the pump. Different types of pumps should be identified by their equipment label. Pump alarms should be identified by standard alarm indication methods.

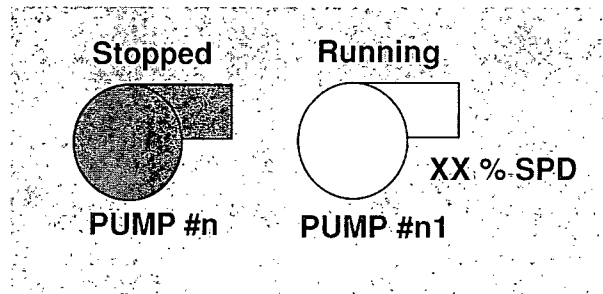


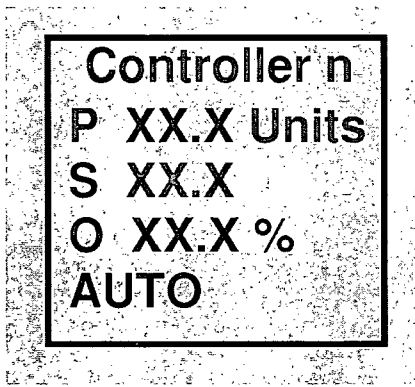
Figure 6 Pump Symbol

## 7.6. Controllers

Controllers should adhere to the following:

- A simplified controller object should display the controller process variable (PV), setpoint (SP), output (CV), and controller mode (Auto, Manual, or Cascade).
- An embedded trend may be required for some control function. The embedded trend provides historical context for the process variable and controller performance.
- Pop-up faceplate should be utilized to provide additional information and control.

All of the controller objects should use consistent colors and text for the process values, controller outputs, and setpoints.



*Figure 7 Controller Symbol*

## 8. MISCELLANEOUS

### 8.1. Control Faceplates

Control faceplates are used to perform operator control, adjust tuning, modify configurations, or troubleshoot failures of a single object or piece of equipment. Common naming conventions, attribute definitions, and logic structures should be used to ensure a common look, feel, and functionality. Critical analog value modifications should use an additional input pop-up that requires positive acknowledgement of input value change. This will limit incorrect values from being entered.

### 8.2. Navigation Targets

Navigation targets are used to identify objects, symbols, and process line arrows that, when clicked, will link to another display or bring up a faceplate for control. Navigation targets should indicate the presence of a link when the mouse is hovered over the object. On process objects that link to faceplates, the navigation target should highlight the object with a gray outline.

Process lines that use arrows to link to other Level 2 or Level 3 displays should be shown differently than process lines that do not link to other displays.

## 9. TRENDING

The trend object should be configured to provide extensive, flexible run-time control including: adding pens, toggling between isolated and non-isolated graphing, specifying unique line settings, plotting one variable against another in XY plots, and printing chart data.

On trends requiring a legend, the legend should be provided with the following information as a minimum:

- Pen tag names and colors
- Pen current value
- Pen units
- Pen maximum and minimum values

In general, the appropriate use of trends is recommended to enhance the operator's awareness of the process and provide the context often missing from most displays.

### 9.1. Embedded Trends

Embedded trends should be pre-configured with a trend title, time scale, value scale, current values, and configured for continuous scrolling with a default time span of two (2) hours. The time span should be adjustable, as needed.

The real-time embedded trends represent common trend configurations used for day-to-day operations.

### 9.2. Scratchpad Trends

Scratchpad trends should consist of a pop-up trend that enables the operator to add any point in the system to a trend for troubleshooting or monitoring. The scratchpad trend should be available from any Level 2 or Level 3 display.

### 9.3. Historical Trends

Historical trends should be configured with a trend title, legend, time scale, value scale, and configured for continuous scrolling with a default time span of twenty-four (24) hours. The time span should be adjustable and include mechanisms to allow for panning, zooming, and scrolling of the time line.

## 10. HISTORICAL DATA

### 10.1. Events

The event summary display should be able to filter events by user role and area of responsibility. Event entries should use the same format as the Alarm History display. Event entries should

identify the action taken, the new value, the time of action, and the name of the user performing the action. In general, the changing of any real-time or historical data, parameter, or configuration should be logged. Attempted changes and display call-up should not be logged. Event entries should be listed in reverse chronological order. Each entry should occupy one line. The Event Summary display should display events for up to 30 days. The Event Summary display should be printable.

## 11. SECURITY

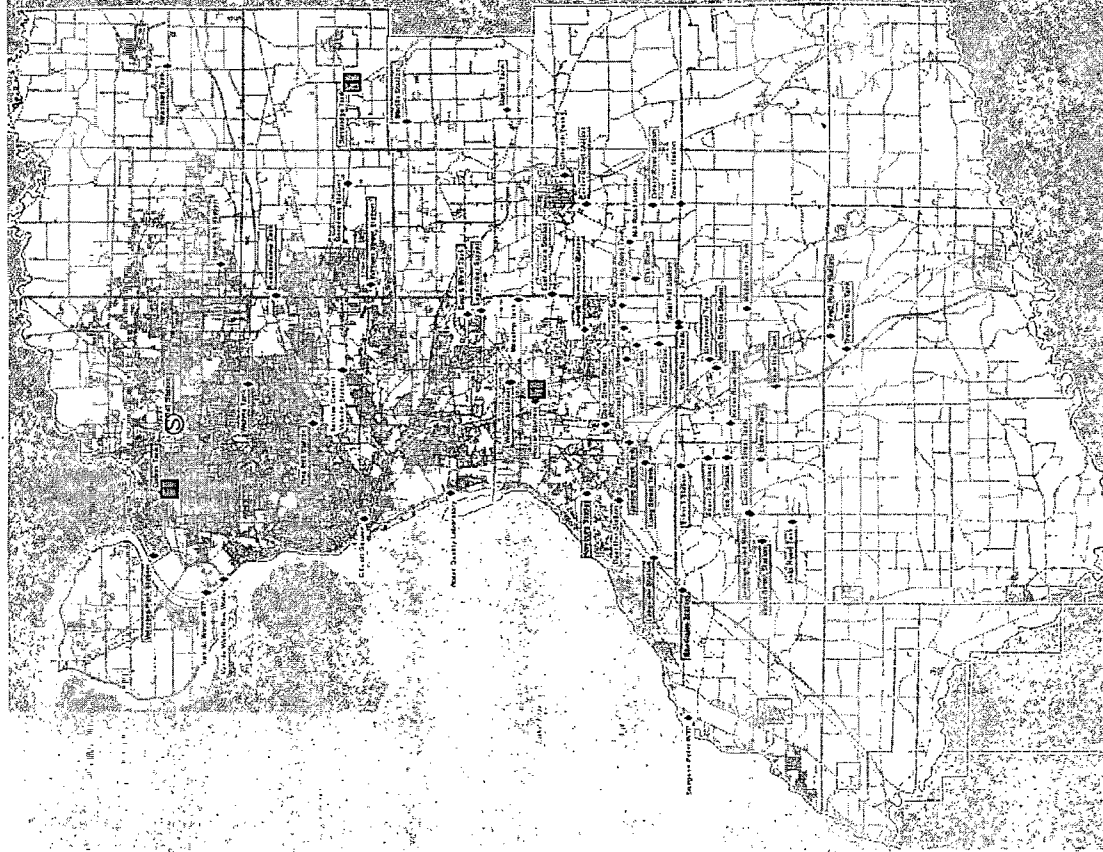
The SCADA system should use the integrated security system provided by Windows Active Directory Domain Services. The SCADA system will have multiple security levels to allow users different monitoring and control access. Faceplates will have security built into them.

The SCADA security system should be configured to provide the following minimum options:

- Continuously display all persons logged-on the system at all levels in the central HMI
- Log all security events (user log-on, user log-off, etc.)
- Assign all events in the events database to logged on user(s)
- Each user should have a separate login
- Automatic log-off by inactivity timeout or by date/time
- Allow a preset number of log-on attempts before sending a notification for an invalid log-on attempt.



## APPENDIX A EXAMPLE SCREENS



Highest Alarm	Suppressed Alarms	Site Name
		<b>CENTRAL SERVICE AREA</b>
⚡	Ⓢ	Ball PS & TK
	Ⓢ	East & West TK
⚡		Guenther PS & TK
		Laydricker PS
		Pinehill PS & TK
		Pleasantview TK
		Wehrle TK
⚡		Windom PS & TK
		William Street PS
		<b>EDEN SERVICE AREA</b>
		Eden 1 PS
		Crestwood TK
		E. Church St TK
		Eden 2 PS & TK
	Ⓢ	Eden 3 PS & TK
		Eden 3 PS & TK
		Jennings Road PS
		Keller Rd PS
		Kulp Road TK
		North Boston PS
		Rice Hill TK
		Trevett Road PS
		Trevett Road TK
		Violet Street PS & TK
		<b>HAMBURG SERVICE AREA</b>
⚡		Hamburg PS
		Janice Street TK
		Lakewood PS
		Long Street TK
		Shadrager Road PS
		Violet Street PS & TK
		<b>ANCASTER SERVICE AREA</b>
		Broadway PS & TK
		Harris Hill PS
	Ⓢ	Manila PS
		Manilla TK
⚡		Newstead TK
		Sandridge Tank
		<b>ORCHARD PARK SERVICE AREA</b>
		Aurora PS & TK
		Benning Road TK
		Castle Hill PS & TK
		Chestnut Ridge PS & TK
		Center Street PS & TK
		Cole Road TK
		Clark Street PS
		East Aurora PS & TK
		East Hill PS
		Ellis Rd PS
		Emery PS & TK
		Gatman PS & TK
⚡		Griffin Mills PS
		Hornet PS
		Jewett-Holmwood PS
		Scheff Road TK
		Ward Road TK
		Wohlheuer TK
		<b>TONGOWANDA SERVICE AREA</b>
⚡		Colvin Blvd TK
		Veterans Park PS & TK

Figure A-1 Example Overview Screen

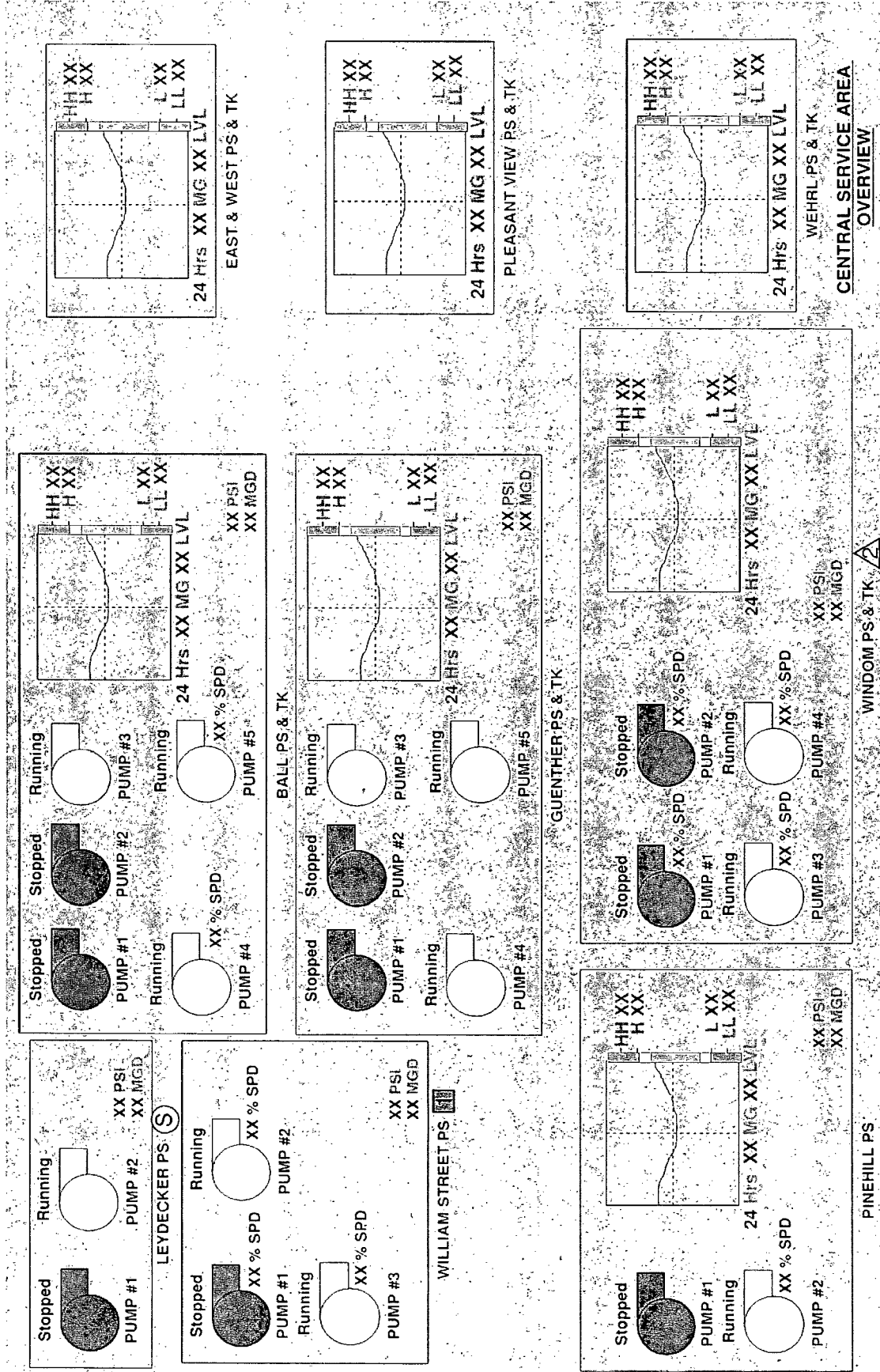


Figure A-2 Example Service Area Screen

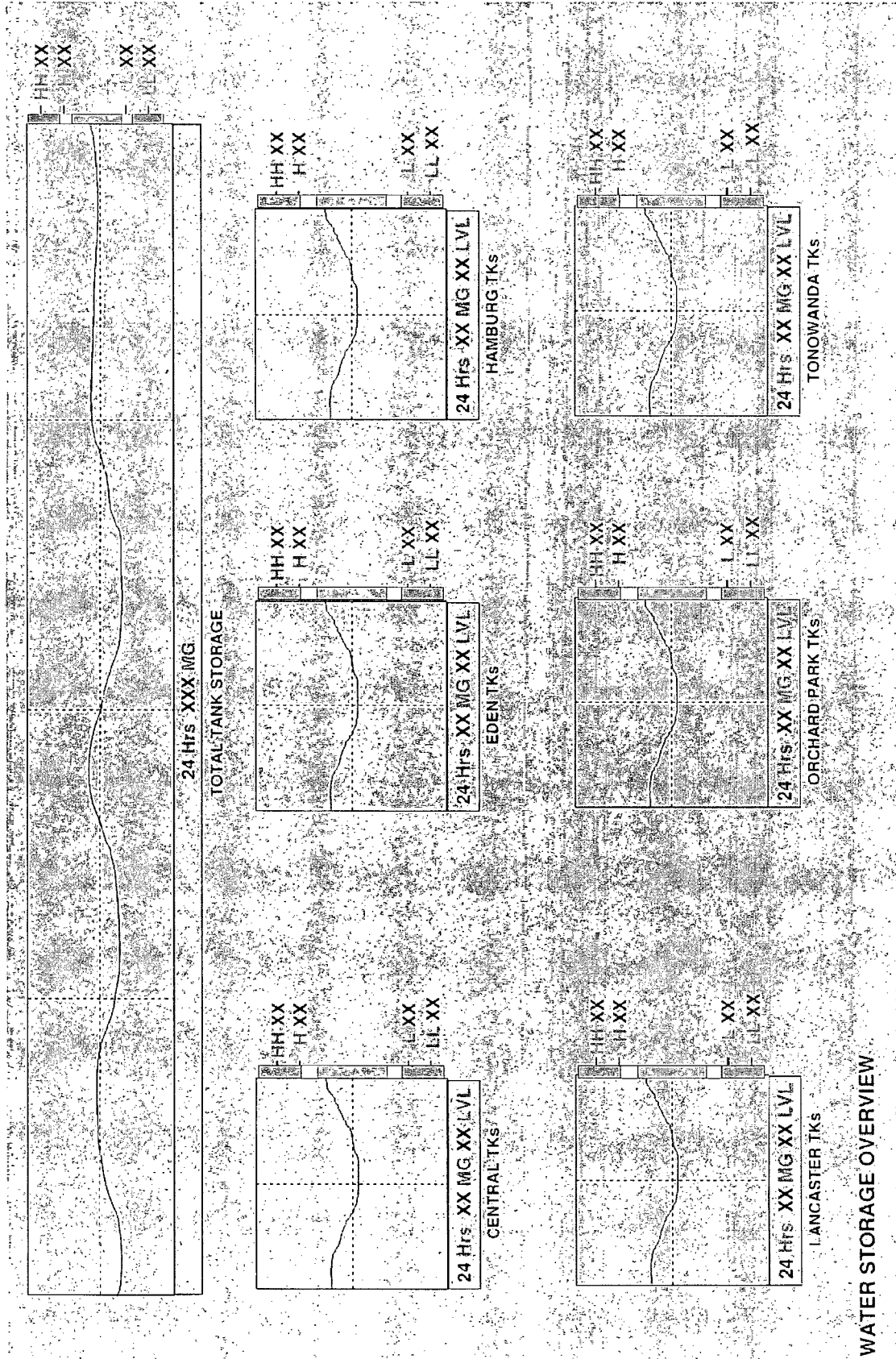


Figure A-3 Example Water Storage Overview Screen

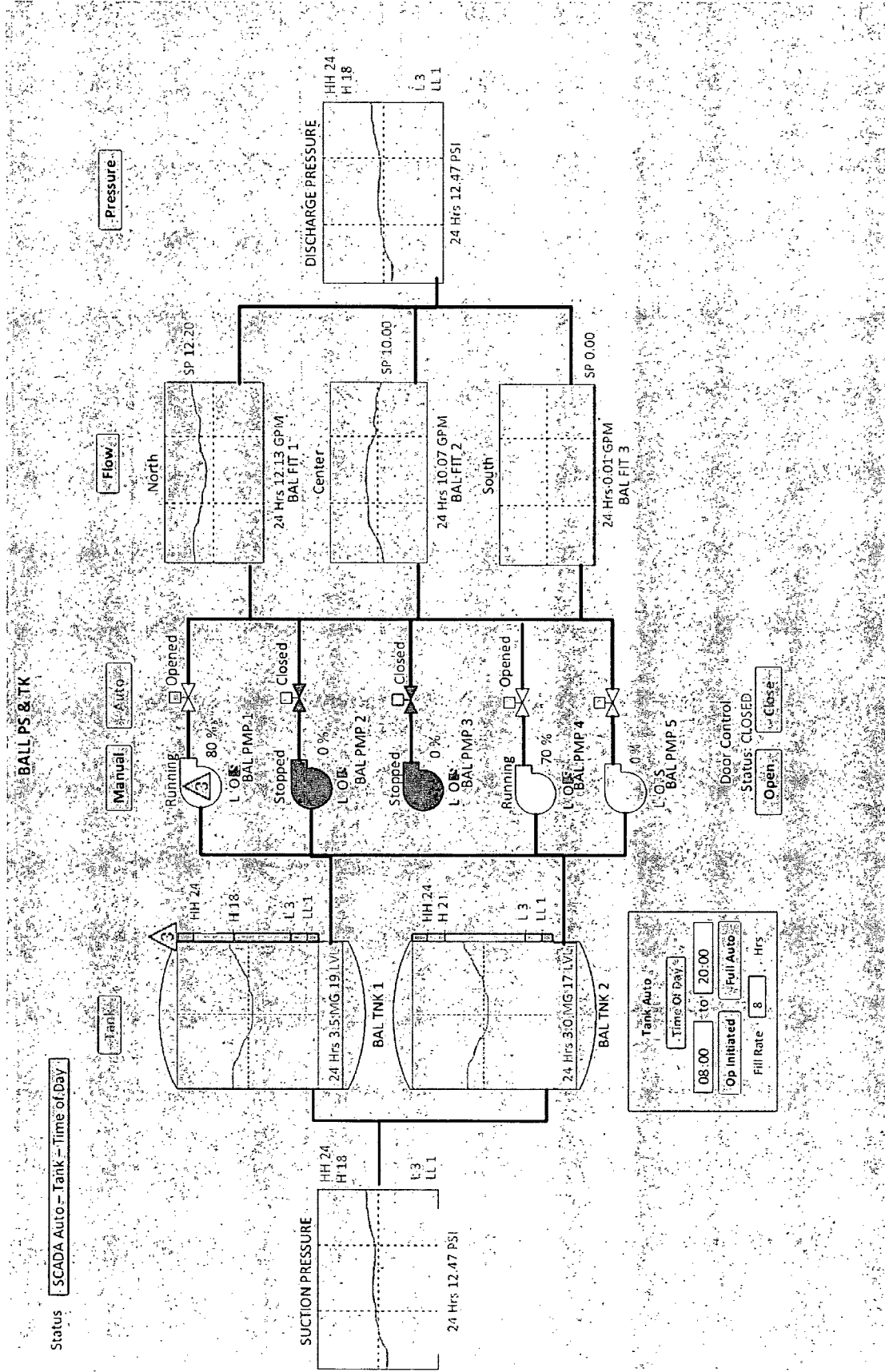


Figure 4A-4 Example PS & TK Screen

**Appendix E**  
**Existing HMI Graphics**

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<p style="text-align: center;">HSQ Technology - XView Alarm Window</p> <pre> 11-JUL-2013 13:04:21.000 ECH-BLDG-TEMP 11-JUL-2013 07:47:18.000 CSS-BLDG-INT 11-JUL-2013 06:45:01.004 TVS-AUTO 11-JUL-2013 06:43:00.718 MAR-AUTO 11-JUL-2013 06:40:00.003 EHS-AUTO 11-JUL-2013 06:00:00.001 GAR-AUTO 19-JUN-2013 05:43:32.436 JHS-CONTROL </pre>	<p style="text-align: center;">HSQ Technology - XView Operator Window</p> <p>Session Customize MISER View Help</p> <p>ERIVS5::JTM - Thu Jul 11, 2013 14:59:14</p> <p>Xview Xalarm started (14:58:31 11-Jul-2013)</p> <p>Xview Xindex started (14:58:31 11-Jul-2013)</p> <p>Slide Window 1, Slide # 1: Message Screen (14:58:31 11-Jul-2013)</p> <p>Xview Xslide #1 started (14:58:31 11-Jul-2013)</p>
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<p style="text-align: center;">HSQ Technology - XView Slide Window #1</p> <p>Slide # 1: Message Screen</p> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <h3 style="margin: 0;">Control Operator Shift Report</h3> <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">ALTITUDE VALVES:</th> <th style="text-align: left;">SETPPOINT</th> <th style="text-align: left;">POSITION</th> </tr> </thead> <tbody> <tr><td colspan="3"><hr/></td></tr> <tr><td>PINEHILL ERIE CO ALT VALVE</td><td>0.0%</td><td>0.0%</td></tr> <tr><td>PINEHILL BUFFALO ALT VALVE</td><td>0.0%</td><td>0.1%</td></tr> <tr><td>LONG ST. ALTITUDE VALVE</td><td></td><td>OPEN</td></tr> <tr><td>EDEN 2 ALTITUDE VALVE</td><td>100.0%</td><td>99.5%</td></tr> <tr><td>VETERAN'S PK ALTITUDE VALVE</td><td>18.0%</td><td>16.1%</td></tr> <tr><td>CHESTNUT RIDGE ALTITUDE VALVE</td><td>99.0%</td><td>95.6%</td></tr> <tr><td>SCHERFF ALTITUDE VALVE</td><td></td><td>OPEN</td></tr> <tr><td>BENNING ALTITUDE VALVE</td><td></td><td>OPEN</td></tr> <tr><td colspan="3"><hr/></td></tr> <tr><td colspan="3">COMPUTER CONTROLLED STATIONS:</td></tr> <tr><td colspan="3"><hr/></td></tr> <tr><td>LEYDECKER</td><td>AUTO</td><td>EAST &amp; WEST TANK LEVEL: 24.0F</td></tr> <tr><td>SHADAGEE</td><td>AUTO</td><td>VIOLET ST LEVEL: 23.8F</td></tr> <tr><td>EDEN 2</td><td>AUTO</td><td>EDEN 3 LEVEL: 20.8F</td></tr> <tr><td>EDEN 3</td><td>AUTO</td><td>EDEN 4 LEVEL: 71.2F</td></tr> <tr><td>JENNINGS</td><td>AUTO</td><td>KULP LEVEL: 94.5F</td></tr> <tr><td>VIOLET ST</td><td>AUTO</td><td>EAST CHURCH LEVEL: 66.6F</td></tr> <tr><td>EAST AURORA</td><td>AUTO</td><td>CENTER/ CASTLEHILL: 22.5F 20.6F</td></tr> <tr><td>CENTER ST</td><td>AUTO</td><td>EMERY LEVEL: 13.3F</td></tr> <tr><td>EMERY</td><td>AUTO</td><td>AURORA LEVEL: 11.8F</td></tr> <tr><td>GRIFFIN MILLS</td><td>MANUAL</td><td>EMERY LEVEL: 13.3F</td></tr> <tr><td>JEWETT-HOLMWOOD</td><td>COMPUTER</td><td>BENNING/ COLE/ SCHERFF: 50.8F 28.1F 39.1F</td></tr> <tr><td colspan="3"><hr/></td></tr> <tr><td colspan="3">TIME-OF-USE STATIONS &amp; TANK LEVELS:</td></tr> <tr><td colspan="3"><hr/></td></tr> <tr><td>CHESTNUT RIDGE</td><td>MANUAL</td><td>GARTMAN TANK LEVEL: 34.4F</td></tr> <tr><td>GARTMAN</td><td>MANUAL</td><td>WARD TANK LEVEL: 39.8F</td></tr> <tr><td>KELLER STATION</td><td>AUTO</td><td>RICEHILL TANK LEVEL: 58.0F</td></tr> <tr><td>MARILLA</td><td>MANUAL</td><td>MARILLA TANK LEVEL: 82.0F</td></tr> <tr><td>NORTH BOSTON</td><td>MANUAL</td><td>CRESTWOOD TANK LEVEL: 32.8F</td></tr> <tr><td>TREVETT STATION</td><td>MANUAL</td><td>TREVETT TANK LEVEL: 60.1F</td></tr> <tr><td colspan="3"><hr/></td></tr> <tr><td colspan="3"><i>see logbook for notes, directives, intrusion alarms, etc.</i></td></tr> </tbody> </table> </div>	ALTITUDE VALVES:	SETPPOINT	POSITION	<hr/>			PINEHILL ERIE CO ALT VALVE	0.0%	0.0%	PINEHILL BUFFALO ALT VALVE	0.0%	0.1%	LONG ST. ALTITUDE VALVE		OPEN	EDEN 2 ALTITUDE VALVE	100.0%	99.5%	VETERAN'S PK ALTITUDE VALVE	18.0%	16.1%	CHESTNUT RIDGE ALTITUDE VALVE	99.0%	95.6%	SCHERFF ALTITUDE VALVE		OPEN	BENNING ALTITUDE VALVE		OPEN	<hr/>			COMPUTER CONTROLLED STATIONS:			<hr/>			LEYDECKER	AUTO	EAST & WEST TANK LEVEL: 24.0F	SHADAGEE	AUTO	VIOLET ST LEVEL: 23.8F	EDEN 2	AUTO	EDEN 3 LEVEL: 20.8F	EDEN 3	AUTO	EDEN 4 LEVEL: 71.2F	JENNINGS	AUTO	KULP LEVEL: 94.5F	VIOLET ST	AUTO	EAST CHURCH LEVEL: 66.6F	EAST AURORA	AUTO	CENTER/ CASTLEHILL: 22.5F 20.6F	CENTER ST	AUTO	EMERY LEVEL: 13.3F	EMERY	AUTO	AURORA LEVEL: 11.8F	GRIFFIN MILLS	MANUAL	EMERY LEVEL: 13.3F	JEWETT-HOLMWOOD	COMPUTER	BENNING/ COLE/ SCHERFF: 50.8F 28.1F 39.1F	<hr/>			TIME-OF-USE STATIONS & TANK LEVELS:			<hr/>			CHESTNUT RIDGE	MANUAL	GARTMAN TANK LEVEL: 34.4F	GARTMAN	MANUAL	WARD TANK LEVEL: 39.8F	KELLER STATION	AUTO	RICEHILL TANK LEVEL: 58.0F	MARILLA	MANUAL	MARILLA TANK LEVEL: 82.0F	NORTH BOSTON	MANUAL	CRESTWOOD TANK LEVEL: 32.8F	TREVETT STATION	MANUAL	TREVETT TANK LEVEL: 60.1F	<hr/>			<i>see logbook for notes, directives, intrusion alarms, etc.</i>		
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1	2 Off	3 Off	4	5	6 Slide	7 Lower	8 Higher	9 Slide



HSQ Technology - XView Alarm Window		HSQ Technology - XView Operator Window	
11-JUL-2013 13:04:21.000 ECH-BLDG-TEMP 11-JUL-2013 07:47:18.000 CSS-BLDG-INT 11-JUL-2013 06:45:01.004 TVS-AUTO 11-JUL-2013 06:43:00.718 MAR-AUTO 11-JUL-2013 06:40:00.003 EHS-AUTO 11-JUL-2013 06:00:00.001 GAR-AUTO 19-JUN-2013 05:43:32.436 JHS-CONTROL		Session Customize MISER View Help ERIVS5::JTM - Thu Jul 11, 2013 15:01:11 Xview Xindex started (14:58:31 11-Jul-2013) Slide Window 1, Slide # 1: Message Screen (14:58:31 11-Jul-2013) Xview Xslide #1 started (14:58:31 11-Jul-2013) Slide Window 1, Slide # 101: NEW & IMPROVED SYSTEM STATUS (	

HSQ Technology - XView Slide Window #1															
Slide # 101: NEW & IMPROVED SYSTEM STATUS															
PRINT LANDSCAPE= /SP1 PORTRAIT= /SP2							EDEN AUTO DISABLED/ MAR AUTO TIL 06:43								
#	ACR	LOCATION	RTU STATUS	FLOW	DISCH PRESS	SUCTION PRESS	TANK LEVEL	#	ACR	LOCATION	RTU STATUS	FLOW	DISCH PRESS	SUCTION PRESS	TANK LEVEL
18	STP	Sturgeon Pt.	UP	49.6	145.0		33	29	Van De Water		UP	18.1	26.4		10.0
25	GUN	Guenther	UP	0.0	36.6	43.4	33.5	72	VPK	Veteran's Pk	UP	1.9	74.7	6.3	16.9
11	WIN	Windom	UP	20.7	52.0	21.4	35.2	73	CLV	Colvin	UP	0.1	74.5		29.5
15	LYD	Leydecker	UP	0.00	62.1	35.5		30	BAL	Ball	UP	20.6	102.0	19.9	31.2
15	EWT	East & West	UP				24.0	06	WER	Wehrle	UP		59.3		13.9
78	WLM	William	UP	6.3	88.4	54.6		07	PIH	Pinehill	UP	0.0	73.7		27.2
10	BRO	Broadway	UP	3.64	121.2	45.8	104.4	09	PLV	Pleasantvw	UP		49.3		0.0
59	HHS	Harrishill	UP	1.6	105.4	32.4		42	CSS	Clark St.	UP	2.1	86.9	22.7	
10	SAN	Sandridge	UP				34.1	13	HOR	Horner	UP	4.7	136.4	29.6	
70	NWS	Newstead	UP				0.6	Future Expansion							
14	MAR	Marilla	UP	0.0	105.9	48.3		17	EAU	East Aurora	UP	0.0	34.8	21.6	49.1
14	MAR1	Marilla Tk	UP				82.0	17	CAS	Castlehill	UP				20.6
63	PEM	Pembroke	UP	0.92	86.6	44.7		65	CNT	Center St.	UP	0.00	119.9	8.2	22.5
20	HAM	Hamburg	UP	2.3	111.4	52.6		57	GMS	Griffin Mls	UP	0.00	125.2	75.9	
38	JAN	Janice Pl.	UP				19.6	67	EMV	Emery	UP	0.00	81.0	5.3	13.3
37	LNG	Long St.	UP	OPEN			20.9	68	ARA	Aurora	UP	0.00	60.1	2.3	11.3
19	LKV	Lakeview	UP	0.00	81.4	47.2		76	CHN	Chestnut Rdg	UP	0.00	143.4	20.9	44.4
81	SDG	Shadagee	UP	1.5	130.2	85.3		77	GAR	Garlman	UP	0.0	78.9	18.2	34.4
75	VIO	Violet St.	UP	-0.00	55.07	14.32	24.1	36	WAR	WARD RD.	UP				39.8
21	ED1	Eden 1	UP	0.00	108.7	22.3		57	EHS	East Hill	UP	0.00	137.7	15.0	
22	ED2	Eden 2	UP	0.7	78.0	29.7	26.9	55	WOL	Wohlheiter	UP				55.0
12	ECH	East Church	UP				66.6	45	JHS	Jewett-Hilmwd	UP	1.0	136.0	54.9	
23	JEN	Jennings	UP	0.00	105.7	29.9		34	BEN	Benning Rd.	UP				50.0
23	KLP	Kulp Tk.	UP				94.5	35	COL	Cole Rd.	UP				23.1
39	NB	N. Boston	UP	0.00	122.3	74.8		33	SHF	Scherff Rd.	UP				39.1
39	CW	Crestwood	UP				32.8	TANK STATUS PHONE #s TOTAL SYSTEM FLOW 67.7							
24	ED3	Eden 3	UP	0.2	102.4	39.9	20.8	SCADA GENSET/STANDBY							
53	KEL	Keller Road	UP	0.00	124.5	47.1		F Hilite 1 F SSD 2 Off F ASD 3 Off F Index 4 F Zoom 5 F Prev 6 Slide F Next 7 Lower F Next 8 Higher F Master 9 Slide							
54	RCH	Rice Hill	UP				58.0								
24	ED4	Eden 4	UP				71.2								
08	SC	Service Ctr	UP												

HSQ Technology - XView Alarm Window

11-JUL-2013 13:04:21.000	ECH-BLDG-TEMP
11-JUL-2013 07:47:15.000	CSS-BLDG-INT
11-JUL-2013 06:45:01.004	TVS-AUTO
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19-JUN-2013 05:43:32.436	JHS-CONTROL

HSQ Technology - XView Operator Window

Session Customize MISER View Help

ERIVS5::JTM - Thu Jul 11, 2013 15:02:58

Xview Xslide #1 started (14:58:31 11-Jul-2013)

Slide Window 1, Slide # 101: NEW & IMPROVED SYSTEM STATUS (

Slide Window 1, Slide # 7: NEW PINEHILL STATION & TANK (15:)

Slide Window 1, Slide # 81: SHADAGEE STATION (15:02:30 11-J

Slide # 81: SHADAGEE STATION

Shadagee Station

CLICK ON DOOR TO OPEN

SUCTION PRESSURE 85.3

DISCHARGE PRESSURE 130.2

Station Flow 1.5 MGD

RTU STATUS	UP	PWR FAIL	NORMAL
RTU DOOR	CLOSED	RTU WATERS	31
BATTERY	27.7	VOLTS	AB 486
RTVSS FAIL	NORMAL	EC	486
INTPUSION	NORMAL	AC	485
FLOOD ALM	NORMAL	GENERATOR	STOPPED
BLDG. TEMP	81.7	TRANSFER SW	NORMAL
		TUNEL PWR OK	UTILITY
			NORMAL

START STOP	PUMP 1	START STOP	PUMP 2
SETPOINT	STATUS	SETPOINT	STATUS
85.01	0.00	85.01	85.00
CHECK VLV CLOSED	STATUS	CHECK VLV OPEN	STATUS
MOTOR CONTROL	VTD BYPASS	MOTOR CONTROL	VTD BYPASS

F Hillite	F SSD	F ASD	F Index	F Zoom	F Prev	F Next	F Next	F Master
1	2 Off	3 Off	4	5	6 Slide	7 Lower	8 Higher	9 Slide

HSQ Technology - XView Alarm Window		HSQ Technology - XView Operator Window	
11-JUL-2013 13:04:21.000 ECH-BLDG-TEMP 11-JUL-2013 07:47:18.000 CSS-BLDG-INT 11-JUL-2013 06:45:01.004 TVS-AUTO 11-JUL-2013 06:43:00.718 MAR-AUTO 11-JUL-2013 06:40:00.003 EHS-AUTO 11-JUL-2013 06:00:00.001 GAR-AUTO 19-JUN-2013 05:43:32.436 JHS-CONTROL		Session Customize MISER View Help ERIVS5::JTM - Thu Jul 11, 2013 15:03:48 Slide Window 1, Slide # 81: SHADAGEE STATION (15:02:30 11-J Slide Window 1, Slide # 79: The New Log Book (15:03:22 11-J Slide Window 1, Slide # 78: GEN-SET STATUS PAGE (15:03:23 1 Slide Window 1, Slide # 77: NEW GARTMAN STATION (15:03:23 1	

Slide # 77: NEW GARTMAN STATION

Station: NEW GARTMAN STATION

**TABLET CHLORINATION SYSTEM**

INFLUENT RESIDUAL 0.43PPM  
 EFFLUENT RESIDUAL 0.55PPM  
 LOW TABLET ALARM NORMAL  
 NAOCI PUMP STATUS PAUSED

CLICK ON DOOR TO OPEN

TANK LEVEL 34.4

RTU STATUS: OK	PWR FAIL: NORMAL
INTRUSTION: NORMAL	BATTERY: OK
FLOOD ALM: NORMAL	RTU DOOR: CLOSED
RIVSS FAIL: NORMAL	BUDC TEMP: 71.30
KW METER: 0.00	PHASE A-B: 0.00
	PHASE B-C: 0.00
	PHASE C-A: 0.00

NEXT TO RUN TIME

START STOP

PUMP 1

CHECK VLV CLOSED STATUS

903.471 RunTotal

START STOP

PUMP 2

CHECK VLV CLOSED STATUS

903.471 RunTotal

**MOTOR CONTROL**

NORMAL RVS BYPASS

RVS OFF

**MOTOR CONTROL**

NORMAL RVS BYPASS

RVS OFF

F Hilite	F SSD	F ASD	F Index	F Zoom	F Prev	F Next	F Next	F Master
1	2 Off	3 Off	4	5	6 Slide	7 Lower	8 Higher	9 Slide

HSQ Technology - XView Alarm Window	
11-JUL-2013 13:04:21.000	ECH-BLDG-TEMP
11-JUL-2013 07:47:18.000	CSS-BLDG-INT
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11-JUL-2013 06:40:00.003	EHS-AUTO
11-JUL-2013 06:00:00.001	GAR-AUTO
19-JUN-2013 05:43:32.436	JHS-CONTROL

HSQ Technology - XView Operator Window	
Session	Customize MISER View Help
ERIVS5::JTM - Thu Jul 11, 2013 15:04:25	
Slide Window 1, Slide # 79:	The New Log Book (15:03:22 11-J
Slide Window 1, Slide # 78:	GEN-SET STATUS PAGE (15:03:23 1
Slide Window 1, Slide # 77:	NEW GARTMAN STATION (15:03:23 1
Slide Window 1, Slide # 76:	NEW CHESTNUT RIDGE STATION (15:

Slide # 76: NEW CHESTNUT RIDGE STATION

Chestnut Ridge Station & Tank	
RTU STATUS:	OK
INTRUSION:	NORMAL
FLOOD ALM:	ARMED
RTVSS:	FAIL/OK
BLDG TEMP:	OK/30
FWR:	FAIL/OK
BATTERY:	29.0V
RTU DOOR:	CLOSED
KW METER:	3K
PHASE A:	120V
PHASE B:	120V
PHASE C:	120V

NEXT TO RUN

**TIME OF USE OPERATION ONLY!**

START STOP	START STOP
PUMP 1	PUMP 2
CHECK VLV CLOSED STATUS	CHECK VLV CLOSED STATUS
5036.5H RunTotal	6775.2H RunTotal
MOTOR CONTROL	MOTOR CONTROL
NORMAL/RVS/BYPASS	NORMAL/RVS/BYPASS
RVS OFF	RVS OFF

F Hilite	F SSD	F ASD	F Index	F Zoom	F Prev	F Next	F Next	F Master
1	2 Off	3 Off	4	5	6 Slide	7 Lower	8 Higher	9 Slide

H5Q Technology - XView Alarm Window

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 11-JUL-2013 06:40:00.003 EHS-AUTO  
 11-JUL-2013 06:00:00.001 GAR-AUTO  
 19-JUN-2013 05:43:32.436 JHS-CONTROL

H5Q Technology - XView Operator Window

Session Customize MISER View Help

ERIVS5::JTM - Thu Jul 11, 2013 15:05:16

Slide Window 1, Slide # 78: GEN-SET STATUS PAGE (15:03:23 1  
 Slide Window 1, Slide # 77: NEW GARTMAN STATION (15:03:23 1  
 Slide Window 1, Slide # 76: NEW CHESTNUT RIDGE STATION (15:  
 Slide Window 1, Slide # 75: Violet Street Station & Tank (1

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H5Q Technology - XView Slide Window #1

Slide # 75: Violet Street Station & Tank

### VIOLET TANK

STATION NO.22

MASTER SLIDE 101

Kulp

TANK LVL 24.1 FT

VOLUME: 0.3 MG

OVERFLOW HIGH 26' 20' LOW 10' 0'

auto-fill 20' to 25'

MOTOR CONTROL

OFF SOFT ST

START STOP

PUMP 2 OFF

3178.5 RunTotal

MOTOR CONTROL

OFF SOFT ST

START STOP

PUMP 1 OFF

2760.5 RunTotal

RTU -

STATUS UP

DOOR CLOSED

BATTERY 28.9

TVSS FAIL NORMAL

FWR FAIL NORMAL

PIT ENTRY NORMAL

BLDG ENTRY NORMAL

FLOOD NORMAL

BLDG TEMP 78.3 DEC

KW METER 2KW

PHASE A-B 490VAC

PHASE B-C 496VAC

PHASE C-A 490VAC

Discharge 55.07 psi

Surge valve

CHECK

CHECK

CHECK

Flow -0.00 mgd

E. Church St tank 66.6F T

Suction 14.32 psi

From Shadagee

2

1

AUTO

F Hilite 1

F SSD 2 Off

F ASD 3 Off

F Index 4

F Zoom 5

F Prev 6 Slide

F Next 7 Lower

F Next 8 Higher

F Master 9 Slide

HSQ Technology - XView Alarm Window

11-JUL-2013 13:04:21.000 ECH-BLDG-TEMP  
 11-JUL-2013 07:47:18.000 CSS-BLDG-INT  
 11-JUL-2013 06:45:01.004 TVS-AUTO  
 11-JUL-2013 06:43:00.718 MAR-AUTO  
 11-JUL-2013 06:40:00.003 EHS-AUTO  
 11-JUL-2013 06:00:00.001 GAR-AUTO  
 19-JUN-2013 05:43:32.436 JHS-CONTROL

HSQ Technology - XView Operator Window

Session Customize MISER View Help

ERIVS5::JTM - Thu Jul 11, 2013 15:06:04

Slide Window 1, Slide # 75: Violet Street Station & Tank (15:05:55)  
 Slide Window 1, Slide # 74: SCADA GENSET / STANBY POWER PRO (15:05:55)  
 Slide Window 1, Slide # 73: COLVIN STATION & TANK (15:05:55)  
 Slide Window 1, Slide # 72: Veteran's Park Pump Station & Tank (15:05:55)

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Slide # 72: Veteran's Park Pump Station & Tank

Veteran's Park Pump Station & Tank City of Tonawanda, N.Y. Veteran's Park Pump Station & Tank City of Tonawanda, N.Y. Veteran's Park Pump Station & Tank City of Tonawanda, N.Y.

101

TANK LVL  
17.0 FT

CLV 20'  
18'  
15'  
10'  
0'

GEN

5.2 MGD (NORMAL)

SETPOINT 18.0%  
POSITION 16.5%

ALTITUDE VALVE REMOTE

START STOP	START STOP	START STOP
OFF	ON	OFF
VFD PUMP 1	VFD PUMP 2	VFD PUMP 3
78.0% SETPOINT *	79.0% SETPOINT *	78.0% SETPOINT *
0.0% STATUS	79.4% STATUS	0.0% STATUS
INVERTER BYPASS	INVERTER BYPASS	INVERTER BYPASS
VFD OFF	VFD OFF	VFD OFF

RTU Status UP    Bldg Temp 84.1 DEG.F \* Minimum setpoint 78%  
 RTU Door CLOSED    Bldg Flood NORMAL    DIS PRESS 74.7 PSI  
 Generator    Intrusion NORMAL

SURGE CLOSED    P1 NORMAL    P2 NORMAL    P3 NORMAL

SUC PRESS 6.3 PSI    AC POWER FAIL: NORMAL  
 VOLTAGE/PHASE LOSS ALARM: NORMAL  
 RTU BATTERY: 28.8  
 STATION KW/H: 60  
 DAILY TOTAL KW/H: 581.1

OPEN & CLOSE ALTITUDE VALVE IN 3% INCREMENTS

FLOW CHAMBER 1.9 MGD NORMAL

Pump 1 Runtime: 18117.4  
 Pump 2 Runtime: 25226.0  
 Pump 3 Runtime: 26212.8

Veteran's Park Pump Station & Tank City of Tonawanda, N.Y.

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F Hilite 1

F SSD 2 Off

F ASD 3 Off

F Index 4

F Zoom 5

F Prev 6 Slide

F Next 7 Lower

F Next 8 Higher

F Master 9 Slide

HSQ Technology - XView Alarm Window

11-JUL-2013 13:04:21.000 ECH-BLDG-TEMP  
 11-JUL-2013 07:47:18.000 CSS-BLDG-INT  
 11-JUL-2013 06:45:01.004 TVS-AUTO  
 11-JUL-2013 06:43:00.718 MAR-AUTO  
 11-JUL-2013 06:40:00.003 EHS-AUTO  
 11-JUL-2013 06:00:00.001 GAR-AUTO  
 19-JUN-2013 05:43:32.436 JHS-CONTROL

HSQ Technology - XView Operator Window

Session Customize MISER View Help

ERIVS5::JTM - Thu Jul 11, 2013 15:06:40

Slide Window 1, Slide # 73: COLVIN STATION & TANK (15:05:55)  
 Slide Window 1, Slide # 72: Veteran's Park Pump Station & T  
 Slide Window 1, Slide # 71: Operator Memo (15:06:28 11-Jul-  
 Slide Window 1, Slide # 70: Newstead Tank (15:06:29 11-Jul-

---

HSQ Technology - XView Slide Window #1

Slide # 70: Newstead Tank

TANK LEVEL = 0.6

TANK CAPACITY = 125 MG

CLICK ON DOOR TO OPEN

ENTRUSTION NORMAL

BYPASS VALVE POSITION

BYPASS VALVE OPERATION

VLV-OP

ALTITUDE VALVE SETPOINT

POSITION

65.0F

INLET PSIG

RTU STATUS UP    T EMP. FAIL NORMAL  
 FLOOD ALM. NORMAL    INTU. DOOR CLOSED  
 LOW TEMP. SSSSSSS    HIGH TEMP. SSSSSSS  
 BATTERY 129.1

NEWSTEAD TANK - SITE 87

BEACON LIGHT

OFF

BEACON FLASHER

NORMAL

BEACON FAIL

NORMAL

101 MASTER SLIDE

F Hilite 1	F SSD 2 Off	F ASD 3 Off	F Index 4	F Zoom 5	F Prev 6 Slide	F Next 7 Lower	F Next 8 Higher	F Master 9 Slide
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HSQ Technology - XView Alarm Window

11-JUL-2013 13:04:21.000 ECH-BLDG-TEMP  
 11-JUL-2013 07:47:18.000 CSS-BLDG-INT  
 11-JUL-2013 06:45:01.004 TVS-AUTO  
 11-JUL-2013 06:43:00.718 MAR-AUTO  
 11-JUL-2013 06:40:00.003 EHS-AUTO  
 11-JUL-2013 06:00:00.001 GAR-AUTO  
 19-JUN-2013 05:43:32.436 JHS-CONTROL

HSQ Technology - XView Operator Window

Session Customize MISER View Help

ERIVS5::JTM - Thu Jul 11, 2013 15:07:54

Slide Window 1, Slide # 69: Aurora Operating Instructions (15:07:39)  
 Slide Window 1, Slide # 68: Aurora Station & Tank (15:07:40)  
 Slide Window 1, Slide # 67: Emery Station & Tank (15:07:40)  
 Slide Window 1, Slide # 68: Aurora Station & Tank (15:07:44)

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HSQ Technology - XView Slide Window #1

Slide # 68: Aurora Station & Tank

TANK LEVEL

overflow 14.5 feet  
 high limit 14 feet  
 low limit 9 feet

FLOW

0.01 GAL / Min

DISCHARGE 64.1 PSIG

SUCTION 2.3 PSIG

<p>LINE VOLTAGE 236VAC            PH VOLTAGE 118VAC            LV VOLTAGE 124VAC            KW METER 1W            BATTERY 29.3VDC</p>	<p>Local-Remote Switch</p> <p><b>LOCAL</b></p>	<p><b>PUMP ONE</b></p> <p>OFF</p> <p>NORMAL</p> <p>RUNTIME 2109.1H</p>	<p><b>PUMP TWO</b></p> <p>OFF</p> <p>NORMAL</p> <p>RUNTIME 2110.1H</p>
--	--	--	--

AC POWER NORMAL  
 RTU STATUS UP  
 BUILDING FLOOD NORMAL  
 FIRE ALARM NORMAL  
 INTRUSION NORMAL  
 RTU DOOR CLOSED  
 BUILDING TEMP 84.0DEG F

\*\* Operating Instruction Page

CNT EMY 101

F Hilite 1	F SSD 2 Off	F ASD 3 Off	F Index 4	F Zoom 5	F Prev 6 Slide	F Next 7 Lower	F Next 8 Higher	F Master 9 Slide
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HSQ Technology - XView Alarm Window	HSQ Technology - XView Operator Window
11-JUL-2013 13:04:21.000 ECH-BLDG-TEMP 11-JUL-2013 07:47:18.000 CSS-BLDG-INT 11-JUL-2013 06:45:01.004 TVS-AUTO 11-JUL-2013 06:43:00.718 MAR-AUTO 11-JUL-2013 06:40:00.003 EHS-AUTO 11-JUL-2013 06:00:00.001 GAR-AUTO 19-JUN-2013 05:43:32.436 JHS-CONTROL	Session Customize MISER View Help ERIVS5::JTM - Thu Jul 11, 2013 15:08:43 Slide Window 1, Slide # 62: Auto-Manual Instructions (15:08:32) Slide Window 1, Slide # 61: GRIFFIN MILLS STATION (15:08:32) Slide Window 1, Slide # 60: BALL SWITCHYARD (15:08:33 11-Ju Slide Window 1, Slide # 59: HARRIS HILL CONTROL (15:08:37 1

HSQ Technology - XView Slide Window #1

Slide # 59: HARRIS HILL CONTROL

# HARRIS HILL STATION CONTROL

STATION NO. 81

UP  
 CLOSED  
 27.9  
 NORMAL  
 NORMAL  
 86.0  
 NORMAL  
 0.0%  
 NORMAL  
 NORMAL  
 NORMAL  
 NORMAL  
 NORMAL  
 68  
 496  
 494  
 500

**START STOP**  
 OFF

**VFD PUMP 3**  
 50.0% SETPOINT  
 0.0% STATUS

INVERTER BYPASS  
 VFD : OFF

**START STOP**  
 OFF

**VFD PUMP 2**  
 60.0% SETPOINT  
 0.0% STATUS

INVERTER BYPASS  
 VFD OFF

**START STOP**  
 ON

**VFD PUMP 1**  
 71.0% SETPOINT  
 68.8% STATUS

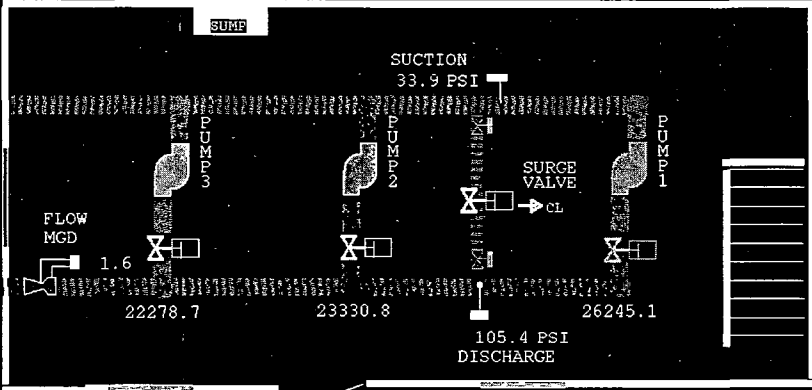
INVERTER BYPASS  
 VFD OFF

\*Minimum setpoint 60%

16" Main from TransIt

SAN-TL 34.1  
 NWS-TL 0.6

16" Main to EAST & Beyond



F Hilite 1	F SSD 2 Off	F ASD 3 Off	F Index 4	F Zoom 5	F Prev 6 Slide	F Next 7 Lower	F Next 8 Higher	F Master 9 Slide
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HSQ Technology - XView Alarm Window

11-JUL-2013 13:04:21.000 ECH-BLDG-TEMP  
 11-JUL-2013 07:47:18.000 CSS-BLDG-INT  
 11-JUL-2013 06:45:01.004 TVS-AUTO  
 11-JUL-2013 06:43:00.718 MAR-AUTO  
 11-JUL-2013 06:40:00.003 EHS-AUTO  
 11-JUL-2013 06:00:00.001 GAR-AUTO  
 19-JUN-2013 09:43:32.436 JHS-CONTROL

HSQ Technology - XView Operator Window

Session Customize MISER View Help

ERIVS5::JTM - Thu Jul 11, 2013 15:09:10

Slide Window 1, Slide # 56: Intrusion Alarms (15:09:01 11-Jul-13)  
 Slide Window 1, Slide # 55: WOHLHEITER TANK (15:09:02 11-Jul-13)  
 Slide Window 1, Slide # 54: RICEHILL TANK (15:09:04 11-Jul-13)  
 Slide Window 1, Slide # 53: KELLER ROAD STATION - NEW SLIDE

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Slide # 53: KELLER ROAD STATION - NEW SLIDE

**Keller Rd Station**

RTU Status	UP
Power Fail	NORMAL
Batt Low	NORMAL
RTU Door	CLOSED
Bldg Temp	85.5
Intrusion	NORMAL
Flood Alarm	NORMAL

Rice Hill Tank Level: 58.0

Rice Hill Tank

Auto - Manual Switch

AUTO MAN

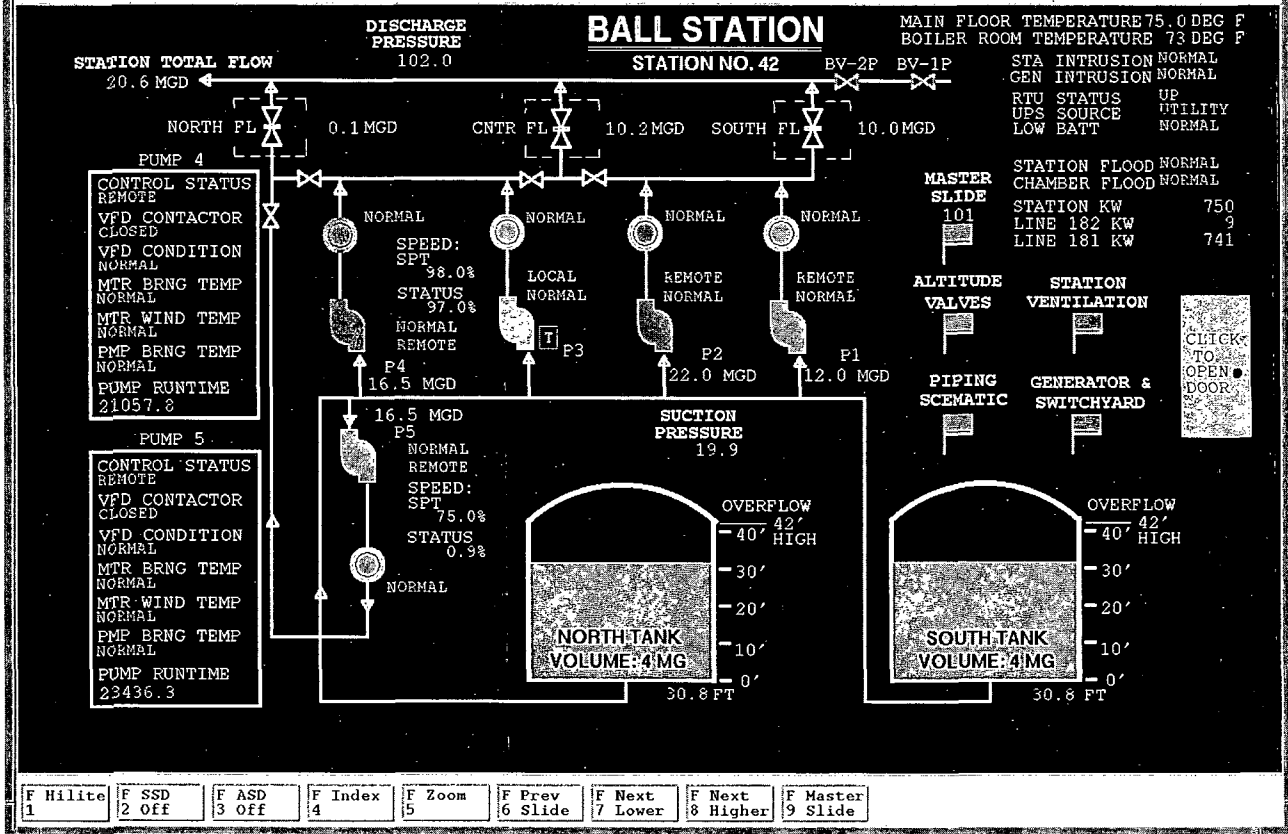
101 SCREEN

Runtime Inverter 1: 10783.9 Hrs	Runtime Pump 1: 18366.4 Hrs
OFF Inverter 2: 11895.7 Hrs	Runtime Pump 2: 18968.8 Hrs

F Hilite 1	F SSD 2 Off	F ASD 3 Off	F Index 4	F Zoom 5	F Prev 6 Slide	F Next 7 Lower	F Next 8 Higher	F Master 9 Slide
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HSQ Technology - XView Alarm Window		HSQ Technology - XView Operator Window	
11-JUL-2013 13:04:21.000 ECH-BLDG-TEMP		Session Customize MISER View	Help
11-JUL-2013 07:47:18.000 CSS-BLDG-INT		ERIVS5::JTM - Thu Jul 11, 2013 15:09:55	
11-JUL-2013 06:45:01.004 FWS-AUTO		Slide Window 1, Slide # 32: RUNTIME ACCUMULATION (15:09:45)	
11-JUL-2013 06:43:00.718 MAR-AUTO		Slide Window 1, Slide # 30: BALL STATION (15:09:46 11-Jul-2)	
11-JUL-2013 06:40:00.003 EHS-AUTO		Slide Window 1, Slide # 29: VAN DE WATER FILTER PLANT (15:0	
11-JUL-2013 06:00:00.001 GAR-AUTO		Slide Window 1, Slide # 30: BALL STATION (15:09:52 11-Jul-2)	
19-JUN-2013 05:43:32.436 JHS-CONTROL			

Slide # 30: BALL STATION



HSQ Technology - XView Alarm Window	HSQ Technology - XView Operator Window
11-JUL-2013 13:04:21.000 ECH-BLDG-TEMP 11-JUL-2013 07:47:18.000 CSS-BLDG-INT 11-JUL-2013 06:45:01.004 TVS-AUTO 11-JUL-2013 06:43:00.718 MAR-AUTO 11-JUL-2013 06:40:00.003 EHS-AUTO 11-JUL-2013 06:00:00.001 GAR-AUTO 19-JUN-2013 05:43:32.436 JHS-CONTROL	Session Customize MISER View Help ERIVSS::JTM - Thu Jul 11, 2013 15:10:35 Slide Window 1, Slide # 28: SCHERF, COLE, & BENNING TANKS Slide Window 1, Slide # 27: GARTMAN & WARD TANKS (15:10:10) Slide Window 1, Slide # 26: CHESTNUT RIDGE & GARTMAN TANKS Slide Window 1, Slide # 25: GUENTHER STATION (15:10:12 11-J

Slide # 25: GUENTHER STATION

### Guenther Station

Station # 31

Volume: 50 MG

Tank Lvl: 33.5 FT

The altitude valve is scaled 0% to 100%. Max open @ 100% is half open.

Viv Sp: 0.0 %  
Altitude Valve  
Viv Pos: 1.00 %

System Status  
Operating Instructions  
Sturgeon Point  
From Sturgeon Point: 49.7 / 144.0

Station No: 31	
RTU Status: UP	High Sump: NORMAL
Pwr Fail: NORMAL	Intrusion: NORMAL
Low Batt: NORMAL	Chlorine: OFF
RTU Door: CLOSED	Bldg Temp: 79.7
	Flood Alm: NORMAL

All Pumps At CSS, ED1, SDG, & LKV need to be OFF when Starting or Stopping

Flow: 0.0 MGD

Discharge Pressure: 36.6 PSI

Suction Pressure: 43.4 PSI

Win-DP: 52.0

Stations: 2029.25 (600 hp), 8725.4 (150 hp), 5818.51 (1500 hp), 4595.78 (1500 hp)

Power: Sta. KVAR: 17.09, Station KW: 9.8, Power Alarm: NORMAL, Sta. IVSS: NORMAL

Flow Control: Rain: Open (OPEN), Low: Close

Viv Pos: 99.6 %

F Hilite 1	F SSD 2 Off	F ASD 3 Off	F Index 4	F Zoom 5	F Prev 6 Slide	F Next 7 Lower	F Next 8 Higher	F Master 9 Slide
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HSQ Technology - XView Alarm Window

11-JUL-2013 13:04:21.000 ECH-BLDG-TEMP  
 11-JUL-2013 07:47:18.000 CSS-BLDG-INT  
 11-JUL-2013 06:45:01.004 TVS-AUTO  
 11-JUL-2013 06:43:00.718 MAR-AUTO  
 11-JUL-2013 06:40:00.003 EHS-AUTO  
 11-JUL-2013 06:00:00.001 GAR-AUTO  
 19-JUN-2013 05:43:32.436 JHS-CONTROL

HSQ Technology - XView Operator Window

Session Customize MISER View Help

ERIVS5::JTM - Thu Jul 11, 2013 15:11:15

Slide Window 1, Slide # 17: NEW EAST AURORA STATION & TANKS  
 Slide Window 1, Slide # 15: Leydecker Station and East & We  
 Slide Window 1, Slide # 14: MARILLA STATION & TANK (15:11:0  
 Slide Window 1, Slide # 15: Leydecker Station and East & We

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Slide # 15: Leydecker Station and East & West Tank

## LEYDECKER STATION - EAST & WEST TANK

**PUMP 1 START STOP**

SOFT-START / BYPASS  
SOFTSTRT

**PUMP 2 START STOP**

SOFT-START / BYPASS  
SOFTSTRT

**TANK NO.12, & STATION NO.13**

TANK LVL  
23.7  
FEET

MASTER SLIDE  
101

GENERATOR  
204

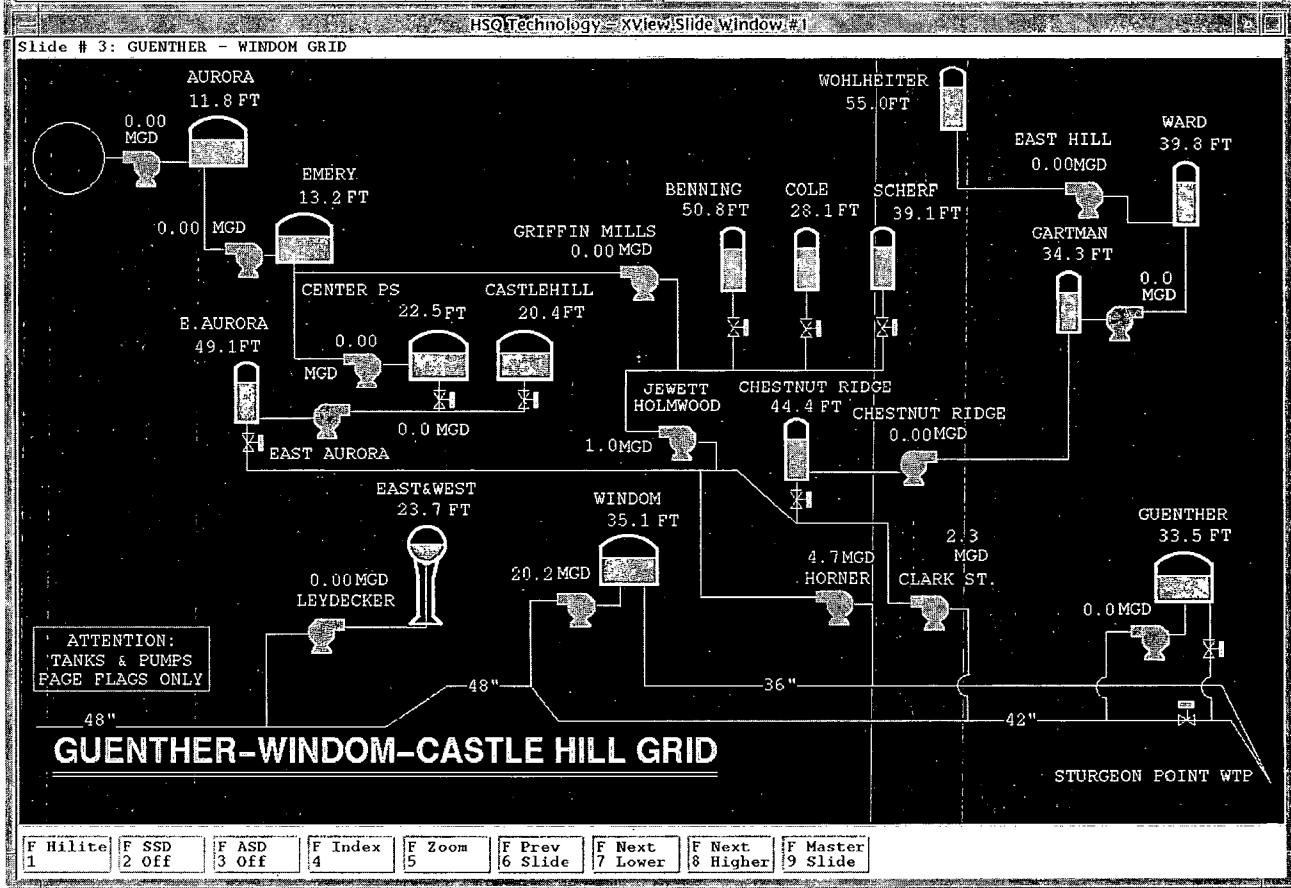
RTU STATUS UP  
INTRUSION NORMAL  
PWR. FAIL NORMAL  
LOW BATT. NORMAL  
RTU DOOR CLOSED

TOTALIZER  
250094 MG

RTU STATUS UP  
PLC MUX UP  
PWR. FAIL NORMAL  
RTU UPS NORMAL  
BATTERY 27.1  
RTU DOOR CLOSED

F Hilita 1	F SSD 2 off	F ASD 3 Off	F Index 4	F Zoom 5	F Prev 6 Slide	F Next 7 Lower	F Next 8 Higher	F Master 9 Slide
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HSQ Technology - XView Alarm Window	HSQ Technology - XView Operator Window
11-JUL-2013 13:04:21.000 ECH-BLDG-TEMP 11-JUL-2013 07:47:18.000 CSS-BLDG-INT 11-JUL-2013 06:45:01.004 TVS-AUTO 11-JUL-2013 06:43:00.718 MAR-AUTO 11-JUL-2013 06:40:00.003 EHS-AUTO 11-JUL-2013 06:00:00.001 GAR-AUTO 19-JUN-2013 05:43:32.436 JHS-CONTROL	Session Customize MISER View Help ERIVS5::JTM - Thu Jul 11, 2013 15:11:50 Slide Window 1, Slide # 7: NEW PINEHILL STATION & TANK (15:11:42) Slide Window 1, Slide # 6: WEHRLE TANK (15:11:42 11-Jul-2013) Slide Window 1, Slide # 4: BALL-WEHRLE-SANDRIDGE (15:11:42) Slide Window 1, Slide # 3: GUENTHER - WINDOM GRID (15:11:43)



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**Appendix F**  
**Site Inventory**



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Minor Process Equipment

Latitude	Longitude	Site Type	Pumps		Generator and Transfer	Chlorine Feed	Facilities	Power Mon. / Prot. Relay	Eye Wash and Showers
			CS	VFD					
42° 59' 46.0" N	78° 47' 53.4" W	PS & TK	3	2			X	X	
42° 49' 15.7" N	78° 42' 37.1" W	TK					X		
42° 43' 49.0" N	78° 51' 38.7" W	PS & TK	5				X		
42° 48' 46.7" N	78° 42' 25.5" W	PS	2		X		X		
42° 54' 47.0" N	78° 47' 54.2" W	PS & TK	1	1			X	X	
42° 56' 7.1" N	78° 41' 43.7" W	TK					X		
42° 57' 6.7" N	78° 46' 1.2" W	TK					X		
42° 47' 46.3" N	78° 45' 59.6" W	PS & TK		4			X	X	

Minor Process Equipment

Latitude	Longitude	Site Type	Pumps		Generator and Transfer	Chlorine Feed	Facilities	Power Mon. / Prot. Relay	Eye Wash and Showers
			CS	VFD					
42° 40' 35.0" N	78° 44' 51.6" W	TK					X		
42° 39' 11.1" N	78° 52' 12.8" W	TK					X		
42° 41' 37.2" N	78° 49' 59.2" W	PS		2	X		X		
42° 40' 38.7" N	78° 49' 37.2" W	PS & TK		2	X		X		
42° 39' 58.2" N	78° 49' 36.1" W	PS & TK	2				X		
42° 38' 46.0" N	78° 49' 40.4" W	TK					X		
42° 39' 7.2" N	78° 52' 17.5" W	PS		2			X		
42° 39' 50.4" N	78° 47' 56.3" W	PS	2				X	X	
42° 37' 41.0" N	78° 52' 40.7" W	TK					X		
42° 59' 58.7" N	78° 30' 35.9" W	PS	2				X	X	
42° 38' 14.0" N	78° 46' 8.8" W	TK			X		X		X
42° 36' 19.9" N	78° 44' 20.8" W	PS		2			X	X	
42° 35' 45.5" N	78° 43' 44.3" W	TK			X		X		X
42° 38' 42.9" N	78° 53' 36.1" W	PS & TK	2				X		

Minor Process Equipment

Latitude	Longitude	Site Type	Pumps		Generator and Transfer	Chlorine Feed	Facilities	Power Mon. / Prot. Relay	Eye Wash and Showers
			CS	VFD					
42° 44' 56.7" N	78° 51' 19.0" W	PS	1	2	X		X	X	
42° 43' 28.1" N	78° 48' 51.9" W	TK					X		
42° 42' 35.5" N	78° 54' 26.0" W	PS	2				X	X	
42° 40' 52.6" N	78° 40' 57.0" W	TK					X		

Latitude	Longitude	Site Type	Pumps		Generator and Transfer	Chlorine Feed	Facilities	Power Mon. / Prot. Relay	Eye Wash and Showers
			CS	VFD					
42° 53' 31.5" N	78° 36' 19.4" W	PS & TK	3		X	X	X	X	
42° 58' 3.6" N	78° 40' 14.9" W	PS		3			X	X	
42° 51' 25.4" N	78° 33' 17.1" W	PS	2				X	X	
42° 47' 51.2" N	78° 32' 48.1" W	TK			X		X		
42° 47' 26.8" N	78° 41' 59.8" W	TK					X		
42° 59' 00.0" N	78° 27' 00.0" W	PS Monitoring Only	2						
42° 53' 34.8" N	78° 31' 31.5" W	TK					X		
42° 52' 43.0" N	78° 41' 14.6" W	PS		3	X		X	X	

Minor Process Equipment									
Latitude	Longitude	Site Type	Pumps		Generator and Transfer	Chlorine Feed	Facilities	Power Mon. / Prot. Relay	Eye Wash and Showers
			CS	VFD					
42° 53' 42.5" N	78° 45' 19.2" W	MISC			X		X		
42° 53' 42.5" N	78° 45' 19.2" W	MISC						X	
42° 47' 46.3" N	78° 45' 59.6" W	MISC						X	

Minor Process Equipment									
Latitude	Longitude	Site Type	Pumps		Generator and Transfer	Chlorine Feed	Facilities	Power Mon. / Prot. Relay	Eye Wash and Showers
			CS	VFD					
42° 41' 37.6" N	78° 37' 20.8" W	PS Hydro-Pneumatic	2				X	X	X
42° 43' 43.9" N	78° 42' 16.0" W	TK					X		
42° 45' 44.3" N	78° 35' 59.9" W	TK					X		
42° 44' 57.7" N	78° 37' 24.0" W	PS & TK		2			X	X	
42° 43' 34.4" N	78° 44' 51.5" W	PS & TK	2				X	X	
42° 44' 18.1" N	78° 48' 0.4" W	PS		3	X		X	X	X
42° 43' 39.3" N	78° 43' 21.6" W	TK					X		
42° 46' 12.3" N	78° 41' 42.7" W	PS & TK	3				X	X	
42° 41' 41.4" N	78° 43' 4.5" W	PS		2			X	X	
42° 43' 14.4" N	78° 40' 58.3" W	PS Hydro-Pneumatic					X		
42° 42' 35.0" N	78° 37' 25.2" W	PS & TK		2			X	X	
42° 42' 24.4" N	78° 44' 6.7" W	PS & TK	2			X	X	X	X
42° 43' 27.8" N	78° 39' 13.3" W	PS		2			X	X	
42° 46' 48.9" N	78° 46' 53.6" W	PS	3		X		X	X	
42° 45' 2.0" N	78° 43' 25.9" W	PS		3	X		X	X	
42° 43' 11.9" N	78° 44' 10.8" W	TK					X		
42° 41' 40.6" N	78° 43' 18.6" W	TK					X		
42° 20' 15.2" N	78° 42' 24.2" W	TK			X		X	X	X

Latitude	Longitude	Site Type	CS	VFD	Generator and Transfer	Chlorine Feed	Facilities	Power Mon. / Prot. Relay	Eye Wash and Showers
42° 41' 24.4" N	79° 2' 9.2" W	MISC	4	2	X				
42° 58' 40.5" N	78° 56' 8.9" W	MISC	1	2	X				

Minor Process Equipment

Latitude	Longitude	Site Type	Pumps		Generator and Transfer	Chlorine Feed	Facilities	Power Mon. / Prot. Relay	Eye Wash and Showers
			CS	VFD					
43° 00' 8.6" N	78° 51' 13.0" W	PS & TK		2			X	X	
43° 00' 26.4" N	78° 54' 19.5" W	PS & TK		3	X		X		

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**Appendix G**  
**I/O List**

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# Appendix G: I/O List

**Aurora PS & TK      Site ID ARA      Site # 52**

Tag Name	I/O Type	Unit	Description	Eng. Unit
ARA LS 001 H	DI	01	Aurora PS & TK Building Flood	N/A
ARA TS 001 H/L	DI	01	Aurora PS & TK Building High/Low Temp	N/A
ARA TT 001 TZ	AI	01	Aurora PS & TK Building or Room Temperature	°F
ARA ZS 001 H	DI	01	Aurora PS & TK Doors & Hatches Intrusion	N/A
ARA DR 001 D	DO	01	Aurora PS & TK Doors & Hatches Open Door	N/A
ARA LS 001 H	DI	01	Aurora PS & TK Pit Flood	N/A
ARA PM 001 IZ_A	AI	01	Aurora PS & TK Power Monitoring Phase A Current	Amps
ARA PM 001 IZ_B	AI	01	Aurora PS & TK Power Monitoring Phase B Current	Amps
ARA PM 001 IZ_C	AI	01	Aurora PS & TK Power Monitoring Phase C Current	Amps
ARA PM 001 JZ_R	AI	01	Aurora PS & TK Power Monitoring Reactive Power	KVAR
ARA PM 001 JZ	AI	01	Aurora PS & TK Power Monitoring Real Power	KW
ARA PM 001 EZ_AB	AI	01	Aurora PS & TK Power Monitoring Voltage A-B	Volts
ARA PM 001 EZ_BC	AI	01	Aurora PS & TK Power Monitoring Voltage B-C	Volts
ARA PM 001 EZ_CA	AI	01	Aurora PS & TK Power Monitoring Voltage C-A	Volts
ARA VLVC 001 ZL	DI	01	Aurora PS & TK Check Valve Closed	N/A
ARA VLVC 002 ZL	DI	02	Aurora PS & TK Check Valve Closed	N/A
ARA VLVC 001 F	DI	01	Aurora PS & TK Check Valve Fault	N/A
ARA VLVC 002 F	DI	02	Aurora PS & TK Check Valve Fault	N/A
ARA VLVC 001 ZH	DI	01	Aurora PS & TK Check Valve Open	N/A
ARA VLVC 002 ZH	DI	02	Aurora PS & TK Check Valve Open	N/A
ARA FIT 001 FZ	AI	01	Aurora PS & TK Flow Meter Discharge Flow	MGD
ARA PIT 001 FZ	AI	01	Aurora PS & TK Pressure Meter Discharge Pressure	PSI
ARA PIT 001 PZ	AI	01	Aurora PS & TK Pressure Meter Suction Pressure	PSI
ARA MCP 001 KX	AI	01	Aurora PS & TK Pump Inhibit Start Time Remaining	Seconds
ARA MCP 002 KX	AI	02	Aurora PS & TK Pump Inhibit Start Time Remaining	Seconds
ARA MCP 001 MN	DI	01	Aurora PS & TK Pump Running	N/A



**Aurora PS & TK Site ID ARA Site # 52**

Tag Name	I/O Type	Unit	Description	Eng. Unit
ARA MCP 002 MN	DI	02	Aurora PS & TK Pump Running	N/A
ARA MCP 001 KZQ	AI	01	Aurora PS & TK Pump Runtime	Hours
ARA MCP 002 KZQ	AI	02	Aurora PS & TK Pump Runtime	Hours
ARA MCP 001 HSS	DI	01	Aurora PS & TK Pump SCADA Mode	N/A
ARA MCP 002 HSS	DI	02	Aurora PS & TK Pump SCADA Mode	N/A
ARA MCP 001 MD	DO	01	Aurora PS & TK Pump Start	N/A
ARA MCP 002 MD	DO	02	Aurora PS & TK Pump Start	N/A
ARA MCP 001 MN_N	DO	01	Aurora PS & TK Pump Stop	N/A
ARA MCP 002 MN_N	DO	02	Aurora PS & TK Pump Stop	N/A
ARA RCP 001 EZ_BA	AI	01	Aurora PS & TK Batteries Voltage	Volts
ARA RCP 001 H	DI	01	Aurora PS & TK Door Open	N/A
ARA RCP 001 EY	DI	01	Aurora PS & TK PMCR 120 VAC Present	N/A
ARA RCP 001 F_TVSS	DI	01	Aurora PS & TK TVSS Fault	N/A
ARA RCP 001 JN_BA	DI	01	Aurora PS & TK UPS Battery Mode	N/A
ARA RCP 001 Z_UPS	DI	01	Aurora PS & TK UPS Charging Mode	N/A
ARA RCP 001 F_UPS	DI	01	Aurora PS & TK UPS Fault	N/A
ARA VLVS 001 B	DO	01	Aurora PS & TK Altitude Valve Close	N/A
ARA VLVA 001 ZL	DI	01	Aurora PS & TK Altitude Valve Closed	N/A
ARA VLVA 001 ZH	DI	01	Aurora PS & TK Altitude Valve Opened	N/A
ARA VLVA 001 Z	AI	01	Aurora PS & TK Altitude Valve Position	Percent
ARA LIT 001 Z	AI	01	Aurora PS & TK Tank/Standpipe Level	Feet
Total				
DI	DO	AI	AO	
22	6	19	0	47

**Ball PS & TK Site ID BAL Site # 42**

Tag Name	I/O Type	Unit	Description	Eng. Unit
BAL LS 001 H	DI	01	Ball PS & TK Building Flood	N/A
BAL TS 001 H/L	DI	01	Ball PS & TK Building High/Low Temp	N/A

Ball PS & TK Site ID BAL Site # 42

Tag Name	I/O Type	Unit	Description	Eng. Unit
BAL TT 001 TZ	AI	01	Ball PS & TK Building or Room Temperature	°F
BAL ZS 001 H	DI	01	Ball PS & TK Doors & Hatches Intrusion	N/A
BAL DR 001 D	DO	01	Ball PS & TK Doors & Hatches Open Door	N/A
BAL LS 001 H	DI	01	Ball PS & TK Pit Flood	N/A
BAL LIT 001 LZ	AI	01	Ball PS & TK Diesel Tank Level	Gallons
BAL GEN 001 IZ_A	AI	01	Ball PS & TK Generator Current Phase A	Amps
BAL GEN 001 IZ_B	AI	01	Ball PS & TK Generator Current Phase B	Amps
BAL GEN 001 IZ_C	AI	01	Ball PS & TK Generator Current Phase C	Amps
BAL GEN 001 F	DI	01	Ball PS & TK Generator Fault	N/A
BAL GEN 001 HSA_	DI	01	Ball PS & TK Generator Not In Auto	N/A
BAL GEN 001 JZ	AI	01	Ball PS & TK Generator Real Power	KW
BAL XFER 001 F_G	DI	01	Ball PS & TK Transfer Switch Generator Running	N/A
BAL XFER 001 N_G	DI	01	Ball PS & TK Transfer Switch On Generator Power	N/A
BAL XFER 001 N_U	DI	01	Ball PS & TK Transfer Switch On Utility Power	N/A
BAL XFER 001 Y_U	DI	01	Ball PS & TK Transfer Switch Utility Power Available	N/A
BAL XFER 001 EZ_A	AI	01	Ball PS & TK Transfer Switch Voltage A-B	Volts
BAL XFER 001 EZ_B	AI	01	Ball PS & TK Transfer Switch Voltage B-C	Volts
BAL XFER 001 EZ_C	AI	01	Ball PS & TK Transfer Switch Voltage C-A	Volts
BAL PR 001 IZ_A	AI	01	Ball PS & TK Schweitzer Relay Phase A Current	Amps
BAL PR 002 IZ_A	AI	02	Ball PS & TK Schweitzer Relay Phase A Current	Amps
BAL PR 003 IZ_A	AI	03	Ball PS & TK Schweitzer Relay Phase A Current	Amps
BAL PR 004 IZ_A	AI	04	Ball PS & TK Schweitzer Relay Phase A Current	Amps
BAL PR 001 IZ_B	AI	01	Ball PS & TK Schweitzer Relay Phase B Current	Amps
BAL PR 002 IZ_B	AI	02	Ball PS & TK Schweitzer Relay Phase B Current	Amps
BAL PR 003 IZ_B	AI	03	Ball PS & TK Schweitzer Relay Phase B Current	Amps
BAL PR 004 IZ_B	AI	04	Ball PS & TK Schweitzer Relay Phase B Current	Amps
BAL PR 001 IZ_C	AI	01	Ball PS & TK Schweitzer Relay Phase C Current	Amps
BAL PR 002 IZ_C	AI	02	Ball PS & TK Schweitzer Relay Phase C Current	Amps
BAL PR 003 IZ_C	AI	03	Ball PS & TK Schweitzer Relay Phase C Current	Amps

## Ball PS &amp; TK

## Site ID BAL Site # 42

Tag Name	I/O Type	Unit	Description	Eng. Unit
BAL PR 004 IZ_C	AI	04	Ball PS & TK Schweitzer Relay Phase C Current	Amps
BAL PR 001 JZ_R	AI	01	Ball PS & TK Schweitzer Relay Reactive Power	KVAR
BAL PR 002 JZ_R	AI	02	Ball PS & TK Schweitzer Relay Reactive Power	KVAR
BAL PR 003 JZ_R	AI	03	Ball PS & TK Schweitzer Relay Reactive Power	KVAR
BAL PR 004 JZ_R	AI	04	Ball PS & TK Schweitzer Relay Reactive Power	KVAR
BAL PR 001 JZ	AI	01	Ball PS & TK Schweitzer Relay Real Power	KW
BAL PR 002 JZ	AI	02	Ball PS & TK Schweitzer Relay Real Power	KW
BAL PR 003 JZ	AI	03	Ball PS & TK Schweitzer Relay Real Power	KW
BAL PR 004 JZ	AI	04	Ball PS & TK Schweitzer Relay Real Power	KW
BAL PR 001 EZ_AB	AI	01	Ball PS & TK Schweitzer Relay Voltage A-B	Volts
BAL PR 002 EZ_AB	AI	02	Ball PS & TK Schweitzer Relay Voltage A-B	Volts
BAL PR 003 EZ_AB	AI	03	Ball PS & TK Schweitzer Relay Voltage A-B	Volts
BAL PR 004 EZ_AB	AI	04	Ball PS & TK Schweitzer Relay Voltage A-B	Volts
BAL PR 001 EZ_BC	AI	01	Ball PS & TK Schweitzer Relay Voltage B-C	Volts
BAL PR 002 EZ_BC	AI	02	Ball PS & TK Schweitzer Relay Voltage B-C	Volts
BAL PR 003 EZ_BC	AI	03	Ball PS & TK Schweitzer Relay Voltage B-C	Volts
BAL PR 004 EZ_BC	AI	04	Ball PS & TK Schweitzer Relay Voltage B-C	Volts
BAL PR 001 EZ_CA	AI	01	Ball PS & TK Schweitzer Relay Voltage C-A	Volts
BAL PR 002 EZ_CA	AI	02	Ball PS & TK Schweitzer Relay Voltage C-A	Volts
BAL PR 003 EZ_CA	AI	03	Ball PS & TK Schweitzer Relay Voltage C-A	Volts
BAL PR 004 EZ_CA	AI	04	Ball PS & TK Schweitzer Relay Voltage C-A	Volts
BAL VLVC 001 ZL	DI	01	Ball PS & TK Check Valve Closed	N/A
BAL VLVC 002 ZL	DI	02	Ball PS & TK Check Valve Closed	N/A
BAL VLVC 003 ZL	DI	03	Ball PS & TK Check Valve Closed	N/A
BAL VLVC 004 ZL	DI	04	Ball PS & TK Check Valve Closed	N/A
BAL VLVC 005 ZL	DI	05	Ball PS & TK Check Valve Closed	N/A
BAL VLVC 001 F	DI	01	Ball PS & TK Check Valve Fault	N/A
BAL VLVC 002 F	DI	02	Ball PS & TK Check Valve Fault	N/A
BAL VLVC 003 F	DI	03	Ball PS & TK Check Valve Fault	N/A

**Ball PS & TK Site ID BAL Site # 42**

Tag Name	I/O Type	Unit	Description	Eng. Unit
BAL VLVC 004 F	DI	04	Ball PS & TK Check Valve Fault	N/A
BAL VLVC 005 F	DI	05	Ball PS & TK Check Valve Fault	N/A
BAL VLVC 001 ZH	DI	01	Ball PS & TK Check Valve Open	N/A
BAL VLVC 002 ZH	DI	02	Ball PS & TK Check Valve Open	N/A
BAL VLVC 003 ZH	DI	03	Ball PS & TK Check Valve Open	N/A
BAL VLVC 004 ZH	DI	04	Ball PS & TK Check Valve Open	N/A
BAL VLVC 005 ZH	DI	05	Ball PS & TK Check Valve Open	N/A
BAL FIT 001 FZ	AI	01	Ball PS & TK Flow Meter Discharge Flow	MGD
BAL FIT 002 FZ	AI	02	Ball PS & TK Flow Meter Discharge Flow	MGD
BAL FIT 003 FZ	AI	03	Ball PS & TK Flow Meter Discharge Flow	MGD
BAL PIT 001 FZ	AI	01	Ball PS & TK Pressure Meter Discharge Pressure	PSI
BAL PIT 001 PZ	AI	01	Ball PS & TK Pressure Meter Suction Pressure	PSI
BAL VFD 004 HSB	DI	04	Ball PS & TK Pump Bypass Selected	N/A
BAL VFD 005 HSB	DI	05	Ball PS & TK Pump Bypass Selected	N/A
BAL MCP 001 KX	AI	01	Ball PS & TK Pump Inhibit Start Time Remaining	Seconds
BAL MCP 002 KX	AI	02	Ball PS & TK Pump Inhibit Start Time Remaining	Seconds
BAL MCP 003 KX	AI	03	Ball PS & TK Pump Inhibit Start Time Remaining	Seconds
BAL MCP 004 KX	AI	04	Ball PS & TK Pump Inhibit Start Time Remaining	Seconds
BAL MCP 005 KX	AI	05	Ball PS & TK Pump Inhibit Start Time Remaining	Seconds
BAL VFD 004 IZ	AI	04	Ball PS & TK Pump Motor Current	Amps
BAL VFD 005 IZ	AI	05	Ball PS & TK Pump Motor Current	Amps
BAL VFD 004 MTZ	AI	04	Ball PS & TK Pump Motor Thermal State	Percent
BAL VFD 005 MTZ	AI	05	Ball PS & TK Pump Motor Thermal State	Percent
BAL MCP 001 MN	DI	01	Ball PS & TK Pump Running	N/A
BAL MCP 002 MN	DI	02	Ball PS & TK Pump Running	N/A
BAL MCP 003 MN	DI	03	Ball PS & TK Pump Running	N/A
BAL MCP 004 MN	DI	04	Ball PS & TK Pump Running	N/A
BAL MCP 005 MN	DI	05	Ball PS & TK Pump Running	N/A
BAL MCP 001 KZQ	AI	01	Ball PS & TK Pump Runtime	Hours

Ball PS & TK

Site ID BAL

Site # 42

Tag Name	I/O Type	Unit	Description	Eng. Unit
BAL MCP 002 KZQ	AI	02	Ball PS & TK Pump Runtime	Hours
BAL MCP 003 KZQ	AI	03	Ball PS & TK Pump Runtime	Hours
BAL MCP 004 KZQ	AI	04	Ball PS & TK Pump Runtime	Hours
BAL MCP 005 KZQ	AI	05	Ball PS & TK Pump Runtime	Hours
BAL MCP 001 HSS	DI	01	Ball PS & TK Pump SCADA Mode	N/A
BAL MCP 002 HSS	DI	02	Ball PS & TK Pump SCADA Mode	N/A
BAL MCP 003 HSS	DI	03	Ball PS & TK Pump SCADA Mode	N/A
BAL MCP 004 HSS	DI	04	Ball PS & TK Pump SCADA Mode	N/A
BAL MCP 005 HSS	DI	05	Ball PS & TK Pump SCADA Mode	N/A
BAL VFD 004 SZD	AO	04	Ball PS & TK Pump Speed Control	Percent
BAL VFD 005 SZD	AO	05	Ball PS & TK Pump Speed Control	Percent
BAL VFD 004 SZ	AI	04	Ball PS & TK Pump Speed Feedback	Percent
BAL VFD 005 SZ	AI	05	Ball PS & TK Pump Speed Feedback	Percent
BAL MCP 001 MD	DO	01	Ball PS & TK Pump Start	N/A
BAL MCP 002 MD	DO	02	Ball PS & TK Pump Start	N/A
BAL MCP 003 MD	DO	03	Ball PS & TK Pump Start	N/A
BAL MCP 004 MD	DO	04	Ball PS & TK Pump Start	N/A
BAL MCP 005 MD	DO	05	Ball PS & TK Pump Start	N/A
BAL MCP 001 MN_N	DO	01	Ball PS & TK Pump Stop	N/A
BAL MCP 002 MN_N	DO	02	Ball PS & TK Pump Stop	N/A
BAL MCP 003 MN_N	DO	03	Ball PS & TK Pump Stop	N/A
BAL MCP 004 MN_N	DO	04	Ball PS & TK Pump Stop	N/A
BAL MCP 005 MN_N	DO	05	Ball PS & TK Pump Stop	N/A
BAL VFD 004 TZ	AI	04	Ball PS & TK Pump Thermal State	Percent
BAL VFD 005 TZ	AI	05	Ball PS & TK Pump Thermal State	Percent
BAL VFD 004 EZ	AI	04	Ball PS & TK Pump Voltage to Motor	Volts
BAL VFD 005 EZ	AI	05	Ball PS & TK Pump Voltage to Motor	Volts
BAL RCP 001 EY_DC	DI	01	Ball PS & TK 24 Volt PS DC OK	N/A
BAL RCP 001 EY_DC	DI	BGN	Ball PS & TK 24 Volt PS DC OK	N/A

Ball PS & TK Site ID BAL Site # 42

Tag Name	I/O Type	Unit	Description	Eng. Unit
BAL RCP 001 EZ_BA	AI	01	Ball PS & TK Batteries Voltage	Volts
BAL RCP 0BGN EZ_	AI	BGN	Ball PS & TK Batteries Voltage	Volts
BAL RCP 001 H	DI	01	Ball PS & TK Door Open	N/A
BAL RCP 0BGN H	DI	BGN	Ball PS & TK Door Open	N/A
BAL RCP 001 EY	DI	01	Ball PS & TK PMCR 120 VAC Present	N/A
BAL RCP 0BGN EY	DI	BGN	Ball PS & TK PMCR 120 VAC Present	N/A
BAL RCP 001 F_TVSS	DI	01	Ball PS & TK TVSS Fault	N/A
BAL RCP 0BGN F_T	DI	BGN	Ball PS & TK TVSS Fault	N/A
BAL RCP 001 JN_BA	DI	01	Ball PS & TK UPS Battery Mode	N/A
BAL RCP 0BGN JN_	DI	BGN	Ball PS & TK UPS Battery Mode	N/A
BAL RCP 001 Z_UPS	DI	01	Ball PS & TK UPS Charging Mode	N/A
BAL RCP 0BGN Z_U	DI	BGN	Ball PS & TK UPS Charging Mode	N/A
BAL RCP 001 F_UPS	DI	01	Ball PS & TK UPS Fault	N/A
BAL RCP 0BGN F_U	DI	BGN	Ball PS & TK UPS Fault	N/A
BAL VLVS 001 B	DO	01	Ball PS & TK Altitude Valve Close	N/A
BAL VLVS 002 B	DO	02	Ball PS & TK Altitude Valve Close	N/A
BAL VLVA 001 ZL	DI	01	Ball PS & TK Altitude Valve Closed	N/A
BAL VLVA 002 ZL	DI	02	Ball PS & TK Altitude Valve Closed	N/A
BAL VLVS 001 D	DO	01	Ball PS & TK Altitude Valve Open	N/A
BAL VLVS 002 D	DO	02	Ball PS & TK Altitude Valve Open	N/A
BAL VLVA 001 ZH	DI	01	Ball PS & TK Altitude Valve Opened	N/A
BAL VLVA 002 ZH	DI	02	Ball PS & TK Altitude Valve Opened	N/A
BAL VLVA 001 Z	AI	01	Ball PS & TK Altitude Valve Position	Percent
BAL VLVA 002 Z	AI	02	Ball PS & TK Altitude Valve Position	Percent
BAL BEA 001 N	DI	01	Ball PS & TK Beacon On	N/A
BAL BEA 002 N	DI	02	Ball PS & TK Beacon On	N/A
BAL HT 001 N	DI	01	Ball PS & TK Heat Tape On	N/A
BAL HT 002 N	DI	02	Ball PS & TK Heat Tape On	N/A
BAL HT 001 PY	DI	01	Ball PS & TK Heat Tape Power Available	N/A

**Ball PS & TK Site ID BAL Site # 42**

Tag Name	I/O Type	Unit	Description	Eng. Unit
BAL HT 002 PY	DI	02	Ball PS & TK Heat Tape Power Available	N/A
BAL LIT 001 Z	AI	01	Ball PS & TK Tank/Standpipe Level	Feet
BAL LIT 002 Z	AI	02	Ball PS & TK Tank/Standpipe Level	Feet

DI	DO	AI	AO	Total
61	15	72	2	150

**Benning Road TK Site ID BEN Site # 39**

Tag Name	I/O Type	Unit	Description	Eng. Unit
BEN LS 001 H	DI	01	Benning Road TK Building Flood	N/A
BEN TS 001 H/L	DI	01	Benning Road TK Building High/Low Temp	N/A
BEN TT 001 TZ	AI	01	Benning Road TK Building or Room Temperature	°F
BEN ZS 001 H	DI	01	Benning Road TK Doors & Hatches Intrusion	N/A
BEN DR 001 D	DO	01	Benning Road TK Doors & Hatches Open Door	N/A
BEN LS 001 H	DI	01	Benning Road TK Pit Flood	N/A
BEN RCP 001 EZ_BA	AI	01	Benning Road TK Batteries Voltage	Volts
BEN RCP 001 H	DI	01	Benning Road TK Door Open	N/A
BEN RCP 001 EY	DI	01	Benning Road TK PMCR 120 VAC Present	N/A
BEN RCP 001 F_TVSS	DI	01	Benning Road TK TVSS Fault	N/A
BEN RCP 001 JN_BA	DI	01	Benning Road TK UPS Battery Mode	N/A
BEN RCP 001 Z_UPS	DI	01	Benning Road TK UPS Charging Mode	N/A
BEN RCP 001 F_UPS	DI	01	Benning Road TK UPS Fault	N/A
BEN VLVS 001 B	DO	01	Benning Road TK Altitude Valve Close	N/A
BEN VLVA 001 ZL	DI	01	Benning Road TK Altitude Valve Closed	N/A
BEN VLVS 001 D	DO	01	Benning Road TK Altitude Valve Open	N/A
BEN VLVA 001 ZH	DI	01	Benning Road TK Altitude Valve Opened	N/A
BEN VLVA 001 Z	AI	01	Benning Road TK Altitude Valve Position	Percent
BEN BEA 001 N	DI	01	Benning Road TK Beacon On	N/A
BEN HT 001 N	DI	01	Benning Road TK Heat Tape On	N/A

Benning Road TK Site ID BEN Site # 39

Tag Name	I/O Type	Unit	Description	Eng. Unit
BEN HT 001 PY	DI	01	Benning Road TK Heat Tape Power Available	N/A
BEN LIT 001 Z	AI	01	Benning Road TK Tank/Standpipe Level	Feet

DI	DO	AI	AO	Total
15	3	4	0	22

Broadway PS & TK Site ID BRO Site # 06

Tag Name	I/O Type	Unit	Description	Eng. Unit
BRO AS 001 H	DI	01	Broadway PS & TK Chlorine Containment Sump Leak	N/A
BRO CFCP 001 MNZ	DI	01	Broadway PS & TK Chlorine System Fault	N/A
BRO CFCP 001 SZD	AI	01	Broadway PS & TK Chlorine System Feed Rate	PPM
BRO CFCP 001 OO	DO	01	Broadway PS & TK Chlorine System Pause	N/A
BRO LT 001 LZ	AI	01	Broadway PS & TK Day Tank Level	Lbs.
BRO AIT 001 AZ	AI	01	Broadway PS & TK Effluent Chlorine Analyzer Chlorine Residual	PPM
BRO AIT 001 AZ	AI	01	Broadway PS & TK Influent Chlorine Analyzer Chlorine Residual	PPM
BRO FS 001 H	DI	01	Broadway PS & TK Eyewash stations and showers In Use	N/A
BRO LS 001 H	DI	01	Broadway PS & TK Building Flood	N/A
BRO TS 001 H/L	DI	01	Broadway PS & TK Building High/Low Temp	N/A
BRO TT 001 TZ	AI	01	Broadway PS & TK Building or Room Temperature	°F
BRO ZS 001 H	DI	01	Broadway PS & TK Doors & Hatches Intrusion	N/A
BRO DR 001 D	DO	01	Broadway PS & TK Doors & Hatches Open Door	N/A
BRO LS 001 H	DI	01	Broadway PS & TK Pit Flood	N/A
BRO LIT 001 LZ	AI	01	Broadway PS & TK Diesel Tank Level	Gallons
BRO GEN 001 IZ_A	AI	01	Broadway PS & TK Generator Current Phase A	Amps
BRO GEN 001 IZ_B	AI	01	Broadway PS & TK Generator Current Phase B	Amps
BRO GEN 001 IZ_C	AI	01	Broadway PS & TK Generator Current Phase C	Amps
BRO GEN 001 F	DI	01	Broadway PS & TK Generator Fault	N/A
BRO GEN 001 HSA	DI	01	Broadway PS & TK Generator Not In Auto	N/A
BRO GEN 001 JZ	AI	01	Broadway PS & TK Generator Real Power	KW



Broadway PS & TK Site ID BRO Site # 06

Tag Name	I/O Type	Unit	Description	Eng. Unit
BRO XFER 001 F_G	DI	01	Broadway PS & TK Transfer Switch Generator Running	N/A
BRO XFER 001 N_G	DI	01	Broadway PS & TK Transfer Switch On Generator Power	N/A
BRO XFER 001 N_U	DI	01	Broadway PS & TK Transfer Switch On Utility Power	N/A
BRO XFER 001 Y_U	DI	01	Broadway PS & TK Transfer Switch Utility Power Available	N/A
BRO XFER 001 EZ_A	AI	01	Broadway PS & TK Transfer Switch Voltage A-B	Volts
BRO XFER 001 EZ_B	AI	01	Broadway PS & TK Transfer Switch Voltage B-C	Volts
BRO XFER 001 EZ_C	AI	01	Broadway PS & TK Transfer Switch Voltage C-A	Volts
BRO PM 001 IZ_A	AI	01	Broadway PS & TK Power Monitoring Phase A Current	Amps
BRO PM 001 IZ_B	AI	01	Broadway PS & TK Power Monitoring Phase B Current	Amps
BRO PM 001 IZ_C	AI	01	Broadway PS & TK Power Monitoring Phase C Current	Amps
BRO PM 001 JZ_R	AI	01	Broadway PS & TK Power Monitoring Reactive Power	KVAR
BRO PM 001 JZ	AI	01	Broadway PS & TK Power Monitoring Real Power	KW
BRO PM 001 EZ_AB	AI	01	Broadway PS & TK Power Monitoring Voltage A-B	Volts
BRO PM 001 EZ_BC	AI	01	Broadway PS & TK Power Monitoring Voltage B-C	Volts
BRO PM 001 EZ_CA	AI	01	Broadway PS & TK Power Monitoring Voltage C-A	Volts
BRO VLVC 001 ZL	DI	01	Broadway PS & TK Check Valve Closed	N/A
BRO VLVC 002 ZL	DI	02	Broadway PS & TK Check Valve Closed	N/A
BRO VLVC 003 ZL	DI	03	Broadway PS & TK Check Valve Closed	N/A
BRO VLVC 001 F	DI	01	Broadway PS & TK Check Valve Fault	N/A
BRO VLVC 002 F	DI	02	Broadway PS & TK Check Valve Fault	N/A
BRO VLVC 003 F	DI	03	Broadway PS & TK Check Valve Fault	N/A
BRO VLVC 001 ZH	DI	01	Broadway PS & TK Check Valve Open	N/A
BRO VLVC 002 ZH	DI	02	Broadway PS & TK Check Valve Open	N/A
BRO VLVC 003 ZH	DI	03	Broadway PS & TK Check Valve Open	N/A
BRO FIT 001 FZ	AI	01	Broadway PS & TK Flow Meter Discharge Flow	MGD
BRO PIT 001 FZ	AI	01	Broadway PS & TK Pressure Meter Discharge Pressure	PSI
BRO PIT 001 PZ	AI	01	Broadway PS & TK Pressure Meter Suction Pressure	PSI
BRO MCP 001 KX	AI	01	Broadway PS & TK Pump Inhibit Start Time Remaining	Seconds
BRO MCP 002 KX	AI	02	Broadway PS & TK Pump Inhibit Start Time Remaining	Seconds

Broadway PS & TK Site ID BRO Site # 06

Tag Name	I/O Type	Unit	Description	Eng. Unit
BRO MCP 003 KX	AI	03	Broadway PS & TK Pump Inhibit Start Time Remaining	Seconds
BRO MCP 001 MN	DI	01	Broadway PS & TK Pump Running	N/A
BRO MCP 002 MN	DI	02	Broadway PS & TK Pump Running	N/A
BRO MCP 003 MN	DI	03	Broadway PS & TK Pump Running	N/A
BRO MCP 001 KZQ	AI	01	Broadway PS & TK Pump Runtime	Hours
BRO MCP 002 KZQ	AI	02	Broadway PS & TK Pump Runtime	Hours
BRO MCP 003 KZQ	AI	03	Broadway PS & TK Pump Runtime	Hours
BRO MCP 001 HSS	DI	01	Broadway PS & TK Pump SCADA Mode	N/A
BRO MCP 002 HSS	DI	02	Broadway PS & TK Pump SCADA Mode	N/A
BRO MCP 003 HSS	DI	03	Broadway PS & TK Pump SCADA Mode	N/A
BRO MCP 001 MD	DO	01	Broadway PS & TK Pump Start	N/A
BRO MCP 002 MD	DO	02	Broadway PS & TK Pump Start	N/A
BRO MCP 003 MD	DO	03	Broadway PS & TK Pump Start	N/A
BRO MCP 001 MN_N	DO	01	Broadway PS & TK Pump Stop	N/A
BRO MCP 002 MN_N	DO	02	Broadway PS & TK Pump Stop	N/A
BRO MCP 003 MN_N	DO	03	Broadway PS & TK Pump Stop	N/A
BRO RCP 001 EZ_BA	AI	01	Broadway PS & TK Batteries Voltage	Volts
BRO RCP 001 H	DI	01	Broadway PS & TK Door Open	N/A
BRO RCP 001 EY	DI	01	Broadway PS & TK PMCR 120 VAC Present	N/A
BRO RCP 001 F_TVS	DI	01	Broadway PS & TK TVSS Fault	N/A
BRO RCP 001 JN_BA	DI	01	Broadway PS & TK UPS Battery Mode	N/A
BRO RCP 001 Z_UPS	DI	01	Broadway PS & TK UPS Charging Mode	N/A
BRO RCP 001 F_UPS	DI	01	Broadway PS & TK UPS Fault	N/A
BRO VLVS 001 B	DO	01	Broadway PS & TK Altitude Valve Close	N/A
BRO VLVA 001 ZL	DI	01	Broadway PS & TK Altitude Valve Closed	N/A
BRO VLVS 001 D	DO	01	Broadway PS & TK Altitude Valve Open	N/A
BRO VLVA 001 ZH	DI	01	Broadway PS & TK Altitude Valve Opened	N/A
BRO VLVA 001 Z	AI	01	Broadway PS & TK Altitude Valve Position	Percent
BRO BEA 001 N	DI	01	Broadway PS & TK Beacon On	- N/A

Broadway PS & TK Site ID BRO Site # 06

Tag Name	I/O Type	Unit	Description	Eng. Unit
BRO HT 001 N	DI	01	Broadway PS & TK Heat Tape On	N/A
BRO HT 001 PY	DI	01	Broadway PS & TK Heat Tape Power Available	N/A
BRO LIT 001 Z	AI	01	Broadway PS & TK Tank/Standpipe Level	Feet

DI	DO	AI	AO	Total
39	10	33	0	82

Castle Hill TK CAS Site # 16

Tag Name	I/O Type	Unit	Description	Eng. Unit
CAS LS 001 H	DI	01	Castle Hill TK Building Flood	N/A
CAS TS 001 H/L	DI	01	Castle Hill TK Building High/Low Temp	N/A
CAS TT 001 TZ	AI	01	Castle Hill TK Building or Room Temperature	°F
CAS ZS 001 H	DI	01	Castle Hill TK Doors & Hatches Intrusion	N/A
CAS DR 001 D	DO	01	Castle Hill TK Doors & Hatches Open Door	N/A
CAS LS 001 H	DI	01	Castle Hill TK Pit Flood	N/A
CAS RCP 001 EZ_BA	AI	01	Castle Hill TK Batteries Voltage	Volts
CAS RCP 001 H	DI	01	Castle Hill TK Door Open	N/A
CAS RCP 001 EY	DI	01	Castle Hill TK PMCR 120 VAC Present	N/A
CAS RCP 001 F_TVSS	DI	01	Castle Hill TK TVSS Fault	N/A
CAS RCP 001 JN_BA	DI	01	Castle Hill TK UPS Battery Mode	N/A
CAS RCP 001 Z_UPS	DI	01	Castle Hill TK UPS Charging Mode	N/A
CAS RCP 001 F_UPS	DI	01	Castle Hill TK UPS Fault	N/A
CAS VLVS 001 B	DO	01	Castle Hill TK Altitude Valve Close	N/A
CAS VLVA 001 ZL	DI	01	Castle Hill TK Altitude Valve Closed	N/A
CAS VLVS 001 D	DO	01	Castle Hill TK Altitude Valve Open	N/A
CAS VLVA 001 ZH	DI	01	Castle Hill TK Altitude Valve Opened	N/A
CAS VLVA 001 Z	AI	01	Castle Hill TK Altitude Valve Position	Percent
CAS BEA 001 N	DI	01	Castle Hill TK Beacon On	N/A
CAS HT 001 N	DI	01	Castle Hill TK Heat Tape On	N/A

Castle Hill TK Site ID CAS Site # 16

Tag Name	I/O Type	Unit	Description	Eng. Unit
CAS HT 001 PY	DI	01	Castle Hill TK Heat Tape Power Available	N/A
CAS LIT 001 Z	AI	01	Castle Hill TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 15 3 4 0 22

Center Street PS & TK Site ID CEN Site # 17

Tag Name	I/O Type	Unit	Description	Eng. Unit
CEN LS 001 H	DI	01	Center Street PS & TK Building Flood	N/A
CEN TS 001 H/L	DI	01	Center Street PS & TK Building High/Low Temp	N/A
CEN TT 001 TZ	AI	01	Center Street PS & TK Building or Room Temperature	°F
CEN ZS 001 H	DI	01	Center Street PS & TK Doors & Hatches Intrusion	N/A
CEN DR 001 D	DO	01	Center Street PS & TK Doors & Hatches Open Door	N/A
CEN LS 001 H	DI	01	Center Street PS & TK Pit Flood	N/A
CEN PM 001 IZ_A	AI	01	Center Street PS & TK Power Monitoring Phase A Current	Amps
CEN PM 001 IZ_B	AI	01	Center Street PS & TK Power Monitoring Phase B Current	Amps
CEN PM 001 IZ_C	AI	01	Center Street PS & TK Power Monitoring Phase C Current	Amps
CEN PM 001 JZ_R	AI	01	Center Street PS & TK Power Monitoring Reactive Power	KVAR
CEN PM 001 JZ	AI	01	Center Street PS & TK Power Monitoring Real Power	KW
CEN PM 001 EZ_AB	AI	01	Center Street PS & TK Power Monitoring Voltage A-B	Volts
CEN PM 001 EZ_BC	AI	01	Center Street PS & TK Power Monitoring Voltage B-C	Volts
CEN PM 001 EZ_CA	AI	01	Center Street PS & TK Power Monitoring Voltage C-A	Volts
CEN VLVC 001 ZL	DI	01	Center Street PS & TK Check Valve Closed	N/A
CEN VLVC 002 ZL	DI	02	Center Street PS & TK Check Valve Closed	N/A
CEN VLVC 001 F	DI	01	Center Street PS & TK Check Valve Fault	N/A
CEN VLVC 002 F	DI	02	Center Street PS & TK Check Valve Fault	N/A
CEN VLVC 001 ZH	DI	01	Center Street PS & TK Check Valve Open	N/A
CEN VLVC 002 ZH	DI	02	Center Street PS & TK Check Valve Open	N/A
CEN FIT 001 FZ	AI	01	Center Street PS & TK Flow Meter Discharge Flow	MGD

Center Street PS & TK Site ID CEN Site # 17

Tag Name	I/O Type	Unit	Description	Eng. Unit
CEN PIT 001 FZ	AI	01	Center Street PS & TK Pressure Meter Discharge Pressure	PSI
CEN PIT 001 PZ	AI	01	Center Street PS & TK Pressure Meter Suction Pressure	PSI
CEN VFD 001 HSB	DI	01	Center Street PS & TK Pump Bypass Selected	N/A
CEN VFD 002 HSB	DI	02	Center Street PS & TK Pump Bypass Selected	N/A
CEN MCP 001 KX	AI	01	Center Street PS & TK Pump Inhibit Start Time Remaining	Seconds
CEN MCP 002 KX	AI	02	Center Street PS & TK Pump Inhibit Start Time Remaining	Seconds
CEN VFD 001 IZ	AI	01	Center Street PS & TK Pump Motor Current	Amps
CEN VFD 002 IZ	AI	02	Center Street PS & TK Pump Motor Current	Amps
CEN VFD 001 MTZ	AI	01	Center Street PS & TK Pump Motor Thermal State	Percent
CEN VFD 002 MTZ	AI	02	Center Street PS & TK Pump Motor Thermal State	Percent
CEN MCP 001 MN	DI	01	Center Street PS & TK Pump Running	N/A
CEN MCP 002 MN	DI	02	Center Street PS & TK Pump Running	N/A
CEN MCP 001 KZQ	AI	01	Center Street PS & TK Pump Runtime	Hours
CEN MCP 002 KZQ	AI	02	Center Street PS & TK Pump Runtime	Hours
CEN MCP 001 HSS	DI	01	Center Street PS & TK Pump SCADA Mode	N/A
CEN MCP 002 HSS	DI	02	Center Street PS & TK Pump SCADA Mode	N/A
CEN VFD 001 SZD	AO	01	Center Street PS & TK Pump Speed Control	Percent
CEN VFD 002 SZD	AO	02	Center Street PS & TK Pump Speed Control	Percent
CEN VFD 001 SZ	AI	01	Center Street PS & TK Pump Speed Feedback	Percent
CEN VFD 002 SZ	AI	02	Center Street PS & TK Pump Speed Feedback	Percent
CEN MCP 001 MD	DO	01	Center Street PS & TK Pump Start	N/A
CEN MCP 002 MD	DO	02	Center Street PS & TK Pump Start	N/A
CEN MCP 001 MN_N	DO	01	Center Street PS & TK Pump Stop	N/A
CEN MCP 002 MN_N	DO	02	Center Street PS & TK Pump Stop	N/A
CEN VFD 001 TZ	AI	01	Center Street PS & TK Pump Thermal State	Percent
CEN VFD 002 TZ	AI	02	Center Street PS & TK Pump Thermal State	Percent
CEN VFD 001 EZ	AI	01	Center Street PS & TK Pump Voltage to Motor	Volts
CEN VFD 002 EZ	AI	02	Center Street PS & TK Pump Voltage to Motor	Volts
CEN RCP 001 EZ_BA	AI	01	Center Street PS & TK Batteries Voltage	Volts

Center Street PS & TK Site ID CEN Site # 17

Tag Name	I/O Type	Unit	Description	Eng. Unit
CEN RCP 001 H	DI	01	Center Street PS & TK Door Open	N/A
CEN RCP 001 EY	DI	01	Center Street PS & TK PMCR 120 VAC Present	N/A
CEN RCP 001 F_TVSS	DI	01	Center Street PS & TK TVSS Fault	N/A
CEN RCP 001 JN_BA	DI	01	Center Street PS & TK UPS Battery Mode	N/A
CEN RCP 001 Z_UPS	DI	01	Center Street PS & TK UPS Charging Mode	N/A
CEN RCP 001 F_UPS	DI	01	Center Street PS & TK UPS Fault	N/A
CEN VLVS 001 B	DO	01	Center Street PS & TK Altitude Valve Close	N/A
CEN VLVA 001 ZL	DI	01	Center Street PS & TK Altitude Valve Closed	N/A
CEN VLVS 001 D	DO	01	Center Street PS & TK Altitude Valve Open	N/A
CEN VLVA 001 ZH	DI	01	Center Street PS & TK Altitude Valve Opened	N/A
CEN VLVA 001 Z	AI	01	Center Street PS & TK Altitude Valve Position	Percent
CEN BEA 001 N	DI	01	Center Street PS & TK Beacon On	N/A
CEN HT 001 N	DI	01	Center Street PS & TK Heat Tape On	N/A
CEN HT 001 PY	DI	01	Center Street PS & TK Heat Tape Power Available	N/A
CEN LIT 001 Z	AI	01	Center Street PS & TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 27 7 29 2 65

Chestnut Ridge PS & TK Site ID CHN Site # 34

Tag Name	I/O Type	Unit	Description	Eng. Unit
CHN LS 001 H	DI	01	Chestnut Ridge PS & TK Building Flood	N/A
CHN TS 001 H/L	DI	01	Chestnut Ridge PS & TK Building High/Low Temp	N/A
CHN TT 001 TZ	AI	01	Chestnut Ridge PS & TK Building or Room Temperature	°F
CHN ZS 001 H	DI	01	Chestnut Ridge PS & TK Doors & Hatches Intrusion	N/A
CHN DR 001 D	DO	01	Chestnut Ridge PS & TK Doors & Hatches Open Door	N/A
CHN LS 001 H	DI	01	Chestnut Ridge PS & TK Pit Flood	N/A
CHN PM 001 IZ_A	AI	01	Chestnut Ridge PS & TK Power Monitoring Phase A Current	Amps
CHN PM 001 IZ_B	AI	01	Chestnut Ridge PS & TK Power Monitoring Phase B Current	Amps

Chestnut Ridge PS & TK Site ID CHN Site # 34

Tag Name	I/O Type	Unit	Description	Eng. Unit
CHN PM 001 IZ_C	AI	01	Chestnut Ridge PS & TK Power Monitoring Phase C Current	Amps
CHN PM 001 JZ_R	AI	01	Chestnut Ridge PS & TK Power Monitoring Reactive Power	KVAR
CHN PM 001 JZ	AI	01	Chestnut Ridge PS & TK Power Monitoring Real Power	KW
CHN PM 001 EZ_AB	AI	01	Chestnut Ridge PS & TK Power Monitoring Voltage A-B	Volts
CHN PM 001 EZ_BC	AI	01	Chestnut Ridge PS & TK Power Monitoring Voltage B-C	Volts
CHN PM 001 EZ_CA	AI	01	Chestnut Ridge PS & TK Power Monitoring Voltage C-A	Volts
CHN VLV_C 001 ZL	DI	01	Chestnut Ridge PS & TK Check Valve Closed	N/A
CHN VLV_C 002 ZL	DI	02	Chestnut Ridge PS & TK Check Valve Closed	N/A
CHN VLV_C 001 F	DI	01	Chestnut Ridge PS & TK Check Valve Fault	N/A
CHN VLV_C 002 F	DI	02	Chestnut Ridge PS & TK Check Valve Fault	N/A
CHN VLV_C 001 ZH	DI	01	Chestnut Ridge PS & TK Check Valve Open	N/A
CHN VLV_C 002 ZH	DI	02	Chestnut Ridge PS & TK Check Valve Open	N/A
CHN FIT 001 FZ	AI	01	Chestnut Ridge PS & TK Flow Meter Discharge Flow	MGD
CHN PIT 001 FZ	AI	01	Chestnut Ridge PS & TK Pressure Meter Discharge Pressure	PSI
CHN PIT 001 PZ	AI	01	Chestnut Ridge PS & TK Pressure Meter Suction Pressure	PSI
CHN MCP 001 KX	AI	01	Chestnut Ridge PS & TK Pump Inhibit Start Time Remaining	Seconds
CHN MCP 002 KX	AI	02	Chestnut Ridge PS & TK Pump Inhibit Start Time Remaining	Seconds
CHN MCP 001 MN	DI	01	Chestnut Ridge PS & TK Pump Running	N/A
CHN MCP 002 MN	DI	02	Chestnut Ridge PS & TK Pump Running	N/A
CHN MCP 001 KZQ	AI	01	Chestnut Ridge PS & TK Pump Runtime	Hours
CHN MCP 002 KZQ	AI	02	Chestnut Ridge PS & TK Pump Runtime	Hours
CHN MCP 001 HSS	DI	01	Chestnut Ridge PS & TK Pump SCADA Mode	N/A
CHN MCP 002 HSS	DI	02	Chestnut Ridge PS & TK Pump SCADA Mode	N/A
CHN MCP 001 MD	DO	01	Chestnut Ridge PS & TK Pump Start	N/A
CHN MCP 002 MD	DO	02	Chestnut Ridge PS & TK Pump Start	N/A
CHN MCP 001 MN_N	DO	01	Chestnut Ridge PS & TK Pump Stop	N/A
CHN MCP 002 MN_N	DO	02	Chestnut Ridge PS & TK Pump Stop	N/A
CHN RCP 001 EZ_BA	AI	01	Chestnut Ridge PS & TK Batteries Voltage	Volts
CHN RCP 001 H	DI	01	Chestnut Ridge PS & TK Door Open	N/A

Chestnut Ridge PS & TK Site ID CHN Site # 34

Tag Name	I/O Type	Unit	Description	Eng. Unit
CHN RCP 001 EY	DI	01	Chestnut Ridge PS & TK PMCR 120 VAC Present	N/A
CHN RCP 001 F_TVSS	DI	01	Chestnut Ridge PS & TK TVSS Fault	N/A
CHN RCP 001 JN_BA	DI	01	Chestnut Ridge PS & TK UPS Battery Mode	N/A
CHN RCP 001 Z_UPS	DI	01	Chestnut Ridge PS & TK UPS Charging Mode	N/A
CHN RCP 001 F_UPS	DI	01	Chestnut Ridge PS & TK UPS Fault	N/A
CHN VLVS 001 B	DO	01	Chestnut Ridge PS & TK Altitude Valve Close	N/A
CHN VLVA 001 ZL	DI	01	Chestnut Ridge PS & TK Altitude Valve Closed	N/A
CHN VLVS 001 D	DO	01	Chestnut Ridge PS & TK Altitude Valve Open	N/A
CHN VLVA 001 ZH	DI	01	Chestnut Ridge PS & TK Altitude Valve Opened	N/A
CHN VLVA 001 Z	AI	01	Chestnut Ridge PS & TK Altitude Valve Position	Percent
CHN BEA 001 N	DI	01	Chestnut Ridge PS & TK Beacon On	N/A
CHN HT 001 N	DI	01	Chestnut Ridge PS & TK Heat Tape On	N/A
CHN HT 001 PY	DI	01	Chestnut Ridge PS & TK Heat Tape Power Available	N/A
CHN LIT 001 Z	AI	01	Chestnut Ridge PS & TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 25 7 19 0 51

Clark Street PS Site ID CLK Site # 26

Tag Name	I/O Type	Unit	Description	Eng. Unit
CLK AS 001 H	DI	01	Clark Street PS Chlorine Containment Sump Leak	N/A
CLK CFCP 001 MNZ	DI	01	Clark Street PS Chlorine System Fault	N/A
CLK CFCP 001 SZD	AI	01	Clark Street PS Chlorine System Feed Rate	PPM
CLK CFCP 001 OO	DO	01	Clark Street PS Chlorine System Pause	N/A
CLK LT 001 LZ	AI	01	Clark Street PS Day Tank Level	Lbs.
CLK AIT 001 AZ	AI	01	Clark Street PS Effluent Chlorine Analyzer Chlorine Residual	PPM
CLK AIT 001 AZ	AI	01	Clark Street PS Influent Chlorine Analyzer Chlorine Residual	PPM
CLK FS 001 H	DI	01	Clark Street PS Eyewash stations and showers In Use	N/A
CLK LS 001 H	DI	01	Clark Street PS Building Flood	N/A



Clark Street PS Site ID CLK Site # 26

Tag Name	I/O Type	Unit	Description	Eng. Unit
CLK TS 001 H/L	DI	01	Clark Street PS Building High/Low Temp	N/A
CLK TT 001 TZ	AI	01	Clark Street PS Building or Room Temperature	°F
CLK ZS 001 H	DI	01	Clark Street PS Doors & Hatches Intrusion	N/A
CLK DR 001 D	DO	01	Clark Street PS Doors & Hatches Open Door	N/A
CLK LS 001 H	DI	01	Clark Street PS Pit Flood	N/A
CLK LIT 001 LZ	AI	01	Clark Street PS Diesel Tank Level	Gallons
CLK GEN 001 IZ_A	AI	01	Clark Street PS Generator Current Phase A	Amps
CLK GEN 001 IZ_B	AI	01	Clark Street PS Generator Current Phase B	Amps
CLK GEN 001 IZ_C	AI	01	Clark Street PS Generator Current Phase C	Amps
CLK GEN 001 F	DI	01	Clark Street PS Generator Fault	N/A
CLK GEN 001 HSA_	DI	01	Clark Street PS Generator Not In Auto	N/A
CLK GEN 001 JZ	AI	01	Clark Street PS Generator Real Power	KW
CLK XFER 001 F_G	DI	01	Clark Street PS Transfer Switch Generator Running	N/A
CLK XFER 001 N_G	DI	01	Clark Street PS Transfer Switch On Generator Power	N/A
CLK XFER 001 N_U	DI	01	Clark Street PS Transfer Switch On Utility Power	N/A
CLK XFER 001 Y_U	DI	01	Clark Street PS Transfer Switch Utility Power Available	N/A
CLK XFER 001 EZ_A	AI	01	Clark Street PS Transfer Switch Voltage A-B	Volts
CLK XFER 001 EZ_B	AI	01	Clark Street PS Transfer Switch Voltage B-C	Volts
CLK XFER 001 EZ_C	AI	01	Clark Street PS Transfer Switch Voltage C-A	Volts
CLK PM 001 IZ_A	AI	01	Clark Street PS Power Monitoring Phase A Current	Amps
CLK PM 001 IZ_B	AI	01	Clark Street PS Power Monitoring Phase B Current	Amps
CLK PM 001 IZ_C	AI	01	Clark Street PS Power Monitoring Phase C Current	Amps
CLK PM 001 JZ_R	AI	01	Clark Street PS Power Monitoring Reactive Power	KVAR
CLK PM 001 JZ	AI	01	Clark Street PS Power Monitoring Real Power	KW
CLK PM 001 EZ_AB	AI	01	Clark Street PS Power Monitoring Voltage A-B	Volts
CLK PM 001 EZ_BC	AI	01	Clark Street PS Power Monitoring Voltage B-C	Volts
CLK PM 001 EZ_CA	AI	01	Clark Street PS Power Monitoring Voltage C-A	Volts
CLK VLVC 001 ZL	DI	01	Clark Street PS Check Valve Closed	N/A
CLK VLVC 002 ZL	DI	02	Clark Street PS Check Valve Closed	N/A

Clark Street PS Site ID CLK Site # 26

Tag Name	I/O Type	Unit	Description	Eng. Unit
CLK VLV03 ZL	DI	03	Clark Street PS Check Valve Closed	N/A
CLK VLV001 F	DI	01	Clark Street PS Check Valve Fault	N/A
CLK VLV002 F	DI	02	Clark Street PS Check Valve Fault	N/A
CLK VLV003 F	DI	03	Clark Street PS Check Valve Fault	N/A
CLK VLV001 ZH	DI	01	Clark Street PS Check Valve Open	N/A
CLK VLV002 ZH	DI	02	Clark Street PS Check Valve Open	N/A
CLK VLV003 ZH	DI	03	Clark Street PS Check Valve Open	N/A
CLK FIT001 FZ	AI	01	Clark Street PS Flow Meter Discharge Flow	MGD
CLK PIT001 FZ	AI	01	Clark Street PS Pressure Meter Discharge Pressure	PSI
CLK PIT001 PZ	AI	01	Clark Street PS Pressure Meter Suction Pressure	PSI
CLK VFD001 HSB	DI	01	Clark Street PS Pump Bypass Selected	N/A
CLK VFD002 HSB	DI	02	Clark Street PS Pump Bypass Selected	N/A
CLK VFD003 HSB	DI	03	Clark Street PS Pump Bypass Selected	N/A
CLK MCP001 KX	AI	01	Clark Street PS Pump Inhibit Start Time Remaining	Seconds
CLK MCP002 KX	AI	02	Clark Street PS Pump Inhibit Start Time Remaining	Seconds
CLK MCP003 KX	AI	03	Clark Street PS Pump Inhibit Start Time Remaining	Seconds
CLK VFD001 IZ	AI	01	Clark Street PS Pump Motor Current	Amps
CLK VFD002 IZ	AI	02	Clark Street PS Pump Motor Current	Amps
CLK VFD003 IZ	AI	03	Clark Street PS Pump Motor Current	Amps
CLK VFD001 MTZ	AI	01	Clark Street PS Pump Motor Thermal State	Percent
CLK VFD002 MTZ	AI	02	Clark Street PS Pump Motor Thermal State	Percent
CLK VFD003 MTZ	AI	03	Clark Street PS Pump Motor Thermal State	Percent
CLK MCP001 MN	DI	01	Clark Street PS Pump Running	N/A
CLK MCP002 MN	DI	02	Clark Street PS Pump Running	N/A
CLK MCP003 MN	DI	03	Clark Street PS Pump Running	N/A
CLK MCP001 KZQ	AI	01	Clark Street PS Pump Runtime	Hours
CLK MCP002 KZQ	AI	02	Clark Street PS Pump Runtime	Hours
CLK MCP003 KZQ	AI	03	Clark Street PS Pump Runtime	Hours
CLK MCP001 HSS	DI	01	Clark Street PS Pump SCADA Mode	N/A

Clark Street PS Site ID CLK Site # 26

Tag Name	I/O Type	Unit	Description	Eng. Unit
CLK MCP 002 HSS	DI	02	Clark Street PS Pump SCADA Mode	N/A
CLK MCP 003 HSS	DI	03	Clark Street PS Pump SCADA Mode	N/A
CLK VFD 001 SZD	AO	01	Clark Street PS Pump Speed Control	Percent
CLK VFD 002 SZD	AO	02	Clark Street PS Pump Speed Control	Percent
CLK VFD 003 SZD	AO	03	Clark Street PS Pump Speed Control	Percent
CLK VFD 001 SZ	AI	01	Clark Street PS Pump Speed Feedback	Percent
CLK VFD 002 SZ	AI	02	Clark Street PS Pump Speed Feedback	Percent
CLK VFD 003 SZ	AI	03	Clark Street PS Pump Speed Feedback	Percent
CLK MCP 001 MD	DO	01	Clark Street PS Pump Start	N/A
CLK MCP 002 MD	DO	02	Clark Street PS Pump Start	N/A
CLK MCP 003 MD	DO	03	Clark Street PS Pump Start	N/A
CLK MCP 001 MN_N	DO	01	Clark Street PS Pump Stop	N/A
CLK MCP 002 MN_N	DO	02	Clark Street PS Pump Stop	N/A
CLK MCP 003 MN_N	DO	03	Clark Street PS Pump Stop	N/A
CLK VFD 001 TZ	AI	01	Clark Street PS Pump Thermal State	Percent
CLK VFD 002 TZ	AI	02	Clark Street PS Pump Thermal State	Percent
CLK VFD 003 TZ	AI	03	Clark Street PS Pump Thermal State	Percent
CLK VFD 001 EZ	AI	01	Clark Street PS Pump Voltage to Motor	Volts
CLK VFD 002 EZ	AI	02	Clark Street PS Pump Voltage to Motor	Volts
CLK VFD 003 EZ	AI	03	Clark Street PS Pump Voltage to Motor	Volts
CLK RCP 001 EZ_BA	AI	01	Clark Street PS Batteries Voltage	Volts
CLK RCP 001 H	DI	01	Clark Street PS Door Open	N/A
CLK RCP 001 EY	DI	01	Clark Street PS PMCR 120 VAC Present	N/A
CLK RCP 001 F_TVSS	DI	01	Clark Street PS TVSS Fault	N/A
CLK RCP 001 JN_BA	DI	01	Clark Street PS UPS Battery Mode	N/A
CLK RCP 001 Z_UPS	DI	01	Clark Street PS UPS Charging Mode	N/A
CLK RCP 001 F_UPS	DI	01	Clark Street PS UPS Fault	N/A

Clark Street PS Site ID CLK Site # 26

Tag Name	I/O Type	Unit	Description	Eng. Unit
DI	DO	AI	AO	Total
37	8	46	3	94

Cole Road TK Site ID COL Site # 38

Tag Name	I/O Type	Unit	Description	Eng. Unit
COL LS 001 H	DI	01	Cole Road TK Building Flood	N/A
COL TS 001 H/L	DI	01	Cole Road TK Building High/Low Temp	N/A
COL TT 001 TZ	AI	01	Cole Road TK Building or Room Temperature	°F
COL ZS 001 H	DI	01	Cole Road TK Doors & Hatches Intrusion	N/A
COL DR 001 D	DO	01	Cole Road TK Doors & Hatches Open Door	N/A
COL LS 001 H	DI	01	Cole Road TK Pit Flood	N/A
COL RCP 001 EZ_BA	AI	01	Cole Road TK Batteries Voltage	Volts
COL RCP 001 H	DI	01	Cole Road TK Door Open	N/A
COL RCP 001 EY	DI	01	Cole Road TK PMCR 120 VAC Present	N/A
COL RCP 001 F_TVSS	DI	01	Cole Road TK TVSS Fault	N/A
COL RCP 001 JN_BA	DI	01	Cole Road TK UPS Battery Mode	N/A
COL RCP 001 Z_UPS	DI	01	Cole Road TK UPS Charging Mode	N/A
COL RCP 001 F_UPS	DI	01	Cole Road TK UPS Fault	N/A
COL VLVS 001 B	DO	01	Cole Road TK Altitude Valve Close	N/A
COL VLVA 001 ZL	DI	01	Cole Road TK Altitude Valve Closed	N/A
COL VLVS 001 D	DO	01	Cole Road TK Altitude Valve Open	N/A
COL VLVA 001 ZH	DI	01	Cole Road TK Altitude Valve Opened	N/A
COL VLVA 001 Z	AI	01	Cole Road TK Altitude Valve Position	Percent
COL BEA 001 N	DI	01	Cole Road TK Beacon On	N/A
COL HT 001 N	DI	01	Cole Road TK Heat Tape On	N/A
COL HT 001 PY	DI	01	Cole Road TK Heat Tape Power Available	N/A
COL LIT 001 Z	AI	01	Cole Road TK Tank/Standpipe Level	Feet

Cole Road TK Site ID COL Site # 38

Tag Name	I/O Type	Unit	Description	Eng. Unit
DI	DO	AI	AO	Total
15	3	4	0	22

Colvin Blvd PS & TK Site ID CLV Site # 79

Tag Name	I/O Type	Unit	Description	Eng. Unit
CLV LS 001 H	DI	01	Colvin Blvd PS & TK Building Flood	N/A
CLV TS 001 H/L	DI	01	Colvin Blvd PS & TK Building High/Low Temp	N/A
CLV TT 001 TZ	AI	01	Colvin Blvd PS & TK Building or Room Temperature	°F
CLV ZS 001 H	DI	01	Colvin Blvd PS & TK Doors & Hatches Intrusion	N/A
CLV DR 001 D	DO	01	Colvin Blvd PS & TK Doors & Hatches Open Door	N/A
CLV LS 001 H	DI	01	Colvin Blvd PS & TK Pit Flood	N/A
CLV PM 001 IZ_A	AI	01	Colvin Blvd PS & TK Power Monitoring Phase A Current	Amps
CLV PM 001 IZ_B	AI	01	Colvin Blvd PS & TK Power Monitoring Phase B Current	Amps
CLV PM 001 IZ_C	AI	01	Colvin Blvd PS & TK Power Monitoring Phase C Current	Amps
CLV PM 001 JZ_R	AI	01	Colvin Blvd PS & TK Power Monitoring Reactive Power	KVAR
CLV PM 001 JZ	AI	01	Colvin Blvd PS & TK Power Monitoring Real Power	KW
CLV PM 001 EZ_AB	AI	01	Colvin Blvd PS & TK Power Monitoring Voltage A-B	Volts
CLV PM 001 EZ_BC	AI	01	Colvin Blvd PS & TK Power Monitoring Voltage B-C	Volts
CLV PM 001 EZ_CA	AI	01	Colvin Blvd PS & TK Power Monitoring Voltage C-A	Volts
CLV VLVC 001 ZL	DI	01	Colvin Blvd PS & TK Check Valve Closed	N/A
CLV VLVC 002 ZL	DI	02	Colvin Blvd PS & TK Check Valve Closed	N/A
CLV VLVC 001 F	DI	01	Colvin Blvd PS & TK Check Valve Fault	N/A
CLV VLVC 002 F	DI	02	Colvin Blvd PS & TK Check Valve Fault	N/A
CLV VLVC 001 ZH	DI	01	Colvin Blvd PS & TK Check Valve Open	N/A
CLV VLVC 002 ZH	DI	02	Colvin Blvd PS & TK Check Valve Open	N/A
CLV FIT 001 FZ	AI	01	Colvin Blvd PS & TK Flow Meter Discharge Flow	MGD
CLV PIT 001 FZ	AI	01	Colvin Blvd PS & TK Pressure Meter Discharge Pressure	PSI
CLV PIT 001 PZ	AI	01	Colvin Blvd PS & TK Pressure Meter Suction Pressure	PSI

Colvin Blvd PS & TK Site ID CLV Site # 79

Tag Name	I/O Type	Unit	Description	Eng. Unit
CLV VFD 001 HSB	DI	01	Colvin Blvd PS & TK Pump Bypass Selected	N/A
CLV VFD 002 HSB	DI	02	Colvin Blvd PS & TK Pump Bypass Selected	N/A
CLV MCP 001 KX	AI	01	Colvin Blvd PS & TK Pump Inhibit Start Time Remaining	Seconds
CLV MCP 002 KX	AI	02	Colvin Blvd PS & TK Pump Inhibit Start Time Remaining	Seconds
CLV VFD 001 IZ	AI	01	Colvin Blvd PS & TK Pump Motor Current	Amps
CLV VFD 002 IZ	AI	02	Colvin Blvd PS & TK Pump Motor Current	Amps
CLV VFD 001 MTZ	AI	01	Colvin Blvd PS & TK Pump Motor Thermal State	Percent
CLV VFD 002 MTZ	AI	02	Colvin Blvd PS & TK Pump Motor Thermal State	Percent
CLV MCP 001 MN	DI	01	Colvin Blvd PS & TK Pump Running	N/A
CLV MCP 002 MN	DI	02	Colvin Blvd PS & TK Pump Running	N/A
CLV MCP 001 KZQ	AI	01	Colvin Blvd PS & TK Pump Runtime	Hours
CLV MCP 002 KZQ	AI	02	Colvin Blvd PS & TK Pump Runtime	Hours
CLV MCP 001 HSS	DI	01	Colvin Blvd PS & TK Pump SCADA Mode	N/A
CLV MCP 002 HSS	DI	02	Colvin Blvd PS & TK Pump SCADA Mode	N/A
CLV VFD 001 SZD	AO	01	Colvin Blvd PS & TK Pump Speed Control	Percent
CLV VFD 002 SZD	AO	02	Colvin Blvd PS & TK Pump Speed Control	Percent
CLV VFD 001 SZ	AI	01	Colvin Blvd PS & TK Pump Speed Feedback	Percent
CLV VFD 002 SZ	AI	02	Colvin Blvd PS & TK Pump Speed Feedback	Percent
CLV MCP 001 MD	DO	01	Colvin Blvd PS & TK Pump Start	N/A
CLV MCP 002 MD	DO	02	Colvin Blvd PS & TK Pump Start	N/A
CLV MCP 001 MN_N	DO	01	Colvin Blvd PS & TK Pump Stop	N/A
CLV MCP 002 MN_N	DO	02	Colvin Blvd PS & TK Pump Stop	N/A
CLV VFD 001 TZ	AI	01	Colvin Blvd PS & TK Pump Thermal State	Percent
CLV VFD 002 TZ	AI	02	Colvin Blvd PS & TK Pump Thermal State	Percent
CLV VFD 001 EZ	AI	01	Colvin Blvd PS & TK Pump Voltage to Motor	Volts
CLV VFD 002 EZ	AI	02	Colvin Blvd PS & TK Pump Voltage to Motor	Volts
CLV RCP 001 EZ_BA	AI	01	Colvin Blvd PS & TK Batteries Voltage	Volts
CLV RCP 001 H	DI	01	Colvin Blvd PS & TK Door Open	N/A
CLV RCP 001 EY	DI	01	Colvin Blvd PS & TK PMCR 120 VAC Present	N/A

Colvin Blvd PS & TK Site ID CLV Site # 79

Tag Name	I/O Type	Unit	Description	Eng. Unit
CLV RCP 001 F_TVS	DI	01	Colvin Blvd PS & TK TVSS Fault	N/A
CLV RCP 001 JN_BA	DI	01	Colvin Blvd PS & TK UPS Battery Mode	N/A
CLV RCP 001 Z_UPS	DI	01	Colvin Blvd PS & TK UPS Charging Mode	N/A
CLV RCP 001 F_UPS	DI	01	Colvin Blvd PS & TK UPS Fault	N/A
CLV VLVS 001 B	DO	01	Colvin Blvd PS & TK Altitude Valve Close	N/A
CLV VLVA 001 ZL	DI	01	Colvin Blvd PS & TK Altitude Valve Closed	N/A
CLV VLVS 001 D	DO	01	Colvin Blvd PS & TK Altitude Valve Open	N/A
CLV VLVA 001 ZH	DI	01	Colvin Blvd PS & TK Altitude Valve Opened	N/A
CLV VLVA 001 Z	AI	01	Colvin Blvd PS & TK Altitude Valve Position	Percent
CLV BEA 001 N	DI	01	Colvin Blvd PS & TK Beacon On	N/A
CLV HT 001 N	DI	01	Colvin Blvd PS & TK Heat Tape On	N/A
CLV HT 001 PY	DI	01	Colvin Blvd PS & TK Heat Tape Power Available	N/A
CLV LIT 001 Z	AI	01	Colvin Blvd PS & TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 27 7 29 2 65

Crestwood TK Site ID CRW Site # 33

Tag Name	I/O Type	Unit	Description	Eng. Unit
CRW LS 001 H	DI	01	Crestwood TK Building Flood	N/A
CRW TS 001 H/L	DI	01	Crestwood TK Building High/Low Temp	N/A
CRW TT 001 TZ	AI	01	Crestwood TK Building or Room Temperature	°F
CRW ZS 001 H	DI	01	Crestwood TK Doors & Hatches Intrusion	N/A
CRW DR 001 D	DO	01	Crestwood TK Doors & Hatches Open Door	N/A
CRW LS 001 H	DI	01	Crestwood TK Pit Flood	N/A
CRW RCP 001 EZ_B	AI	01	Crestwood TK Batteries Voltage	Volts
CRW RCP 001 H	DI	01	Crestwood TK Door Open	N/A
CRW RCP 001 EY	DI	01	Crestwood TK PMCR 120 VAC Present	N/A
CRW RCP 001 F_TVS	DI	01	Crestwood TK TVSS Fault	N/A

Crestwood TK Site ID CRW Site # 33

Tag Name	I/O Type	Unit	Description	Eng. Unit
CRW RCP 001 JN_BA	DI	01	Crestwood TK UPS Battery Mode	N/A
CRW RCP 001 Z_UPS	DI	01	Crestwood TK UPS Charging Mode	N/A
CRW RCP 001 F_UPS	DI	01	Crestwood TK UPS Fault	N/A
CRW VLVS 001 B	DO	01	Crestwood TK Altitude Valve Close	N/A
CRW VLVA 001 ZL	DI	01	Crestwood TK Altitude Valve Closed	N/A
CRW VLVS 001 D	DO	01	Crestwood TK Altitude Valve Open	N/A
CRW VLVA 001 ZH	DI	01	Crestwood TK Altitude Valve Opened	N/A
CRW VLVA 001 Z	AI	01	Crestwood TK Altitude Valve Position	Percent
CRW BEA 001 N	DI	01	Crestwood TK Beacon On	N/A
CRW HT 001 N	DI	01	Crestwood TK Heat Tape On	N/A
CRW HT 001 PY	DI	01	Crestwood TK Heat Tape Power Available	N/A
CRW LIT 001 Z	AI	01	Crestwood TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
15 3 4 0 22

East & West TK Site ID EWT Site # 12

Tag Name	I/O Type	Unit	Description	Eng. Unit
EWT LS 001 H	DI	01	East & West TK Building Flood	N/A
EWT TS 001 H/L	DI	01	East & West TK Building High/Low Temp	N/A
EWT TT 001 TZ	AI	01	East & West TK Building or Room Temperature	°F
EWT ZS 001 H	DI	01	East & West TK Doors & Hatches Intrusion	N/A
EWT DR 001 D	DO	01	East & West TK Doors & Hatches Open Door	N/A
EWT LS 001 H	DI	01	East & West TK Pit Flood	N/A
EWT RCP 001 EZ_BA	AI	01	East & West TK Batteries Voltage	Volts
EWT RCP 001 H	DI	01	East & West TK Door Open	N/A
EWT RCP 001 EY	DI	01	East & West TK PMCR 120 VAC Present	N/A
EWT RCP 001 F_TVSS	DI	01	East & West TK TVSS Fault	N/A
EWT RCP 001 JN_BA	DI	01	East & West TK UPS Battery Mode	N/A



East & West TK Site ID EWT Site # 12

Tag Name	I/O Type	Unit	Description	Eng. Unit
EWT RCP 001 Z UPS	DI	01	East & West TK UPS Charging Mode	N/A
EWT RCP 001 F UPS	DI	01	East & West TK UPS Fault	N/A
EWT VLVS 001 B	DO	01	East & West TK Altitude Valve Close	N/A
EWT VLVA 001 ZL	DI	01	East & West TK Altitude Valve Closed	N/A
EWT VLVS 001 D	DO	01	East & West TK Altitude Valve Open	N/A
EWT VLVA 001 ZH	DI	01	East & West TK Altitude Valve Opened	N/A
EWT VLVA 001 Z	AI	01	East & West TK Altitude Valve Position	Percent
EWT BEA 001 N	DI	01	East & West TK Beacon On	N/A
EWT HT 001 N	DI	01	East & West TK Heat Tape On	N/A
EWT HT 001 PY	DI	01	East & West TK Heat Tape Power Available	N/A
EWT LIT 001 Z	AI	01	East & West TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 15 3 4 0 22

East Aurora PS & TK Site ID EAU Site # 15

Tag Name	I/O Type	Unit	Description	Eng. Unit
EAU LS 001 H	DI	01	East Aurora PS & TK Building Flood	N/A
EAU TS 001 H/L	DI	01	East Aurora PS & TK Building High/Low Temp	N/A
EAU TT 001 TZ	AI	01	East Aurora PS & TK Building or Room Temperature	°F
EAU ZS 001 H	DI	01	East Aurora PS & TK Doors & Hatches Intrusion	N/A
EAU DR 001 D	DO	01	East Aurora PS & TK Doors & Hatches Open Door	N/A
EAU LS 001 H	DI	01	East Aurora PS & TK Pit Flood	N/A
EAU PM 001 IZ_A	AI	01	East Aurora PS & TK Power Monitoring Phase A Current	Amps
EAU PM 001 IZ_B	AI	01	East Aurora PS & TK Power Monitoring Phase B Current	Amps
EAU PM 001 IZ_C	AI	01	East Aurora PS & TK Power Monitoring Phase C Current	Amps
EAU PM 001 JZ_R	AI	01	East Aurora PS & TK Power Monitoring Reactive Power	KVAR
EAU PM 001 JZ	AI	01	East Aurora PS & TK Power Monitoring Real Power	KW
EAU PM 001 EZ_AB	AI	01	East Aurora PS & TK Power Monitoring Voltage A-B	Volts

East Aurora PS & TK Site ID EAU Site # 15

Tag Name	I/O Type	Unit	Description	Eng. Unit
EAU PM 001 EZ_BC	AI	01	East Aurora PS & TK Power Monitoring Voltage B-C	Volts
EAU PM 001 EZ_CA	AI	01	East Aurora PS & TK Power Monitoring Voltage C-A	Volts
EAU VLVC 001 ZL	DI	01	East Aurora PS & TK Check Valve Closed	N/A
EAU VLVC 002 ZL	DI	02	East Aurora PS & TK Check Valve Closed	N/A
EAU VLVC 003 ZL	DI	03	East Aurora PS & TK Check Valve Closed	N/A
EAU VLVC 001 F	DI	01	East Aurora PS & TK Check Valve Fault	N/A
EAU VLVC 002 F	DI	02	East Aurora PS & TK Check Valve Fault	N/A
EAU VLVC 003 F	DI	03	East Aurora PS & TK Check Valve Fault	N/A
EAU VLVC 001 ZH	DI	01	East Aurora PS & TK Check Valve Open	N/A
EAU VLVC 002 ZH	DI	02	East Aurora PS & TK Check Valve Open	N/A
EAU VLVC 003 ZH	DI	03	East Aurora PS & TK Check Valve Open	N/A
EAU FIT 001 FZ	AI	01	East Aurora PS & TK Flow Meter Discharge Flow	MGD
EAU PIT 001 FZ	AI	01	East Aurora PS & TK Pressure Meter Discharge Pressure	PSI
EAU PIT 001 PZ	AI	01	East Aurora PS & TK Pressure Meter Suction Pressure	PSI
EAU MCP 001 KX	AI	01	East Aurora PS & TK Pump Inhibit Start Time Remaining	Seconds
EAU MCP 002 KX	AI	02	East Aurora PS & TK Pump Inhibit Start Time Remaining	Seconds
EAU MCP 003 KX	AI	03	East Aurora PS & TK Pump Inhibit Start Time Remaining	Seconds
EAU MCP 001 MN	DI	01	East Aurora PS & TK Pump Running	N/A
EAU MCP 002 MN	DI	02	East Aurora PS & TK Pump Running	N/A
EAU MCP 003 MN	DI	03	East Aurora PS & TK Pump Running	N/A
EAU MCP 001 KZQ	AI	01	East Aurora PS & TK Pump Runtime	Hours
EAU MCP 002 KZQ	AI	02	East Aurora PS & TK Pump Runtime	Hours
EAU MCP 003 KZQ	AI	03	East Aurora PS & TK Pump Runtime	Hours
EAU MCP 001 HSS	DI	01	East Aurora PS & TK Pump SCADA Mode	N/A
EAU MCP 002 HSS	DI	02	East Aurora PS & TK Pump SCADA Mode	N/A
EAU MCP 003 HSS	DI	03	East Aurora PS & TK Pump SCADA Mode	N/A
EAU MCP 001 MD	DO	01	East Aurora PS & TK Pump Start	N/A
EAU MCP 002 MD	DO	02	East Aurora PS & TK Pump Start	N/A
EAU MCP 003 MD	DO	03	East Aurora PS & TK Pump Start	N/A

East Aurora PS & TK Site ID EAU Site # 15

Tag Name	I/O Type	Unit	Description	Eng. Unit
EAU MCP 001 MN_N	DO	01	East Aurora PS & TK Pump Stop	N/A
EAU MCP 002 MN_N	DO	02	East Aurora PS & TK Pump Stop	N/A
EAU MCP 003 MN_N	DO	03	East Aurora PS & TK Pump Stop	N/A
EAU RCP 001 EZ_BA	AI	01	East Aurora PS & TK Batteries Voltage	Volts
EAU RCP 001 H	DI	01	East Aurora PS & TK Door Open	N/A
EAU RCP 001 EY	DI	01	East Aurora PS & TK PMCR 120 VAC Present	N/A
EAU RCP 001 F_TVSS	DI	01	East Aurora PS & TK TVSS Fault	N/A
EAU RCP 001 JN_BA	DI	01	East Aurora PS & TK UPS Battery Mode	N/A
EAU RCP 001 Z_UPS	DI	01	East Aurora PS & TK UPS Charging Mode	N/A
EAU RCP 001 F_UPS	DI	01	East Aurora PS & TK UPS Fault	N/A
EAU VLV_001 B	DO	01	East Aurora PS & TK Altitude Valve Close	N/A
EAU VLV_001 ZL	DI	01	East Aurora PS & TK Altitude Valve Closed	N/A
EAU VLV_001 D	DO	01	East Aurora PS & TK Altitude Valve Open	N/A
EAU VLV_001 ZH	DI	01	East Aurora PS & TK Altitude Valve Opened	N/A
EAU VLV_001 Z	AI	01	East Aurora PS & TK Altitude Valve Position	Percent
EAU BEA 001 N	DI	01	East Aurora PS & TK Beacon On	N/A
EAU HT 001 N	DI	01	East Aurora PS & TK Heat Tape On	N/A
EAU HT 001 PY	DI	01	East Aurora PS & TK Heat Tape Power Available	N/A
EAU LIT 001 Z	AI	01	East Aurora PS & TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 30 9 21 0 60

East Church St TK Site ID ECH Site # 09

Tag Name	I/O Type	Unit	Description	Eng. Unit
ECH LS 001 H	DI	01	East Church St TK Building Flood	N/A
ECH TS 001 H/L	DI	01	East Church St TK Building High/Low Temp	N/A
ECH TT 001 TZ	AI	01	East Church St TK Building or Room Temperature	°F
ECH ZS 001 H	DI	01	East Church St TK Doors & Hatches Intrusion	N/A

East Church St TK Site ID ECH Site # 09

Tag Name	I/O Type	Unit	Description	Eng. Unit
ECH DR 001 D	DO	01	East Church St TK Doors & Hatches Open Door	N/A
ECH LS 001 H	DI	01	East Church St TK Pit Flood	N/A
ECH RCP 001 EZ_BA	AI	01	East Church St TK Batteries Voltage	Volts
ECH RCP 001 H	DI	01	East Church St TK Door Open	N/A
ECH RCP 001 EY	DI	01	East Church St TK PMCR 120 VAC Present	N/A
ECH RCP 001 F_TVSS	DI	01	East Church St TK TVSS Fault	N/A
ECH RCP 001 JN_BA	DI	01	East Church St TK UPS Battery Mode	N/A
ECH RCP 001 Z_UPS	DI	01	East Church St TK UPS Charging Mode	N/A
ECH RCP 001 F_UPS	DI	01	East Church St TK UPS Fault	N/A
ECH VLVS 001 B	DO	01	East Church St TK Altitude Valve Close	N/A
ECH VLVA 001 ZL	DI	01	East Church St TK Altitude Valve Closed	N/A
ECH VLVS 001 D	DO	01	East Church St TK Altitude Valve Open	N/A
ECH VLVA 001 ZH	DI	01	East Church St TK Altitude Valve Opened	N/A
ECH VLVA 001 Z	AI	01	East Church St TK Altitude Valve Position	Percent
ECH BEA 001 N	DI	01	East Church St TK Beacon On	N/A
ECH HT 001 N	DI	01	East Church St TK Heat Tape On	N/A
ECH HT 001 PY	DI	01	East Church St TK Heat Tape Power Available	N/A
ECH LIT 001 Z	AI	01	East Church St TK Tank/Standpipe Level	Feet

DI	DO	AI	AO	Total
15	3	4	0	22

East Hill PS Site ID EHS Site # 83

Tag Name	I/O Type	Unit	Description	Eng. Unit
EHS LS 001 H	DI	01	East Hill PS Building Flood	N/A
EHS TS 001 H/L	DI	01	East Hill PS Building High/Low Temp	N/A
EHS TT 001 TZ	AI	01	East Hill PS Building or Room Temperature	°F
EHS ZS 001 H	DI	01	East Hill PS Doors & Hatches Intrusion	N/A
EHS DR 001 D	DO	01	East Hill PS Doors & Hatches Open Door	N/A

Site # 83

Site ID EHS

Description

Hill PS

Name	I/O Type	Unit	Description	Eng. Unit
LS 001 H	DI	01	East Hill PS Pit Flood	N/A
PS PM 001 IZ_A	AI	01	East Hill PS Power Monitoring Phase A Current	Amps
PS PM 001 IZ_B	AI	01	East Hill PS Power Monitoring Phase B Current	Amps
PS PM 001 IZ_C	AI	01	East Hill PS Power Monitoring Phase C Current	Amps
PS PM 001 IZ_R	AI	01	East Hill PS Power Monitoring Reactive Power	KVAR
HS PM 001 JZ	AI	01	East Hill PS Power Monitoring Real Power	KW
EHS PM 001 EZ_AB	AI	01	East Hill PS Power Monitoring Voltage A-B	Volts
EHS PM 001 EZ_BC	AI	01	East Hill PS Power Monitoring Voltage B-C	Volts
EHS PM 001 EZ_CA	AI	01	East Hill PS Power Monitoring Voltage C-A	Volts
EHS VLV 001 ZL	DI	01	East Hill PS Power Monitoring Voltage Closed	N/A
EHS VLV 002 ZL	DI	01	East Hill PS Check Valve Closed	N/A
EHS VLV 001 F	DI	01	East Hill PS Check Valve Fault	N/A
EHS VLV 002 F	DI	02	East Hill PS Check Valve Fault	N/A
EHS VLV 001 ZH	DI	01	East Hill PS Check Valve Open	N/A
EHS VLV 002 ZH	DI	02	East Hill PS Check Valve Open	N/A
EHS FIT 001 FZ	DI	01	East Hill PS Check Valve Open	PSI
EHS PIT 001 FZ	DI	01	East Hill PS Check Valve Open	PSI
EHS PIT 001 PZ	DI	01	East Hill PS Check Valve Open	N/A
EHS VFD 001 HSB	DI	02	East Hill PS Flow Meter Discharge Flow	N/A
EHS VFD 002 HSB	DI	02	East Hill PS Flow Meter Discharge Pressure	Seconds
EHS MCP 001 KX	AI	01	East Hill PS Pressure Meter Discharge Pressure	Seconds
EHS MCP 002 KX	AI	01	East Hill PS Pressure Meter Suction Pressure	Amps
EHS VFD 001 IZ	AI	01	East Hill PS Pressure Meter Bypass Selected	Amps
EHS VFD 002 IZ	AI	01	East Hill PS Pump Bypass Selected	Amps
EHS VFD 001 MTZ	AI	01	East Hill PS Pump Bypass Selected	Percent
EHS VFD 002 MTZ	AI	02	East Hill PS Pump Inhibit Start Time Remaining	Percent
EHS MCP 001 MN	DI	01	East Hill PS Pump Inhibit Start Time Remaining	N/A
EHS MCP 002 MN	DI	02	East Hill PS Pump Inhibit Start Time Remaining	N/A
EHS MCP 001 KZQ	AI	01	East Hill PS Pump Motor Current	Hours
EHS MCP 002 KZQ	AI	02	East Hill PS Pump Motor Current	Hours
			East Hill PS Pump Motor Thermal State	
			East Hill PS Pump Motor Thermal State	
			East Hill PS Pump Running	
			East Hill PS Pump Running	
			East Hill PS Pump Runtime	
			East Hill PS Pump Runtime	

East Hill PS Site ID EHS Site # 83

Tag Name	I/O Type	Unit	Description	Eng. Unit
EHS MCP 002 KZQ	AI	02	East Hill PS Pump Runtime	Hours
EHS MCP 001 HSS	DI	01	East Hill PS Pump SCADA Mode	N/A
EHS MCP 002 HSS	DI	02	East Hill PS Pump SCADA Mode	N/A
EHS VFD 001 SZD	AO	01	East Hill PS Pump Speed Control	Percent
EHS VFD 002 SZD	AO	02	East Hill PS Pump Speed Control	Percent
EHS VFD 001 SZ	AI	01	East Hill PS Pump Speed Feedback	Percent
EHS VFD 002 SZ	AI	02	East Hill PS Pump Speed Feedback	Percent
EHS MCP 001 MD	DO	01	East Hill PS Pump Start	N/A
EHS MCP 002 MD	DO	02	East Hill PS Pump Start	N/A
EHS MCP 001 MN_N	DO	01	East Hill PS Pump Stop	N/A
EHS MCP 002 MN_N	DO	02	East Hill PS Pump Stop	N/A
EHS VFD 001 TZ	AI	01	East Hill PS Pump Thermal State	Percent
EHS VFD 002 TZ	AI	02	East Hill PS Pump Thermal State	Percent
EHS VFD 001 EZ	AI	01	East Hill PS Pump Voltage to Motor	Volts
EHS VFD 002 EZ	AI	02	East Hill PS Pump Voltage to Motor	Volts
EHS RCP 001 EZ_BA	AI	01	East Hill PS Batteries Voltage	Volts
EHS RCP 001 H	DI	01	East Hill PS Door Open	N/A
EHS RCP 001 EY	DI	01	East Hill PS PMCR 120 VAC Present	N/A
EHS RCP 001 F_TVSS	DI	01	East Hill PS TVSS Fault	N/A
EHS RCP 001 JN_BA	DI	01	East Hill PS UPS Battery Mode	N/A
EHS RCP 001 Z_UPS	DI	01	East Hill PS UPS Charging Mode	N/A
EHS RCP 001 F_UPS	DI	01	East Hill PS UPS Fault	N/A
DI DO AI AO Total				
22 5 27 2 56				

Eden 1 PS Site ID ED1 Site # 27

Tag Name	I/O Type	Unit	Description	Eng. Unit
ED1 LS 001 H	DI	01	Eden 1 PS Building Flood	N/A

Tag Name	I/O Type	Unit	Description	Eng. Unit
ED1 TS 001 H/L	DI	01	Eden 1 PS Building High/Low Temp	N/A
ED1 TT 001 TZ	AI	01	Eden 1 PS Building or Room Temperature	°F
ED1 ZS 001 H	DI	01	Eden 1 PS Doors & Hatches Intrusion	N/A
ED1 DR 001 D	DO	01	Eden 1 PS Doors & Hatches Open Door	N/A
ED1 LS 001 H	DI	01	Eden 1 PS Pit Flood	N/A
ED1 LIT 001 LZ	AI	01	Eden 1 PS Diesel Tank Level	Gallons
ED1 GEN 001 IZ_A	AI	01	Eden 1 PS Generator Current Phase A	Amps
ED1 GEN 001 IZ_B	AI	01	Eden 1 PS Generator Current Phase B	Amps
ED1 GEN 001 IZ_C	AI	01	Eden 1 PS Generator Current Phase C	Amps
ED1 GEN 001 F	DI	01	Eden 1 PS Generator Fault	N/A
ED1 GEN 001 HSA_N	DI	01	Eden 1 PS Generator Not In Auto	N/A
ED1 GEN 001 JZ	AI	01	Eden 1 PS Generator Real Power	KW
ED1 XFER 001 F_G	DI	01	Eden 1 PS Transfer Switch Generator Running	N/A
ED1 XFER 001 N_G	DI	01	Eden 1 PS Transfer Switch On Generator Power	N/A
ED1 XFER 001 N_U	DI	01	Eden 1 PS Transfer Switch On Utility Power	N/A
ED1 XFER 001 Y_U	DI	01	Eden 1 PS Transfer Switch Utility Power Available	N/A
ED1 XFER 001 EZ_A	AI	01	Eden 1 PS Transfer Switch Voltage A-B	Volts
ED1 XFER 001 EZ_B	AI	01	Eden 1 PS Transfer Switch Voltage B-C	Volts
ED1 XFER 001 EZ_C	AI	01	Eden 1 PS Transfer Switch Voltage C-A	Volts
ED1 PM 001 IZ_A	AI	01	Eden 1 PS Power Monitoring Phase A Current	Amps
ED1 PM 001 IZ_B	AI	01	Eden 1 PS Power Monitoring Phase B Current	Amps
ED1 PM 001 IZ_C	AI	01	Eden 1 PS Power Monitoring Phase C Current	Amps
ED1 PM 001 JZ_R	AI	01	Eden 1 PS Power Monitoring Reactive Power	KVAR
ED1 PM 001 JZ	AI	01	Eden 1 PS Power Monitoring Real Power	KW
ED1 PM 001 EZ_AB	AI	01	Eden 1 PS Power Monitoring Voltage A-B	Volts
ED1 PM 001 EZ_BC	AI	01	Eden 1 PS Power Monitoring Voltage B-C	Volts
ED1 PM 001 EZ_CA	AI	01	Eden 1 PS Power Monitoring Voltage C-A	Volts
ED1 VLVC 001 ZL	DI	01	Eden 1 PS Check Valve Closed	N/A
ED1 VLVC 002 ZL	DI	02	Eden 1 PS Check Valve Closed	N/A

Eden 1 PS Site ID ED1 Site # 27

Tag Name	I/O Type	Unit	Description	Eng. Unit
ED1 VLVC 001 F	DI	01	Eden 1 PS Check Valve Fault	N/A
ED1 VLVC 002 F	DI	02	Eden 1 PS Check Valve Fault	N/A
ED1 VLVC 001 ZH	DI	01	Eden 1 PS Check Valve Open	N/A
ED1 VLVC 002 ZH	DI	02	Eden 1 PS Check Valve Open	N/A
ED1 FIT 001 FZ	AI	01	Eden 1 PS Flow Meter Discharge Flow	MGD
ED1 PIT 001 FZ	AI	01	Eden 1 PS Pressure Meter Discharge Pressure	PSI
ED1 PIT 001 PZ	AI	01	Eden 1 PS Pressure Meter Suction Pressure	PSI
ED1 VFD 001 HSB	DI	01	Eden 1 PS Pump Bypass Selected	N/A
ED1 VFD 002 HSB	DI	02	Eden 1 PS Pump Bypass Selected	N/A
ED1 MCP 001 KX	AI	01	Eden 1 PS Pump Inhibit Start Time Remaining	Seconds
ED1 MCP 002 KX	AI	02	Eden 1 PS Pump Inhibit Start Time Remaining	Seconds
ED1 VFD 001 IZ	AI	01	Eden 1 PS Pump Motor Current	Amps
ED1 VFD 002 IZ	AI	02	Eden 1 PS Pump Motor Current	Amps
ED1 VFD 001 MTZ	AI	01	Eden 1 PS Pump Motor Thermal State	Percent
ED1 VFD 002 MTZ	AI	02	Eden 1 PS Pump Motor Thermal State	Percent
ED1 MCP 001 MN	DI	01	Eden 1 PS Pump Running	N/A
ED1 MCP 002 MN	DI	02	Eden 1 PS Pump Running	N/A
ED1 MCP 001 KZQ	AI	01	Eden 1 PS Pump Runtime	Hours
ED1 MCP 002 KZQ	AI	02	Eden 1 PS Pump Runtime	Hours
ED1 MCP 001 HSS	DI	01	Eden 1 PS Pump SCADA Mode	N/A
ED1 MCP 002 HSS	DI	02	Eden 1 PS Pump SCADA Mode	N/A
ED1 VFD 001 SZD	AO	01	Eden 1 PS Pump Speed Control	Percent
ED1 VFD 002 SZD	AO	02	Eden 1 PS Pump Speed Control	Percent
ED1 VFD 001 SZ	AI	01	Eden 1 PS Pump Speed Feedback	Percent
ED1 VFD 002 SZ	AI	02	Eden 1 PS Pump Speed Feedback	Percent
ED1 MCP 001 MD	DO	01	Eden 1 PS Pump Start	N/A
ED1 MCP 002 MD	DO	02	Eden 1 PS Pump Start	N/A
ED1 MCP 001 MN_N	DO	01	Eden 1 PS Pump Stop	N/A
ED1 MCP 002 MN_N	DO	02	Eden 1 PS Pump Stop	N/A



Eden 1 PS Site ID ED1 Site # 27

Tag Name	I/O Type	Unit	Description	Eng. Unit
ED1 VFD 001 TZ	AI	01	Eden 1 PS Pump Thermal State	Percent
ED1 VFD 002 TZ	AI	02	Eden 1 PS Pump Thermal State	Percent
ED1 VFD 001 EZ	AI	01	Eden 1 PS Pump Voltage to Motor	Volts
ED1 VFD 002 EZ	AI	02	Eden 1 PS Pump Voltage to Motor	Volts
ED1 RCP 001 EZ_BA	AI	01	Eden 1 PS Batteries Voltage	Volts
ED1 RCP 001 H	DI	01	Eden 1 PS Door Open	N/A
ED1 RCP 001 EY	DI	01	Eden 1 PS PMCR 120 V AC Present	N/A
ED1 RCP 001 F_TVS	DI	01	Eden 1 PS TVSS Fault	N/A
ED1 RCP 001 JN_BA	DI	01	Eden 1 PS UPS Battery Mode	N/A
ED1 RCP 001 Z_UPS	DI	01	Eden 1 PS UPS Charging Mode	N/A
ED1 RCP 001 F_UPS	DI	01	Eden 1 PS UPS Fault	N/A

DI	DO	AI	AO	Total
28	5	35	2	70

Eden 2 PS & TK Site ID ED2 Site # 28

Tag Name	I/O Type	Unit	Description	Eng. Unit
ED2 LS 001 H	DI	01	Eden 2 PS & TK Building Flood	N/A
ED2 TS 001 H/L	DI	01	Eden 2 PS & TK Building High/Low Temp	N/A
ED2 TT 001 TZ	AI	01	Eden 2 PS & TK Building or Room Temperature	°F
ED2 ZS 001 H	DI	01	Eden 2 PS & TK Doors & Hatches Intrusion	N/A
ED2 DR 001 D	DO	01	Eden 2 PS & TK Doors & Hatches Open Door	N/A
ED2 LS 001 H	DI	01	Eden 2 PS & TK Pit Flood	N/A
ED2 LIT 001 LZ	AI	01	Eden 2 PS & TK Diesel Tank Level	Gallons
ED2 GEN 001 IZ_A	AI	01	Eden 2 PS & TK Generator Current Phase A	Amps
ED2 GEN 001 IZ_B	AI	01	Eden 2 PS & TK Generator Current Phase B	Amps
ED2 GEN 001 IZ_C	AI	01	Eden 2 PS & TK Generator Current Phase C	Amps
ED2 GEN 001 F	DI	01	Eden 2 PS & TK Generator Fault	N/A
ED2 GEN 001 HSA_N	DI	01	Eden 2 PS & TK Generator Not In Auto	N/A

Eden 2 PS & TK Site ID ED2 Site # 28

Tag Name	I/O Type	Unit	Description	Eng. Unit
ED2 GEN 001 JZ	AI	01	Eden 2 PS & TK Generator Real Power	KW
ED2 XFER 001 F_G	DI	01	Eden 2 PS & TK Transfer Switch Generator Running	N/A
ED2 XFER 001 N_G	DI	01	Eden 2 PS & TK Transfer Switch On Generator Power	N/A
ED2 XFER 001 N_U	DI	01	Eden 2 PS & TK Transfer Switch On Utility Power	N/A
ED2 XFER 001 Y_U	DI	01	Eden 2 PS & TK Transfer Switch Utility Power Available	N/A
ED2 XFER 001 EZ_A	AI	01	Eden 2 PS & TK Transfer Switch Voltage A-B	Volts
ED2 XFER 001 EZ_B	AI	01	Eden 2 PS & TK Transfer Switch Voltage B-C	Volts
ED2 XFER 001 EZ_C	AI	01	Eden 2 PS & TK Transfer Switch Voltage C-A	Volts
ED2 PM 001 IZ_A	AI	01	Eden 2 PS & TK Power Monitoring Phase A Current	Amps
ED2 PM 001 IZ_B	AI	01	Eden 2 PS & TK Power Monitoring Phase B Current	Amps
ED2 PM 001 IZ_C	AI	01	Eden 2 PS & TK Power Monitoring Phase C Current	Amps
ED2 PM 001 JZ_R	AI	01	Eden 2 PS & TK Power Monitoring Reactive Power	KVAR
ED2 PM 001 JZ	AI	01	Eden 2 PS & TK Power Monitoring Real Power	KW
ED2 PM 001 EZ_AB	AI	01	Eden 2 PS & TK Power Monitoring Voltage A-B	Volts
ED2 PM 001 EZ_BC	AI	01	Eden 2 PS & TK Power Monitoring Voltage B-C	Volts
ED2 PM 001 EZ_CA	AI	01	Eden 2 PS & TK Power Monitoring Voltage C-A	Volts
ED2 VLVC 001 ZL	DI	01	Eden 2 PS & TK Check Valve Closed	N/A
ED2 VLVC 002 ZL	DI	02	Eden 2 PS & TK Check Valve Closed	N/A
ED2 VLVC 001 F	DI	01	Eden 2 PS & TK Check Valve Fault	N/A
ED2 VLVC 002 F	DI	02	Eden 2 PS & TK Check Valve Fault	N/A
ED2 VLVC 001 ZH	DI	01	Eden 2 PS & TK Check Valve Open	N/A
ED2 VLVC 002 ZH	DI	02	Eden 2 PS & TK Check Valve Open	N/A
ED2 FIT 001 FZ	AI	01	Eden 2 PS & TK Flow Meter Discharge Flow	MGD
ED2 PIT 001 FZ	AI	01	Eden 2 PS & TK Pressure Meter Discharge Pressure	PSI
ED2 PIT 001 PZ	AI	01	Eden 2 PS & TK Pressure Meter Suction Pressure	PSI
ED2 VFD 001 HSB	DI	01	Eden 2 PS & TK Pump Bypass Selected	N/A
ED2 VFD 002 HSB	DI	02	Eden 2 PS & TK Pump Bypass Selected	N/A
ED2 MCP 001 KX	AI	01	Eden 2 PS & TK Pump Inhibit Start Time Remaining	Seconds
ED2 MCP 002 KX	AI	02	Eden 2 PS & TK Pump Inhibit Start Time Remaining	Seconds

Eden 2 PS & TK Site ID ED2 Site # 28

Tag Name	I/O Type	Unit	Description	Eng. Unit
ED2 VFD 001 IZ	AI	01	Eden 2 PS & TK Pump Motor Current	Amps
ED2 VFD 002 IZ	AI	02	Eden 2 PS & TK Pump Motor Current	Amps
ED2 VFD 001 MTZ	AI	01	Eden 2 PS & TK Pump Motor Thermal State	Percent
ED2 VFD 002 MTZ	AI	02	Eden 2 PS & TK Pump Motor Thermal State	Percent
ED2 MCP 001 MN	DI	01	Eden 2 PS & TK Pump Running	N/A
ED2 MCP 002 MN	DI	02	Eden 2 PS & TK Pump Running	N/A
ED2 MCP 001 KZQ	AI	01	Eden 2 PS & TK Pump Runtime	Hours
ED2 MCP 002 KZQ	AI	02	Eden 2 PS & TK Pump Runtime	Hours
ED2 MCP 001 HSS	DI	01	Eden 2 PS & TK Pump SCADA Mode	N/A
ED2 MCP 002 HSS	DI	02	Eden 2 PS & TK Pump SCADA Mode	N/A
ED2 VFD 001 SZD	AO	01	Eden 2 PS & TK Pump Speed Control	Percent
ED2 VFD 002 SZD	AO	02	Eden 2 PS & TK Pump Speed Control	Percent
ED2 VFD 001 SZ	AI	01	Eden 2 PS & TK Pump Speed Feedback	Percent
ED2 VFD 002 SZ	AI	02	Eden 2 PS & TK Pump Speed Feedback	Percent
ED2 MCP 001 MD	DO	01	Eden 2 PS & TK Pump Start	N/A
ED2 MCP 002 MD	DO	02	Eden 2 PS & TK Pump Start	N/A
ED2 MCP 001 MN_N	DO	01	Eden 2 PS & TK Pump Stop	N/A
ED2 MCP 002 MN_N	DO	02	Eden 2 PS & TK Pump Stop	N/A
ED2 VFD 001 TZ	AI	01	Eden 2 PS & TK Pump Thermal State	Percent
ED2 VFD 002 TZ	AI	02	Eden 2 PS & TK Pump Thermal State	Percent
ED2 VFD 001 EZ	AI	01	Eden 2 PS & TK Pump Voltage to Motor	Volts
ED2 VFD 002 EZ	AI	02	Eden 2 PS & TK Pump Voltage to Motor	Volts
ED2 RCP 001 EZ_BA	AI	01	Eden 2 PS & TK Batteries Voltage	Volts
ED2 RCP 001 H	DI	01	Eden 2 PS & TK Door Open	N/A
ED2 RCP 001 EY	DI	01	Eden 2 PS & TK PMCR 120 VAC Present	N/A
ED2 RCP 001 F_TVSS	DI	01	Eden 2 PS & TK TVSS Fault	N/A
ED2 RCP 001 JN_BA	DI	01	Eden 2 PS & TK UPS Battery Mode	N/A
ED2 RCP 001 Z_UPS	DI	01	Eden 2 PS & TK UPS Charging Mode	N/A
ED2 RCP 001 F_UPS	DI	01	Eden 2 PS & TK UPS Fault	N/A

Eden 2 PS & TK Site ID ED2 Site # 28

Tag Name	I/O Type	Unit	Description	Eng. Unit
ED2 VLVS 001 B	DO	01	Eden 2 PS & TK Altitude Valve Close	N/A
ED2 VLVA 001 ZL	DI	01	Eden 2 PS & TK Altitude Valve Closed	N/A
ED2 VLVS 001 D	DO	01	Eden 2 PS & TK Altitude Valve Open	N/A
ED2 VLVA 001 ZH	DI	01	Eden 2 PS & TK Altitude Valve Opened	N/A
ED2 VLVA 001 Z	AI	01	Eden 2 PS & TK Altitude Valve Position	Percent
ED2 BEA 001 N	DI	01	Eden 2 PS & TK Beacon On	N/A
ED2 HT 001 N	DI	01	Eden 2 PS & TK Heat Tape On	N/A
ED2 HT 001 PY	DI	01	Eden 2 PS & TK Heat Tape Power Available	N/A
ED2 LIT 001 Z	AI	01	Eden 2 PS & TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 33 7 37 2 79

Eden 3 PS & TK Site ID ED3 Site # 29

Tag Name	I/O Type	Unit	Description	Eng. Unit
ED3 LS 001 H	DI	01	Eden 3 PS & TK Building Flood	N/A
ED3 TS 001 H/L	DI	01	Eden 3 PS & TK Building High/Low Temp	N/A
ED3 TT 001 TZ	AI	01	Eden 3 PS & TK Building or Room Temperature	°F
ED3 ZS 001 H	DI	01	Eden 3 PS & TK Doors & Hatches Intrusion	N/A
ED3 DR 001 D	DO	01	Eden 3 PS & TK Doors & Hatches Open Door	N/A
ED3 LS 001 H	DI	01	Eden 3 PS & TK Pit Flood	N/A
ED3 PM 001 IZ_A	AI	01	Eden 3 PS & TK Power Monitoring Phase A Current	Amps
ED3 PM 001 IZ_B	AI	01	Eden 3 PS & TK Power Monitoring Phase B Current	Amps
ED3 PM 001 IZ_C	AI	01	Eden 3 PS & TK Power Monitoring Phase C Current	Amps
ED3 PM 001 JZ_R	AI	01	Eden 3 PS & TK Power Monitoring Reactive Power	KVAR
ED3 PM 001 JZ	AI	01	Eden 3 PS & TK Power Monitoring Real Power	KW
ED3 PM 001 EZ_AB	AI	01	Eden 3 PS & TK Power Monitoring Voltage A-B	Volts
ED3 PM 001 EZ_BC	AI	01	Eden 3 PS & TK Power Monitoring Voltage B-C	Volts
ED3 PM 001 EZ_CA	AI	01	Eden 3 PS & TK Power Monitoring Voltage C-A	Volts

Tag Name	I/O Type	Unit	Description	Eng. Unit
ED3 VLVC 001 ZL	DI	01	Eden 3 PS & TK Check Valve Closed	N/A
ED3 VLVC 002 ZL	DI	02	Eden 3 PS & TK Check Valve Closed	N/A
ED3 VLVC 001 F	DI	01	Eden 3 PS & TK Check Valve Fault	N/A
ED3 VLVC 002 F	DI	02	Eden 3 PS & TK Check Valve Fault	N/A
ED3 VLVC 001 ZH	DI	01	Eden 3 PS & TK Check Valve Open	N/A
ED3 VLVC 002 ZH	DI	02	Eden 3 PS & TK Check Valve Open	N/A
ED3 FIT 001 FZ	AI	01	Eden 3 PS & TK Flow Meter Discharge Flow	MGD
ED3 PIT 001 FZ	AI	01	Eden 3 PS & TK Pressure Meter Discharge Pressure	PSI
ED3 PIT 001 PZ	AI	01	Eden 3 PS & TK Pressure Meter Suction Pressure	PSI
ED3 MCP 001 KX	AI	01	Eden 3 PS & TK Pump Inhibit Start Time Remaining	Seconds
ED3 MCP 002 KX	AI	02	Eden 3 PS & TK Pump Inhibit Start Time Remaining	Seconds
ED3 MCP 001 MN	DI	01	Eden 3 PS & TK Pump Running	N/A
ED3 MCP 002 MN	DI	02	Eden 3 PS & TK Pump Running	N/A
ED3 MCP 001 KZQ	AI	01	Eden 3 PS & TK Pump Runtime	Hours
ED3 MCP 002 KZQ	AI	02	Eden 3 PS & TK Pump Runtime	Hours
ED3 MCP 001 HSS	DI	01	Eden 3 PS & TK Pump SCADA Mode	N/A
ED3 MCP 002 HSS	DI	02	Eden 3 PS & TK Pump SCADA Mode	N/A
ED3 MCP 001 MD	DO	01	Eden 3 PS & TK Pump Start	N/A
ED3 MCP 002 MD	DO	02	Eden 3 PS & TK Pump Start	N/A
ED3 MCP 001 MN_N	DO	01	Eden 3 PS & TK Pump Stop	N/A
ED3 MCP 002 MN_N	DO	02	Eden 3 PS & TK Pump Stop	N/A
ED3 RCP 001 EZ_BA	AI	01	Eden 3 PS & TK Batteries Voltage	Volts
ED3 RCP 001 H	DI	01	Eden 3 PS & TK Door Open	N/A
ED3 RCP 001 EY	DI	01	Eden 3 PS & TK PMCR 120 VAC Present	N/A
ED3 RCP 001 F_TVS	DI	01	Eden 3 PS & TK TVSS Fault	N/A
ED3 RCP 001 JN_BA	DI	01	Eden 3 PS & TK UPS Battery Mode	N/A
ED3 RCP 001 Z_UPS	DI	01	Eden 3 PS & TK UPS Charging Mode	N/A
ED3 RCP 001 F_UPS	DI	01	Eden 3 PS & TK UPS Fault	N/A
ED3 VLVS 001 B	DO	01	Eden 3 PS & TK Altitude Valve Close	N/A

Eden 3 PS & TK Site ID ED3 Site # 29

Tag Name	I/O Type	Unit	Description	Eng. Unit
ED3 VLVA 001 ZL	DI	01	Eden 3 PS & TK Altitude Valve Closed	N/A
ED3 VLVS 001 D	DO	01	Eden 3 PS & TK Altitude Valve Open	N/A
ED3 VLVA 001 ZH	DI	01	Eden 3 PS & TK Altitude Valve Opened	N/A
ED3 VLVA 001 Z	AI	01	Eden 3 PS & TK Altitude Valve Position	Percent
ED3 BEA 001 N	DI	01	Eden 3 PS & TK Beacon On	N/A
ED3 HT 001 N	DI	01	Eden 3 PS & TK Heat Tape On	N/A
ED3 HT 001 PY	DI	01	Eden 3 PS & TK Heat Tape Power Available	N/A
ED3 LIT 001 Z	AI	01	Eden 3 PS & TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 25 7 19 0 51

Eden 4 TK Site ID ED4 Site # 30

Tag Name	I/O Type	Unit	Description	Eng. Unit
ED4 LS 001 H	DI	01	Eden 4 TK Building Flood	N/A
ED4 TS 001 H/L	DI	01	Eden 4 TK Building High/Low Temp	N/A
ED4 TT 001 TZ	AI	01	Eden 4 TK Building or Room Temperature	°F
ED4 ZS 001 H	DI	01	Eden 4 TK Doors & Hatches Intrusion	N/A
ED4 DR 001 D	DO	01	Eden 4 TK Doors & Hatches Open Door	N/A
ED4 LS 001 H	DI	01	Eden 4 TK Pit Flood	N/A
ED4 RCP 001 EZ_BA	AI	01	Eden 4 TK Batteries Voltage	Volts
ED4 RCP 001 H	DI	01	Eden 4 TK Door Open	N/A
ED4 RCP 001 EY	DI	01	Eden 4 TK PMCR 120 VAC Present	N/A
ED4 RCP 001 F_TVSS	DI	01	Eden 4 TK TVSS Fault	N/A
ED4 RCP 001 JN_BA	DI	01	Eden 4 TK UPS Battery Mode	N/A
ED4 RCP 001 Z_UPS	DI	01	Eden 4 TK UPS Charging Mode	N/A
ED4 RCP 001 F_UPS	DI	01	Eden 4 TK UPS Fault	N/A
ED4 VLVS 001 B	DO	01	Eden 4 TK Altitude Valve Close	N/A
ED4 VLVA 001 ZL	DI	01	Eden 4 TK Altitude Valve Closed	N/A

**Eden 4 TK Site ID ED4 Site # 30**

Tag Name	I/O Type	Unit	Description	Eng. Unit
ED4 VLVS 001 D	DO	01	Eden 4 TK Altitude Valve Open	N/A
ED4 VLVA 001 ZH	DI	01	Eden 4 TK Altitude Valve Opened	N/A
ED4 VLVA 001 Z	AI	01	Eden 4 TK Altitude Valve Position	Percent
ED4 BEA 001 N	DI	01	Eden 4 TK Beacon On	N/A
ED4 HT 001 N	DI	01	Eden 4 TK Heat Tape On	N/A
ED4 HT 001 PY	DI	01	Eden 4 TK Heat Tape Power Available	N/A
ED4 LIT 001 Z	AI	01	Eden 4 TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 15 3 4 0 22

**Ellis Rd PS Site ID ELS Site # 19**

Tag Name	I/O Type	Unit	Description	Eng. Unit
ELS LS 001 H	DI	01	Ellis Rd PS Building Flood	N/A
ELS TS 001 H/L	DI	01	Ellis Rd PS Building High/Low Temp	N/A
ELS TT 001 TZ	AI	01	Ellis Rd PS Building or Room Temperature	°F
ELS ZS 001 H	DI	01	Ellis Rd PS Doors & Hatches Intrusion	N/A
ELS DR 001 D	DO	01	Ellis Rd PS Doors & Hatches Open Door	N/A
ELS LS 001 H	DI	01	Ellis Rd PS Pit Flood	N/A
ELS PM 001 IZ_A	AI	01	Ellis Rd PS Power Monitoring Phase A Current	Amps
ELS PM 001 IZ_B	AI	01	Ellis Rd PS Power Monitoring Phase B Current	Amps
ELS PM 001 IZ_C	AI	01	Ellis Rd PS Power Monitoring Phase C Current	Amps
ELS PM 001 JZ_R	AI	01	Ellis Rd PS Power Monitoring Reactive Power	KVAR
ELS PM 001 JZ	AI	01	Ellis Rd PS Power Monitoring Real Power	KW
ELS PM 001 EZ_AB	AI	01	Ellis Rd PS Power Monitoring Voltage A-B	Volts
ELS PM 001 EZ_BC	AI	01	Ellis Rd PS Power Monitoring Voltage B-C	Volts
ELS PM 001 EZ_CA	AI	01	Ellis Rd PS Power Monitoring Voltage C-A	Volts
ELS RCP 001 EZ_BA	AI	01	Ellis Rd PS Batteries Voltage	Volts
ELS RCP 001 H	DI	01	Ellis Rd PS Door Open	N/A

Ellis Rd PS Site ID ELS Site # 19

Tag Name	I/O Type	Unit	Description	Eng. Unit
ELS RCP 001 EY	DI	01	Ellis Rd PS PMCR 120 VAC Present	N/A
ELS RCP 001 F_TVSS	DI	01	Ellis Rd PS TVSS Fault	N/A
ELS RCP 001 JN_BA	DI	01	Ellis Rd PS UPS Battery Mode	N/A
ELS RCP 001 Z_UPS	DI	01	Ellis Rd PS UPS Charging Mode	N/A
ELS RCP 001 F_UPS	DI	01	Ellis Rd PS UPS Fault	N/A

DI DO AI AO Total  
 10 1 10 0 21

Emery PS & TK Site ID EMY Site # 43

Tag Name	I/O Type	Unit	Description	Eng. Unit
EMY LS 001 H	DI	01	Emery PS & TK Building Flood	N/A
EMY TS 001 H/L	DI	01	Emery PS & TK Building High/Low Temp	N/A
EMY TT 001 TZ	AI	01	Emery PS & TK Building or Room Temperature	°F
EMY ZS 001 H	DI	01	Emery PS & TK Doors & Hatches Intrusion	N/A
EMY DR 001 D	DO	01	Emery PS & TK Doors & Hatches Open Door	N/A
EMY LS 001 H	DI	01	Emery PS & TK Pit Flood	N/A
EMY PM 001 IZ_A	AI	01	Emery PS & TK Power Monitoring Phase A Current	Amps
EMY PM 001 IZ_B	AI	01	Emery PS & TK Power Monitoring Phase B Current	Amps
EMY PM 001 IZ_C	AI	01	Emery PS & TK Power Monitoring Phase C Current	Amps
EMY PM 001 JZ_R	AI	01	Emery PS & TK Power Monitoring Reactive Power	KVAR
EMY PM 001 JZ	AI	01	Emery PS & TK Power Monitoring Real Power	KW
EMY PM 001 EZ_AB	AI	01	Emery PS & TK Power Monitoring Voltage A-B	Volts
EMY PM 001 EZ_BC	AI	01	Emery PS & TK Power Monitoring Voltage B-C	Volts
EMY PM 001 EZ_CA	AI	01	Emery PS & TK Power Monitoring Voltage C-A	Volts
EMY VLVC 001 ZL	DI	01	Emery PS & TK Check Valve Closed	N/A
EMY VLVC 002 ZL	DI	02	Emery PS & TK Check Valve Closed	N/A
EMY VLVC 001 F	DI	01	Emery PS & TK Check Valve Fault	N/A
EMY VLVC 002 F	DI	02	Emery PS & TK Check Valve Fault	N/A



**Emery PS & TK Site ID EMY Site # 43**

Tag Name	I/O Type	Unit	Description	Eng. Unit
EMY VLVC 001 ZH	DI	01	Emery PS & TK Check Valve Open	N/A
EMY VLVC 002 ZH	DI	02	Emery PS & TK Check Valve Open	N/A
EMY FIT 001 FZ	AI	01	Emery PS & TK Flow Meter Discharge Flow	MGD
EMY PIT 001 FZ	AI	01	Emery PS & TK Pressure Meter Discharge Pressure	PSI
EMY PIT 001 PZ	AI	01	Emery PS & TK Pressure Meter Suction Pressure	PSI
EMY VFD 001 HSB	DI	01	Emery PS & TK Pump Bypass Selected	N/A
EMY VFD 002 HSB	DI	02	Emery PS & TK Pump Bypass Selected	N/A
EMY MCP 001 KX	AI	01	Emery PS & TK Pump Inhibit Start Time Remaining	Seconds
EMY MCP 002 KX	AI	02	Emery PS & TK Pump Inhibit Start Time Remaining	Seconds
EMY VFD 001 IZ	AI	01	Emery PS & TK Pump Motor Current	Amps
EMY VFD 002 IZ	AI	02	Emery PS & TK Pump Motor Current	Amps
EMY VFD 001 MTZ	AI	01	Emery PS & TK Pump Motor Thermal State	Percent
EMY VFD 002 MTZ	AI	02	Emery PS & TK Pump Motor Thermal State	Percent
EMY MCP 001 MN	DI	01	Emery PS & TK Pump Running	N/A
EMY MCP 002 MN	DI	02	Emery PS & TK Pump Running	N/A
EMY MCP 001 KZQ	AI	01	Emery PS & TK Pump Runtime	Hours
EMY MCP 002 KZQ	AI	02	Emery PS & TK Pump Runtime	Hours
EMY MCP 001 HSS	DI	01	Emery PS & TK Pump SCADA Mode	N/A
EMY MCP 002 HSS	DI	02	Emery PS & TK Pump SCADA Mode	N/A
EMY VFD 001 SZD	AO	01	Emery PS & TK Pump Speed Control	Percent
EMY VFD 002 SZD	AO	02	Emery PS & TK Pump Speed Control	Percent
EMY VFD 001 SZ	AI	01	Emery PS & TK Pump Speed Feedback	Percent
EMY VFD 002 SZ	AI	02	Emery PS & TK Pump Speed Feedback	Percent
EMY MCP 001 MD	DO	01	Emery PS & TK Pump Start	N/A
EMY MCP 002 MD	DO	02	Emery PS & TK Pump Start	N/A
EMY MCP 001 MN_	DO	01	Emery PS & TK Pump Stop	N/A
EMY MCP 002 MN_	DO	02	Emery PS & TK Pump Stop	N/A
EMY VFD 001 TZ	AI	01	Emery PS & TK Pump Thermal State	Percent
EMY VFD 002 TZ	AI	02	Emery PS & TK Pump Thermal State	Percent

Emery PS & TK Site ID EMY Site # 43

Tag Name	I/O Type	Unit	Description	Eng. Unit
EMY VFD 001 EZ	AI	01	Emery PS & TK Pump Voltage to Motor	Volts
EMY VFD 002 EZ	AI	02	Emery PS & TK Pump Voltage to Motor	Volts
EMY RCP 001 EZ_B	AI	01	Emery PS & TK Batteries Voltage	Volts
EMY RCP 001 H	DI	01	Emery PS & TK Door Open	N/A
EMY RCP 001 EY	DI	01	Emery PS & TK PMCR 120 VAC Present	N/A
EMY RCP 001 F_TVS	DI	01	Emery PS & TK TVSS Fault	N/A
EMY RCP 001 JN_BA	DI	01	Emery PS & TK UPS Battery Mode	N/A
EMY RCP 001 Z_UPS	DI	01	Emery PS & TK UPS Charging Mode	N/A
EMY RCP 001 F_UPS	DI	01	Emery PS & TK UPS Fault	N/A
EMY VLVS 001 B	DO	01	Emery PS & TK Altitude Valve Close	N/A
EMY VLVA 001 ZL	DI	01	Emery PS & TK Altitude Valve Closed	N/A
EMY VLVS 001 D	DO	01	Emery PS & TK Altitude Valve Open	N/A
EMY VLVA 001 ZH	DI	01	Emery PS & TK Altitude Valve Opened	N/A
EMY VLVA 001 Z	AI	01	Emery PS & TK Altitude Valve Position	Percent
EMY BEA 001 N	DI	01	Emery PS & TK Beacon On	N/A
EMY HT 001 N	DI	01	Emery PS & TK Heat Tape On	N/A
EMY HT 001 PY	DI	01	Emery PS & TK Heat Tape Power Available	N/A
EMY LIT 001 Z	AI	01	Emery PS & TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 27 7 29 2 65

Gartman PS & TK Site ID GAR Site # 35

Tag Name	I/O Type	Unit	Description	Eng. Unit
GAR AS 001 H	DI	01	Gartman PS & TK Chlorine Containment Sump Leak	N/A
GAR CFCP 001 MNZ	DI	01	Gartman PS & TK Chlorine System Fault	N/A
GAR CFCP 001 SZD	AI	01	Gartman PS & TK Chlorine System Feed Rate	PPM
GAR CFCP 001 OO	DO	01	Gartman PS & TK Chlorine System Pause	N/A
GAR LT 001 LZ	AI	01	Gartman PS & TK Day Tank Level	Lbs.

Gartman PS & TK Site ID GAR Site # 35

Tag Name	I/O Type	Unit	Description	Eng. Unit
GAR AIT 001 AZ	AI	01	Gartman PS & TK Effluent Chlorine Analyzer Chlorine Residual	PPM
GAR AIT 001 AZ	AI	01	Gartman PS & TK Influent Chlorine Analyzer Chlorine Residual	PPM
GAR FS 001 H	DI	01	Gartman PS & TK Eyewash stations and showers In Use	N/A
GAR LS 001 H	DI	01	Gartman PS & TK Building Flood	N/A
GAR TS 001 H/L	DI	01	Gartman PS & TK Building High/Low Temp	N/A
GAR TT 001 TZ	AI	01	Gartman PS & TK Building or Room Temperature	°F
GAR ZS 001 H	DI	01	Gartman PS & TK Doors & Hatches Intrusion	N/A
GAR DR 001 D	DO	01	Gartman PS & TK Doors & Hatches Open Door	N/A
GAR LS 001 H	DI	01	Gartman PS & TK Pit Flood	N/A
GAR PM 001 IZ_A	AI	01	Gartman PS & TK Power Monitoring Phase A Current	Amps
GAR PM 001 IZ_B	AI	01	Gartman PS & TK Power Monitoring Phase B Current	Amps
GAR PM 001 IZ_C	AI	01	Gartman PS & TK Power Monitoring Phase C Current	Amps
GAR PM 001 JZ_R	AI	01	Gartman PS & TK Power Monitoring Reactive Power	KVAR
GAR PM 001 JZ	AI	01	Gartman PS & TK Power Monitoring Real Power	KW
GAR PM 001 EZ_AB	AI	01	Gartman PS & TK Power Monitoring Voltage A-B	Volts
GAR PM 001 EZ_BC	AI	01	Gartman PS & TK Power Monitoring Voltage B-C	Volts
GAR PM 001 EZ_CA	AI	01	Gartman PS & TK Power Monitoring Voltage C-A	Volts
GAR VLVC 001 ZL	DI	01	Gartman PS & TK Check Valve Closed	N/A
GAR VLVC 002 ZL	DI	02	Gartman PS & TK Check Valve Closed	N/A
GAR VLVC 001 F	DI	01	Gartman PS & TK Check Valve Fault	N/A
GAR VLVC 002 F	DI	02	Gartman PS & TK Check Valve Fault	N/A
GAR VLVC 001 ZH	DI	01	Gartman PS & TK Check Valve Open	N/A
GAR VLVC 002 ZH	DI	02	Gartman PS & TK Check Valve Open	N/A
GAR FIT 001 FZ	AI	01	Gartman PS & TK Flow Meter Discharge Flow	MGD
GAR PIT 001 FZ	AI	01	Gartman PS & TK Pressure Meter Discharge Pressure	PSI
GAR PIT 001 PZ	AI	01	Gartman PS & TK Pressure Meter Suction Pressure	PSI
GAR MCP 001 KX	AI	01	Gartman PS & TK Pump Inhibit Start Time Remaining	Seconds
GAR MCP 002 KX	AI	02	Gartman PS & TK Pump Inhibit Start Time Remaining	Seconds
GAR MCP 001 MN	DI	01	Gartman PS & TK Pump Running	N/A

Gartman PS & TK Site ID GAR Site # 35

Tag Name	I/O Type	Unit	Description	Eng. Unit
GAR MCP 002 MN	DI	02	Gartman PS & TK Pump Running	N/A
GAR MCP 001 KZQ	AI	01	Gartman PS & TK Pump Runtime	Hours
GAR MCP 002 KZQ	AI	02	Gartman PS & TK Pump Runtime	Hours
GAR MCP 001 HSS	DI	01	Gartman PS & TK Pump SCADA Mode	N/A
GAR MCP 002 HSS	DI	02	Gartman PS & TK Pump SCADA Mode	N/A
GAR MCP 001 MD	DO	01	Gartman PS & TK Pump Start	N/A
GAR MCP 002 MD	DO	02	Gartman PS & TK Pump Start	N/A
GAR MCP 001 MN_N	DO	01	Gartman PS & TK Pump Stop	N/A
GAR MCP 002 MN_N	DO	02	Gartman PS & TK Pump Stop	N/A
GAR RCP 001 EZ_BA	AI	01	Gartman PS & TK Batteries Voltage	Volts
GAR RCP 001 H	DI	01	Gartman PS & TK Door Open	N/A
GAR RCP 001 EY	DI	01	Gartman PS & TK PMCR 120 VAC Present	N/A
GAR RCP 001 F_TVSS	DI	01	Gartman PS & TK TVSS Fault	N/A
GAR RCP 001 JN_BA	DI	01	Gartman PS & TK UPS Battery Mode	N/A
GAR RCP 001 Z_UPS	DI	01	Gartman PS & TK UPS Charging Mode	N/A
GAR RCP 001 F_UPS	DI	01	Gartman PS & TK UPS Fault	N/A
GAR VLVS 001 B	DO	01	Gartman PS & TK Altitude Valve Close	N/A
GAR VLVA 001 ZL	DI	01	Gartman PS & TK Altitude Valve Closed	N/A
GAR VLVS 001 D	DO	01	Gartman PS & TK Altitude Valve Open	N/A
GAR VLVA 001 ZH	DI	01	Gartman PS & TK Altitude Valve Opened	N/A
GAR VLVA 001 Z	AI	01	Gartman PS & TK Altitude Valve Position	Percent
GAR BEA 001 N	DI	01	Gartman PS & TK Beacon On	N/A
GAR HT 001 N	DI	01	Gartman PS & TK Heat Tape On	N/A
GAR HT 001 PY	DI	01	Gartman PS & TK Heat Tape Power Available	N/A
GAR LIT 001 Z	AI	01	Gartman PS & TK Tank/Standpipe Level	Feet

Total			
DI	DO	AI	AO
28	8	23	0
			59

**Griffin Mills PS Site ID GMS Site # 53**

Tag Name	I/O Type	Unit	Description	Eng. Unit
GMS LS 001 H	DI	01	Griffin Mills PS Building Flood	N/A
GMS TS 001 H/L	DI	01	Griffin Mills PS Building High/Low Temp	N/A
GMS TT 001 TZ	AI	01	Griffin Mills PS Building or Room Temperature	°F
GMS ZS 001 H	DI	01	Griffin Mills PS Doors & Hatches Intrusion	N/A
GMS DR 001 D	DO	01	Griffin Mills PS Doors & Hatches Open Door	N/A
GMS LS 001 H	DI	01	Griffin Mills PS Pit Flood	N/A
GMS PM 001 IZ_A	AI	01	Griffin Mills PS Power Monitoring Phase A Current	Amps
GMS PM 001 IZ_B	AI	01	Griffin Mills PS Power Monitoring Phase B Current	Amps
GMS PM 001 IZ_C	AI	01	Griffin Mills PS Power Monitoring Phase C Current	Amps
GMS PM 001 IZ_R	AI	01	Griffin Mills PS Power Monitoring Reactive Power	KVAR
GMS PM 001 IZ	AI	01	Griffin Mills PS Power Monitoring Real Power	KW
GMS PM 001 EZ_AB	AI	01	Griffin Mills PS Power Monitoring Voltage A-B	Volts
GMS PM 001 EZ_BC	AI	01	Griffin Mills PS Power Monitoring Voltage B-C	Volts
GMS PM 001 EZ_CA	AI	01	Griffin Mills PS Power Monitoring Voltage C-A	Volts
GMS VLVC 001 ZL	DI	01	Griffin Mills PS Check Valve Closed	N/A
GMS VLVC 002 ZL	DI	02	Griffin Mills PS Check Valve Closed	N/A
GMS VLVC 001 F	DI	01	Griffin Mills PS Check Valve Fault	N/A
GMS VLVC 002 F	DI	02	Griffin Mills PS Check Valve Fault	N/A
GMS VLVC 001 ZH	DI	01	Griffin Mills PS Check Valve Open	N/A
GMS VLVC 002 ZH	DI	02	Griffin Mills PS Check Valve Open	N/A
GMS FIT 001 FZ	AI	01	Griffin Mills PS Flow Meter Discharge Flow	MGD
GMS PIT 001 FZ	AI	01	Griffin Mills PS Pressure Meter Discharge Pressure	PSI
GMS PIT 001 PZ	AI	01	Griffin Mills PS Pressure Meter Suction Pressure	PSI
GMS VFD 001 HSB	DI	01	Griffin Mills PS Pump Bypass Selected	N/A
GMS VFD 002 HSB	DI	02	Griffin Mills PS Pump Bypass Selected	N/A
GMS MCP 001 KX	AI	01	Griffin Mills PS Pump Inhibit Start Time Remaining	Seconds
GMS MCP 002 KX	AI	02	Griffin Mills PS Pump Inhibit Start Time Remaining	Seconds
GMS VFD 001 IZ	AI	01	Griffin Mills PS Pump Motor Current	Amps
GMS VFD 002 IZ	AI	02	Griffin Mills PS Pump Motor Current	Amps

Griffin Mills PS Site ID: GMS Site # 53

Tag Name	I/O Type	Unit	Description	Eng. Unit
GMS VFD 001 MTZ	AI	01	Griffin Mills PS Pump Motor Thermal State	Percent
GMS VFD 002 MTZ	AI	02	Griffin Mills PS Pump Motor Thermal State	Percent
GMS MCP 001 MN	DI	01	Griffin Mills PS Pump Running	N/A
GMS MCP 002 MN	DI	02	Griffin Mills PS Pump Running	N/A
GMS MCP 001 KZQ	AI	01	Griffin Mills PS Pump Runtime	Hours
GMS MCP 002 KZQ	AI	02	Griffin Mills PS Pump Runtime	Hours
GMS MCP 001 HSS	DI	01	Griffin Mills PS Pump SCADA Mode	N/A
GMS MCP 002 HSS	DI	02	Griffin Mills PS Pump SCADA Mode	N/A
GMS VFD 001 SZD	AO	01	Griffin Mills PS Pump Speed Control	Percent
GMS VFD 002 SZD	AO	02	Griffin Mills PS Pump Speed Control	Percent
GMS VFD 001 SZ	AI	01	Griffin Mills PS Pump Speed Feedback	Percent
GMS VFD 002 SZ	AI	02	Griffin Mills PS Pump Speed Feedback	Percent
GMS MCP 001 MD	DO	01	Griffin Mills PS Pump Start	N/A
GMS MCP 002 MD	DO	02	Griffin Mills PS Pump Start	N/A
GMS MCP 001 MN_N	DO	01	Griffin Mills PS Pump Stop	N/A
GMS MCP 002 MN_N	DO	02	Griffin Mills PS Pump Stop	N/A
GMS VFD 001 TZ	AI	01	Griffin Mills PS Pump Thermal State	Percent
GMS VFD 002 TZ	AI	02	Griffin Mills PS Pump Thermal State	Percent
GMS VFD 001 EZ	AI	01	Griffin Mills PS Pump Voltage to Motor	Volts
GMS VFD 002 EZ	AI	02	Griffin Mills PS Pump Voltage to Motor	Volts
GMS RCP 001 EZ_BA	AI	01	Griffin Mills PS Batteries Voltage	Volts
GMS RCP 001 H	DI	01	Griffin Mills PS Door Open	N/A
GMS RCP 001 EY	DI	01	Griffin Mills PS PMCR 120 VAC Present	N/A
GMS RCP 001 F_TVSS	DI	01	Griffin Mills PS TVSS Fault	N/A
GMS RCP 001 JN_BA	DI	01	Griffin Mills PS UPS Battery Mode	N/A
GMS RCP 001 Z_UPS	DI	01	Griffin Mills PS UPS Charging Mode	N/A
GMS RCP 001 F_UPS	DI	01	Griffin Mills PS UPS Fault	N/A

**Griffin Mills PS**

**Site ID GMS**

**Site # 53**

**Tag Name I/O Type Unit Description**

DI	DO	AI	AO	Total
22	5	27	2	56

**Guenther PS & TK**

**Site ID GUN**

**Site # 31**

**Tag Name I/O Type Unit Description Eng. Unit**

GUN LS 001 H	DI	01	Guenther PS & TK Building Flood	N/A
GUN TS 001 H/L	DI	01	Guenther PS & TK Building High/Low Temp	N/A
GUN TT 001 TZ	AI	01	Guenther PS & TK Building or Room Temperature	°F
GUN ZS 001 H	DI	01	Guenther PS & TK Doors & Hatches Intrusion	N/A
GUN DR 001 D	DO	01	Guenther PS & TK Doors & Hatches Open Door	N/A
GUN LS 001 H	DI	01	Guenther PS & TK Pit Flood	N/A
GUN PM 001 IZ_A	AI	01	Guenther PS & TK Power Monitoring Phase A Current	Amps
GUN PM 001 IZ_B	AI	01	Guenther PS & TK Power Monitoring Phase B Current	Amps
GUN PM 001 IZ_C	AI	01	Guenther PS & TK Power Monitoring Phase C Current	Amps
GUN PM 001 JZ_R	AI	01	Guenther PS & TK Power Monitoring Reactive Power	KVAR
GUN PM 001 JZ	AI	01	Guenther PS & TK Power Monitoring Real Power	KW
GUN PM 001 EZ_AB	AI	01	Guenther PS & TK Power Monitoring Voltage A-B	Volts
GUN PM-001 EZ_BC	AI	01	Guenther PS & TK Power Monitoring Voltage B-C	Volts
GUN PM 001 EZ_CA	AI	01	Guenther PS & TK Power Monitoring Voltage C-A	Volts
GUN VLVC 001 ZL	DI	01	Guenther PS & TK Check Valve Closed	N/A
GUN VLVC 002 ZL	DI	02	Guenther PS & TK Check Valve Closed	N/A
GUN VLVC 003 ZL	DI	03	Guenther PS & TK Check Valve Closed	N/A
GUN VLVC 004 ZL	DI	04	Guenther PS & TK Check Valve Closed	N/A
GUN VLVC 005 ZL	DI	05	Guenther PS & TK Check Valve Closed	N/A
GUN VLVC 001 F	DI	01	Guenther PS & TK Check Valve Fault	N/A
GUN VLVC 002 F	DI	02	Guenther PS & TK Check Valve Fault	N/A
GUN VLVC 003 F	DI	03	Guenther PS & TK Check Valve Fault	N/A
GUN VLVC 004 F	DI	04	Guenther PS & TK Check Valve Fault	N/A

Guenther PS & TK Site ID GUN Site # 31

Tag Name	I/O Type	Unit	Description	Eng. Unit
GUN VLVC 005 F	DI	05	Guenther PS & TK Check Valve Fault	N/A
GUN VLVC 001 ZH	DI	01	Guenther PS & TK Check Valve Open	N/A
GUN VLVC 002 ZH	DI	02	Guenther PS & TK Check Valve Open	N/A
GUN VLVC 003 ZH	DI	03	Guenther PS & TK Check Valve Open	N/A
GUN VLVC 004 ZH	DI	04	Guenther PS & TK Check Valve Open	N/A
GUN VLVC 005 ZH	DI	05	Guenther PS & TK Check Valve Open	N/A
GUN FIT 001 FZ	AI	01	Guenther PS & TK Flow Meter Discharge Flow	MGD
GUN PIT 001 FZ	AI	01	Guenther PS & TK Pressure Meter Discharge Pressure	PSI
GUN PIT 001 PZ	AI	01	Guenther PS & TK Pressure Meter Suction Pressure	PSI
GUN MCP 001 KX	AI	01	Guenther PS & TK Pump Inhibit Start Time Remaining	Seconds
GUN MCP 002 KX	AI	02	Guenther PS & TK Pump Inhibit Start Time Remaining	Seconds
GUN MCP 003 KX	AI	03	Guenther PS & TK Pump Inhibit Start Time Remaining	Seconds
GUN MCP 004 KX	AI	04	Guenther PS & TK Pump Inhibit Start Time Remaining	Seconds
GUN MCP 005 KX	AI	05	Guenther PS & TK Pump Inhibit Start Time Remaining	Seconds
GUN MCP 001 MN	DI	01	Guenther PS & TK Pump Running	N/A
GUN MCP 002 MN	DI	02	Guenther PS & TK Pump Running	N/A
GUN MCP 003 MN	DI	03	Guenther PS & TK Pump Running	N/A
GUN MCP 004 MN	DI	04	Guenther PS & TK Pump Running	N/A
GUN MCP 005 MN	DI	05	Guenther PS & TK Pump Running	N/A
GUN MCP 001 KZQ	AI	01	Guenther PS & TK Pump Runtime	Hours
GUN MCP 002 KZQ	AI	02	Guenther PS & TK Pump Runtime	Hours
GUN MCP 003 KZQ	AI	03	Guenther PS & TK Pump Runtime	Hours
GUN MCP 004 KZQ	AI	04	Guenther PS & TK Pump Runtime	Hours
GUN MCP 005 KZQ	AI	05	Guenther PS & TK Pump Runtime	Hours
GUN MCP 001 HSS	DI	01	Guenther PS & TK Pump SCADA Mode	N/A
GUN MCP 002 HSS	DI	02	Guenther PS & TK Pump SCADA Mode	N/A
GUN MCP 003 HSS	DI	03	Guenther PS & TK Pump SCADA Mode	N/A
GUN MCP 004 HSS	DI	04	Guenther PS & TK Pump SCADA Mode	N/A
GUN MCP 005 HSS	DI	05	Guenther PS & TK Pump SCADA Mode	N/A



**Guenther PS & TK Site ID GUN Site # 31**

Tag Name	I/O Type	Unit	Description	Eng. Unit
GUN MCP 001 MD	DO	01	Guenther PS & TK Pump Start	N/A
GUN MCP 002 MD	DO	02	Guenther PS & TK Pump Start	N/A
GUN MCP 003 MD	DO	03	Guenther PS & TK Pump Start	N/A
GUN MCP 004 MD	DO	04	Guenther PS & TK Pump Start	N/A
GUN MCP 005 MD	DO	05	Guenther PS & TK Pump Start	N/A
GUN MCP 001 MN_N	DO	01	Guenther PS & TK Pump Stop	N/A
GUN MCP 002 MN_N	DO	02	Guenther PS & TK Pump Stop	N/A
GUN MCP 003 MN_N	DO	03	Guenther PS & TK Pump Stop	N/A
GUN MCP 004 MN_N	DO	04	Guenther PS & TK Pump Stop	N/A
GUN MCP 005 MN_N	DO	05	Guenther PS & TK Pump Stop	N/A
GUN RCP 001 EZ_BA	AI	01	Guenther PS & TK Batteries Voltage	Volts
GUN RCP 001 H	DI	01	Guenther PS & TK Door Open	N/A
GUN RCP 001 EY	DI	01	Guenther PS & TK PMCR 120 VAC Present	N/A
GUN RCP 001 F_TVS	DI	01	Guenther PS & TK TVSS Fault	N/A
GUN RCP 001 JN_BA	DI	01	Guenther PS & TK UPS Battery Mode	N/A
GUN RCP 001 Z_UPS	DI	01	Guenther PS & TK UPS Charging Mode	N/A
GUN RCP 001 F_UPS	DI	01	Guenther PS & TK UPS Fault	N/A
GUN VLVS 001 B	DO	01	Guenther PS & TK Altitude Valve Close	N/A
GUN VLVA 001 ZL	DI	01	Guenther PS & TK Altitude Valve Closed	N/A
GUN VLVS 001 D	DO	01	Guenther PS & TK Altitude Valve Open	N/A
GUN VLVA 001 ZH	DI	01	Guenther PS & TK Altitude Valve Opened	N/A
GUN VLVA 001 Z	AI	01	Guenther PS & TK Altitude Valve Position	Percent
GUN BEA 001 N	DI	01	Guenther PS & TK Beacon On	N/A
GUN VLVS 001 B	DO	01	Guenther PS & TK Control Valve Close	N/A
GUN VLVS 002 B	DO	02	Guenther PS & TK Control Valve Close	N/A
GUN VLVA 001 ZL	DI	01	Guenther PS & TK Control Valve Closed	N/A
GUN VLVA 002 ZL	DI	02	Guenther PS & TK Control Valve Closed	N/A
GUN VLVS 001 D	DO	01	Guenther PS & TK Control Valve Open	N/A
GUN VLVS 002 D	DO	02	Guenther PS & TK Control Valve Open	N/A

**Guenther PS & TK, Site ID GUN Site # 31**

Tag Name	I/O Type	Unit	Description	Eng. Unit
GUN VLVA 001_ZH	DI	01	Guenther PS & TK Control Valve Opened	N/A
GUN VLVA 002_ZH	DI	02	Guenther PS & TK Control Valve Opened	N/A
GUN VLVA 001_Z	AI	01	Guenther PS & TK Control Valve Position	Percent
GUN VLVA 002_Z	AI	02	Guenther PS & TK Control Valve Position	Percent
GUN HT 001_N	DI	01	Guenther PS & TK Heat Tape On	N/A
GUN HT 001_PY	DI	01	Guenther PS & TK Heat Tape Power Available	N/A
GUN LIT 001_Z	AI	01	Guenther PS & TK Tank/Standpipe Level	Feet

DI	DO	AI	AO	Total
44	17	27	0	88

**Hamburg PS, Site ID HAM Site # 25**

Tag Name	I/O Type	Unit	Description	Eng. Unit
HAM LS 001_H	DI	01	Hamburg PS Building Flood	N/A
HAM TS 001_H/L	DI	01	Hamburg PS Building High/Low Temp	N/A
HAM TT 001_TZ	AI	01	Hamburg PS Building or Room Temperature	°F
HAM ZS 001_H	DI	01	Hamburg PS Doors & Hatches Intrusion	N/A
HAM DR 001_D	DO	01	Hamburg PS Doors & Hatches Open Door	N/A
HAM LS 001_H	DI	01	Hamburg PS Pit Flood	N/A
HAM LIT 001_LZ	AI	01	Hamburg PS Diesel Tank Level	Gallons
HAM GEN 001_IZ_A	AI	01	Hamburg PS Generator Current Phase A	Amps
HAM GEN 001_IZ_B	AI	01	Hamburg PS Generator Current Phase B	Amps
HAM GEN 001_IZ_C	AI	01	Hamburg PS Generator Current Phase C	Amps
HAM GEN 001_F	DI	01	Hamburg PS Generator Fault	N/A
HAM GEN 001_HSA	DI	01	Hamburg PS Generator Not In Auto	N/A
HAM GEN 001_JZ	AI	01	Hamburg PS Generator Real Power	KW
HAM XFER 001_F_G	DI	01	Hamburg PS Transfer Switch Generator Running	N/A
HAM XFER 001_N_G	DI	01	Hamburg PS Transfer Switch On Generator Power	N/A
HAM XFER 001_N_U	DI	01	Hamburg PS Transfer Switch On Utility Power	N/A

Hamburg PS

Site ID HAM Site # 25

Tag Name	I/O Type	Unit	Description	Eng. Unit
HAM XFER 001 Y_U	DI	01	Hamburg PS Transfer Switch Utility Power Available	N/A
HAM XFER 001 EZ_	AI	01	Hamburg PS Transfer Switch Voltage A-B	Volts
HAM XFER 001 EZ_	AI	01	Hamburg PS Transfer Switch Voltage B-C	Volts
HAM XFER 001 EZ_	AI	01	Hamburg PS Transfer Switch Voltage C-A	Volts
HAM PM 001 IZ_A	AI	01	Hamburg PS Power Monitoring Phase A Current	Amps
HAM PM 001 IZ_B	AI	01	Hamburg PS Power Monitoring Phase B Current	Amps
HAM PM 001 IZ_C	AI	01	Hamburg PS Power Monitoring Phase C Current	Amps
HAM PM 001 JZ_R	AI	01	Hamburg PS Power Monitoring Reactive Power	KVAR
HAM PM 001 JZ	AI	01	Hamburg PS Power Monitoring Real Power	KW
HAM PM 001 EZ_AB	AI	01	Hamburg PS Power Monitoring Voltage A-B	Volts
HAM PM 001 EZ_BC	AI	01	Hamburg PS Power Monitoring Voltage B-C	Volts
HAM PM 001 EZ_CA	AI	01	Hamburg PS Power Monitoring Voltage C-A	Volts
HAM VLVC 001 ZL	DI	01	Hamburg PS Check Valve Closed	N/A
HAM VLVC 002 ZL	DI	02	Hamburg PS Check Valve Closed	N/A
HAM VLVC 003 ZL	DI	03	Hamburg PS Check Valve Closed	N/A
HAM VLVC 001 F	DI	01	Hamburg PS Check Valve Fault	N/A
HAM VLVC 002 F	DI	02	Hamburg PS Check Valve Fault	N/A
HAM VLVC 003 F	DI	03	Hamburg PS Check Valve Fault	N/A
HAM VLVC 001 ZH	DI	01	Hamburg PS Check Valve Open	N/A
HAM VLVC 002 ZH	DI	02	Hamburg PS Check Valve Open	N/A
HAM VLVC 003 ZH	DI	03	Hamburg PS Check Valve Open	N/A
HAM FIT 001 FZ	AI	01	Hamburg PS Flow Meter Discharge Flow	MGD
HAM PIT 001 FZ	AI	01	Hamburg PS Pressure Meter Discharge Pressure	PSI
HAM PIT 001 PZ	AI	01	Hamburg PS Pressure Meter Suction Pressure	PSI
HAM VFD 001 HSB	DI	01	Hamburg PS Pump Bypass Selected	N/A
HAM VFD 002 HSB	DI	02	Hamburg PS Pump Bypass Selected	N/A
HAM VFD 003 HSB	DI	03	Hamburg PS Pump Bypass Selected	N/A
HAM MCP 001 KX	AI	01	Hamburg PS Pump Inhibit Start Time Remaining	Seconds
HAM MCP 002 KX	AI	02	Hamburg PS Pump Inhibit Start Time Remaining	Seconds

Hamburg PS Site ID HAM Site # 25

Tag Name	I/O Type	Unit	Description	Eng. Unit
HAM MCP 003 KX	AI	03	Hamburg PS Pump Inhibit Start Time Remaining	Seconds
HAM VFD 001 IZ	AI	01	Hamburg PS Pump Motor Current	Amps
HAM VFD 002 IZ	AI	02	Hamburg PS Pump Motor Current	Amps
HAM VFD 003 IZ	AI	03	Hamburg PS Pump Motor Current	Amps
HAM VFD 001 MTZ	AI	01	Hamburg PS Pump Motor Thermal State	Percent
HAM VFD 002 MTZ	AI	02	Hamburg PS Pump Motor Thermal State	Percent
HAM VFD 003 MTZ	AI	03	Hamburg PS Pump Motor Thermal State	Percent
HAM MCP 001 MN	DI	01	Hamburg PS Pump Running	N/A
HAM MCP 002 MN	DI	02	Hamburg PS Pump Running	N/A
HAM MCP 003 MN	DI	03	Hamburg PS Pump Running	N/A
HAM MCP 001 KZQ	AI	01	Hamburg PS Pump Runtime	Hours
HAM MCP 002 KZQ	AI	02	Hamburg PS Pump Runtime	Hours
HAM MCP 003 KZQ	AI	03	Hamburg PS Pump Runtime	Hours
HAM MCP 001 HSS	DI	01	Hamburg PS Pump SCADA Mode	N/A
HAM MCP 002 HSS	DI	02	Hamburg PS Pump SCADA Mode	N/A
HAM MCP 003 HSS	DI	03	Hamburg PS Pump SCADA Mode	N/A
HAM VFD 001 SZD	AO	01	Hamburg PS Pump Speed Control	Percent
HAM VFD 002 SZD	AO	02	Hamburg PS Pump Speed Control	Percent
HAM VFD 001 SZ	AI	01	Hamburg PS Pump Speed Feedback	Percent
HAM VFD 002 SZ	AI	02	Hamburg PS Pump Speed Feedback	Percent
HAM MCP 001 MD	DO	01	Hamburg PS Pump Start	N/A
HAM MCP 002 MD	DO	02	Hamburg PS Pump Start	N/A
HAM MCP 003 MD	DO	03	Hamburg PS Pump Start	N/A
HAM MCP 001 MN_	DO	01	Hamburg PS Pump Stop	N/A
HAM MCP 002 MN_	DO	02	Hamburg PS Pump Stop	N/A
HAM MCP 003 MN_	DO	03	Hamburg PS Pump Stop	N/A
HAM VFD 001 TZ	AI	01	Hamburg PS Pump Thermal State	Percent
HAM VFD 002 TZ	AI	02	Hamburg PS Pump Thermal State	Percent
HAM VFD 003 TZ	AI	03	Hamburg PS Pump Thermal State	Percent

Hamburg PS Site ID HAM Site # 25

Tag Name	I/O Type	Unit	Description	Eng. Unit
HAM VFD 001 EZ	AI	01	Hamburg PS Pump Voltage to Motor	Volts
HAM VFD 002 EZ	AI	02	Hamburg PS Pump Voltage to Motor	Volts
HAM VFD 003 EZ	AI	03	Hamburg PS Pump Voltage to Motor	Volts
HAM RCP 001 EZ_B	AI	01	Hamburg PS Batteries Voltage	Volts
HAM RCP 001 H	DI	01	Hamburg PS Door Open	N/A
HAM RCP 001 EY	DI	01	Hamburg PS PMCR 120 VAC Present	N/A
HAM RCP 001 F_TV	DI	01	Hamburg PS TVSS Fault	N/A
HAM RCP 001 JN_B	DI	01	Hamburg PS UPS Battery Mode	N/A
HAM RCP 001 Z_UPS	DI	01	Hamburg PS UPS Charging Mode	N/A
HAM RCP 001 F_UPS	DI	01	Hamburg PS UPS Fault	N/A

DI DO AI AO Total  
 34 7 41 2 84

Harris Hill PS Site ID HHS Site # 81

Tag Name	I/O Type	Unit	Description	Eng. Unit
HHS LS 001 H	DI	01	Harris Hill PS Building Flood	N/A
HHS TS 001 H/L	DI	01	Harris Hill PS Building High/Low Temp	N/A
HHS TT 001 TZ	AI	01	Harris Hill PS Building or Room Temperature	°F
HHS ZS 001 H	DI	01	Harris Hill PS Doors & Hatches Intrusion	N/A
HHS DR 001 D	DO	01	Harris Hill PS Doors & Hatches Open Door	N/A
HHS LS 001 H	DI	01	Harris Hill PS Pit Flood	N/A
HHS PM 001 IZ_A	AI	01	Harris Hill PS Power Monitoring Phase A Current	Amps
HHS PM 001 IZ_B	AI	01	Harris Hill PS Power Monitoring Phase B Current	Amps
HHS PM 001 IZ_C	AI	01	Harris Hill PS Power Monitoring Phase C Current	Amps
HHS PM 001 JZ_R	AI	01	Harris Hill PS Power Monitoring Reactive Power	KVAR
HHS PM 001 JZ	AI	01	Harris Hill PS Power Monitoring Real Power	KW
HHS PM 001 EZ_AB	AI	01	Harris Hill PS Power Monitoring Voltage A-B	Volts
HHS PM 001 EZ_BC	AI	01	Harris Hill PS Power Monitoring Voltage B-C	Volts

Harris Hill PS Site ID HHS Site # 81

Tag Name	I/O Type	Unit	Description	Eng. Unit
HHS PM 001 EZ_CA	AI	01	Harris Hill PS Power Monitoring Voltage C-A	Volts
HHS VLVC 001 ZL	DI	01	Harris Hill PS Check Valve Closed	N/A
HHS VLVC 002 ZL	DI	02	Harris Hill PS Check Valve Closed	N/A
HHS VLVC 003 ZL	DI	03	Harris Hill PS Check Valve Closed	N/A
HHS VLVC 001 F	DI	01	Harris Hill PS Check Valve Fault	N/A
HHS VLVC 002 F	DI	02	Harris Hill PS Check Valve Fault	N/A
HHS VLVC 003 F	DI	03	Harris Hill PS Check Valve Fault	N/A
HHS VLVC 001 ZH	DI	01	Harris Hill PS Check Valve Open	N/A
HHS VLVC 002 ZH	DI	02	Harris Hill PS Check Valve Open	N/A
HHS VLVC 003 ZH	DI	03	Harris Hill PS Check Valve Open	N/A
HHS FIT 001 FZ	AI	01	Harris Hill PS Flow Meter Discharge Flow	MGD
HHS PIT 001 FZ	AI	01	Harris Hill PS Pressure Meter Discharge Pressure	PSI
HHS PIT 001 PZ	AI	01	Harris Hill PS Pressure Meter Suction Pressure	PSI
HHS VFD 001 HSB	DI	01	Harris Hill PS Pump Bypass Selected	N/A
HHS VFD 002 HSB	DI	02	Harris Hill PS Pump Bypass Selected	N/A
HHS VFD 003 HSB	DI	03	Harris Hill PS Pump Bypass Selected	N/A
HHS MCP 001 KX	AI	01	Harris Hill PS Pump Inhibit Start Time Remaining	Seconds
HHS MCP 002 KX	AI	02	Harris Hill PS Pump Inhibit Start Time Remaining	Seconds
HHS MCP 003 KX	AI	03	Harris Hill PS Pump Inhibit Start Time Remaining	Seconds
HHS VFD 001 IZ	AI	01	Harris Hill PS Pump Motor Current	Amps
HHS VFD 002 IZ	AI	02	Harris Hill PS Pump Motor Current	Amps
HHS VFD 003 IZ	AI	03	Harris Hill PS Pump Motor Current	Amps
HHS VFD 001 MTZ	AI	01	Harris Hill PS Pump Motor Thermal State	Percent
HHS VFD 002 MTZ	AI	02	Harris Hill PS Pump Motor Thermal State	Percent
HHS VFD 003 MTZ	AI	03	Harris Hill PS Pump Motor Thermal State	Percent
HHS MCP 001 MN	DI	01	Harris Hill PS Pump Running	N/A
HHS MCP 002 MN	DI	02	Harris Hill PS Pump Running	N/A
HHS MCP 003 MN	DI	03	Harris Hill PS Pump Running	N/A
HHS MCP 001 KZQ	AI	01	Harris Hill PS Pump Runtime	Hours

Harris Hill PS Site ID HHS Site # 81

Tag Name	I/O Type	Unit	Description	Eng. Unit
HHS MCP 002 KZQ	AI	02	Harris Hill PS Pump Runtime	Hours
HHS MCP 003 KZQ	AI	03	Harris Hill PS Pump Runtime	Hours
HHS MCP 001 HSS	DI	01	Harris Hill PS Pump SCADA Mode	N/A
HHS MCP 002 HSS	DI	02	Harris Hill PS Pump SCADA Mode	N/A
HHS MCP 003 HSS	DI	03	Harris Hill PS Pump SCADA Mode	N/A
HHS VFD 001 SZD	AO	01	Harris Hill PS Pump Speed Control	Percent
HHS VFD 002 SZD	AO	02	Harris Hill PS Pump Speed Control	Percent
HHS VFD 003 SZD	AO	03	Harris Hill PS Pump Speed Control	Percent
HHS VFD 001 SZ	AI	01	Harris Hill PS Pump Speed Feedback	Percent
HHS VFD 002 SZ	AI	02	Harris Hill PS Pump Speed Feedback	Percent
HHS VFD 003 SZ	AI	03	Harris Hill PS Pump Speed Feedback	Percent
HHS MCP 001 MD	DO	01	Harris Hill PS Pump Start	N/A
HHS MCP 002 MD	DO	02	Harris Hill PS Pump Start	N/A
HHS MCP 003 MD	DO	03	Harris Hill PS Pump Start	N/A
HHS MCP 001 MN_N	DO	01	Harris Hill PS Pump Stop	N/A
HHS MCP 002 MN_N	DO	02	Harris Hill PS Pump Stop	N/A
HHS MCP 003 MN_N	DO	03	Harris Hill PS Pump Stop	N/A
HHS VFD 001 TZ	AI	01	Harris Hill PS Pump Thermal State	Percent
HHS VFD 002 TZ	AI	02	Harris Hill PS Pump Thermal State	Percent
HHS VFD 003 TZ	AI	03	Harris Hill PS Pump Thermal State	Percent
HHS VFD 001 EZ	AI	01	Harris Hill PS Pump Voltage to Motor	Volts
HHS VFD 002 EZ	AI	02	Harris Hill PS Pump Voltage to Motor	Volts
HHS VFD 003 EZ	AI	03	Harris Hill PS Pump Voltage to Motor	Volts
HHS RCP 001 EZ_BA	AI	01	Harris Hill PS Batteries Voltage	Volts
HHS RCP 001 H	DI	01	Harris Hill PS Door Open	N/A
HHS RCP 001 EY	DI	01	Harris Hill PS PMCR 120 VAC Present	N/A
HHS RCP 001 F_TVSS	DI	01	Harris Hill PS TVSS Fault	N/A
HHS RCP 001 JN_BA	DI	01	Harris Hill PS UPS Battery Mode	N/A
HHS RCP 001 Z_UPS	DI	01	Harris Hill PS UPS Charging Mode	N/A

Harris Hill PS Site ID HHS Site # 81

Tag Name	I/O Type	Unit	Description	Eng. Unit
HHS RCP 001 F_UPS	DI	01	Harris Hill PS UPS Fault	N/A

DI	DO	AI	AO	Total
28	7	34	3	72

Horner PS Site ID HOR Site # 10

Tag Name	I/O Type	Unit	Description	Eng. Unit
HOR LS 001 H	DI	01	Horner PS Building Flood	N/A
HOR TS 001 H/L	DI	01	Horner PS Building High/Low Temp	N/A
HOR TT 001 TZ	AI	01	Horner PS Building or Room Temperature	°F
HOR ZS 001 H	DI	01	Horner PS Doors & Hatches Intrusion	N/A
HOR DR 001 D	DO	01	Horner PS Doors & Hatches Open Door	N/A
HOR LS 001 H	DI	01	Horner PS Pit Flood	N/A
HOR LIT 001 LZ	AI	01	Horner PS Diesel Tank Level	Gallons
HOR GEN 001 IZ_A	AI	01	Horner PS Generator Current Phase A	Amps
HOR GEN 001 IZ_B	AI	01	Horner PS Generator Current Phase B	Amps
HOR GEN 001 IZ_C	AI	01	Horner PS Generator Current Phase C	Amps
HOR GEN 001 F	DI	01	Horner PS Generator Fault	N/A
HOR GEN 001 HSA_	DI	01	Horner PS Generator Not In-Auto	N/A
HOR GEN 001 JZ	AI	01	Horner PS Generator Real Power	KW
HOR XFER 001 F_G	DI	01	Horner PS Transfer Switch Generator Running	N/A
HOR XFER 001 N_G	DI	01	Horner PS Transfer Switch On Generator Power	N/A
HOR XFER 001 N_U	DI	01	Horner PS Transfer Switch On Utility Power	N/A
HOR XFER 001 Y_U	DI	01	Horner PS Transfer Switch Utility Power Available	N/A
HOR XFER 001 EZ_A	AI	01	Horner PS Transfer Switch Voltage A-B	Volts
HOR XFER 001 EZ_B	AI	01	Horner PS Transfer Switch Voltage B-C	Volts
HOR XFER 001 EZ_C	AI	01	Horner PS Transfer Switch Voltage C-A	Volts
HOR PM 001 IZ_A	AI	01	Horner PS Power Monitoring Phase A Current	Amps
HOR PM 001 IZ_B	AI	01	Horner PS Power Monitoring Phase B Current	Amps



Horner PS

Site ID HOR Site # 10

Tag Name	I/O Type	Unit	Description	Eng. Unit
HOR PM 001 IZ_C	AI	01	Horner PS Power Monitoring Phase C Current	Amps
HOR PM 001 JZ_R	AI	01	Horner PS Power Monitoring Reactive Power	KVAR
HOR PM 001 JZ	AI	01	Horner PS Power Monitoring Real Power	KW
HOR PM 001 EZ_AB	AI	01	Horner PS Power Monitoring Voltage A-B	Volts
HOR PM 001 EZ_BC	AI	01	Horner PS Power Monitoring Voltage B-C	Volts
HOR PM 001 EZ_CA	AI	01	Horner PS Power Monitoring Voltage C-A	Volts
HOR VLVC 001 ZL	DI	01	Horner PS Check Valve Closed	N/A
HOR VLVC 002 ZL	DI	02	Horner PS Check Valve Closed	N/A
HOR VLVC 003 ZL	DI	03	Horner PS Check Valve Closed	N/A
HOR VLVC 001 F	DI	01	Horner PS Check Valve Fault	N/A
HOR VLVC 002 F	DI	02	Horner PS Check Valve Fault	N/A
HOR VLVC 003 F	DI	03	Horner PS Check Valve Fault	N/A
HOR VLVC 001 ZH	DI	01	Horner PS Check Valve Open	N/A
HOR VLVC 002 ZH	DI	02	Horner PS Check Valve Open	N/A
HOR VLVC 003 ZH	DI	03	Horner PS Check Valve Open	N/A
HOR FIT 001 FZ	AI	01	Horner PS Flow Meter Discharge Flow	MGD
HOR PIT 001 FZ	AI	01	Horner PS Pressure Meter Discharge Pressure	PSI
HOR PIT 001 PZ	AI	01	Horner PS Pressure Meter Suction Pressure	PSI
HOR MCP 001 KX	AI	01	Horner PS Pump Inhibit Start Time Remaining	Seconds
HOR MCP 002 KX	AI	02	Horner PS Pump Inhibit Start Time Remaining	Seconds
HOR MCP 003 KX	AI	03	Horner PS Pump Inhibit Start Time Remaining	Seconds
HOR MCP 001 MN	DI	01	Horner PS Pump Running	N/A
HOR MCP 002 MN	DI	02	Horner PS Pump Running	N/A
HOR MCP 003 MN	DI	03	Horner PS Pump Running	N/A
HOR MCP 001 KZQ	AI	01	Horner PS Pump Runtime	Hours
HOR MCP 002 KZQ	AI	02	Horner PS Pump Runtime	Hours
HOR MCP 003 KZQ	AI	03	Horner PS Pump Runtime	Hours
HOR MCP 001 HSS	DI	01	Horner PS Pump SCADA Mode	N/A
HOR MCP 002 HSS	DI	02	Horner PS Pump SCADA Mode	N/A

Horner PS Site ID HOR Site # 10

Tag Name	I/O Type	Unit	Description	Eng. Unit
HOR MCP 003 HSS	DI	03	Horner PS Pump SCADA Mode	N/A
HOR MCP 001 MD	DO	01	Horner PS Pump Start	N/A
HOR MCP 002 MD	DO	02	Horner PS Pump Start	N/A
HOR MCP 003 MD	DO	03	Horner PS Pump Start	N/A
HOR MCP 001 MN_N	DO	01	Horner PS Pump Stop	N/A
HOR MCP 002 MN_N	DO	02	Horner PS Pump Stop	N/A
HOR MCP 003 MN_N	DO	03	Horner PS Pump Stop	N/A
HOR RCP 001 EZ_BA	AI	01	Horner PS Batteries Voltage	Volts
HOR RCP 001 H	DI	01	Horner PS Door Open	N/A
HOR RCP 001 EY	DI	01	Horner PS PMCR 120 VAC Present	N/A
HOR RCP 001 F_TVS	DI	01	Horner PS TVSS Fault	N/A
HOR RCP 001 JN_BA	DI	01	Horner PS UPS Battery Mode	N/A
HOR RCP 001 Z_UPS	DI	01	Horner PS UPS Charging Mode	N/A
HOR RCP 001 F_UPS	DI	01	Horner PS UPS Fault	N/A

DI DO AI AO Total  
 31 7 27 0 65

Janice Street TK Site ID JAN Site # 24

Tag Name	I/O Type	Unit	Description	Eng. Unit
JAN LS 001 H	DI	01	Janice Street TK Building Flood	N/A
JAN TS 001 H/L	DI	01	Janice Street TK Building High/Low Temp	N/A
JAN TT 001 TZ	AI	01	Janice Street TK Building or Room Temperature	°F
JAN ZS 001 H	DI	01	Janice Street TK Doors & Hatches Intrusion	N/A
JAN DR 001 D	DO	01	Janice Street TK Doors & Hatches Open Door	N/A
JAN LS 001 H	DI	01	Janice Street TK Pit Flood	N/A
JAN RCP 001 EZ_BA	AI	01	Janice Street TK Batteries Voltage	Volts
JAN RCP 001 H	DI	01	Janice Street TK Door Open	N/A
JAN RCP 001 EY	DI	01	Janice Street TK PMCR 120 VAC Present	N/A

Janice Street TK Site ID JAN Site # 24

Tag Name	I/O Type	Unit	Description	Eng. Unit
JAN RCP 001 F_TVS	DI	01	Janice Street TK TVSS Fault	N/A
JAN RCP 001 JN_BA	DI	01	Janice Street TK UPS Battery Mode	N/A
JAN RCP 001 Z_UPS	DI	01	Janice Street TK UPS Charging Mode	N/A
JAN RCP 001 F_UPS	DI	01	Janice Street TK UPS Fault	N/A
JAN VLVS 001 B	DO	01	Janice Street TK Altitude Valve Close	N/A
JAN VLVA 001 ZL	DI	01	Janice Street TK Altitude Valve Closed	N/A
JAN VLVS 001 D	DO	01	Janice Street TK Altitude Valve Open	N/A
JAN VLVA 001 ZH	DI	01	Janice Street TK Altitude Valve Opened	N/A
JAN VLVA 001 Z	AI	01	Janice Street TK Altitude Valve Position	Percent
JAN BEA 001 N	DI	01	Janice Street TK Beacon On	N/A
JAN HT 001 N	DI	01	Janice Street TK Heat Tape On	N/A
JAN HT 001 PY	DI	01	Janice Street TK Heat Tape Power Available	N/A
JAN LIT 001 Z	AI	01	Janice Street TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 15 3 4 0 22

Jennings Road PS Site ID JEN Site # 85

Tag Name	I/O Type	Unit	Description	Eng. Unit
JEN LS 001 H	DI	01	Jennings Road PS Building Flood	N/A
JEN TS 001 H/L	DI	01	Jennings Road PS Building High/Low Temp	N/A
JEN TT 001 TZ	AI	01	Jennings Road PS Building or Room Temperature	°F
JEN ZS 001 H	DI	01	Jennings Road PS Doors & Hatches Intrusion	N/A
JEN DR 001 D	DO	01	Jennings Road PS Doors & Hatches Open Door	N/A
JEN LS 001 H	DI	01	Jennings Road PS Pit Flood	N/A
JEN PM 001 IZ_A	AI	01	Jennings Road PS Power Monitoring Phase A Current	Amps
JEN PM 001 IZ_B	AI	01	Jennings Road PS Power Monitoring Phase B Current	Amps
JEN PM 001 IZ_C	AI	01	Jennings Road PS Power Monitoring Phase C Current	Amps
JEN PM 001 JZ_R	AI	01	Jennings Road PS Power Monitoring Reactive Power	KVAR

Jennings Road PS Site ID JEN Site # 85

Tag Name	I/O Type	Unit	Description	Eng. Unit
JEN PM 001 JZ	AI	01	Jennings Road PS Power Monitoring Real Power	KW
JEN PM 001 EZ_AB	AI	01	Jennings Road PS Power Monitoring Voltage A-B	Volts
JEN PM 001 EZ_BC	AI	01	Jennings Road PS Power Monitoring Voltage B-C	Volts
JEN PM 001 EZ_CA	AI	01	Jennings Road PS Power Monitoring Voltage C-A	Volts
JEN VLVC 001 ZL	DI	01	Jennings Road PS Check Valve Closed	N/A
JEN VLVC 002 ZL	DI	02	Jennings Road PS Check Valve Closed	N/A
JEN VLVC 001 F	DI	01	Jennings Road PS Check Valve Fault	N/A
JEN VLVC 002 F	DI	02	Jennings Road PS Check Valve Fault	N/A
JEN VLVC 001 ZH	DI	01	Jennings Road PS Check Valve Open	N/A
JEN VLVC 002 ZH	DI	02	Jennings Road PS Check Valve Open	N/A
JEN FIT 001 FZ	AI	01	Jennings Road PS Flow Meter Discharge Flow	MGD
JEN PIT 001 FZ	AI	01	Jennings Road PS Pressure Meter Discharge Pressure	PSI
JEN PIT 001 PZ	AI	01	Jennings Road PS Pressure Meter Suction Pressure	PSI
JEN VFD 001 HSB	DI	01	Jennings Road PS Pump Bypass Selected	N/A
JEN VFD 002 HSB	DI	02	Jennings Road PS Pump Bypass Selected	N/A
JEN MCP 001 KX	AI	01	Jennings Road PS Pump Inhibit Start Time Remaining	Seconds
JEN MCP 002 KX	AI	02	Jennings Road PS Pump Inhibit Start Time Remaining	Seconds
JEN VFD 001 IZ	AI	01	Jennings Road PS Pump Motor Current	Amps
JEN VFD 002 IZ	AI	02	Jennings Road PS Pump Motor Current	Amps
JEN VFD 001 MTZ	AI	01	Jennings Road PS Pump Motor Thermal State	Percent
JEN VFD 002 MTZ	AI	02	Jennings Road PS Pump Motor Thermal State	Percent
JEN MCP 001 MN	DI	01	Jennings Road PS Pump Running	N/A
JEN MCP 002 MN	DI	02	Jennings Road PS Pump Running	N/A
JEN MCP 001 KZQ	AI	01	Jennings Road PS Pump Runtime	Hours
JEN MCP 002 KZQ	AI	02	Jennings Road PS Pump Runtime	Hours
JEN MCP 001 HSS	DI	01	Jennings Road PS Pump SCADA Mode	N/A
JEN MCP 002 HSS	DI	02	Jennings Road PS Pump SCADA Mode	N/A
JEN VFD 001 SZD	AO	01	Jennings Road PS Pump Speed Control	Percent
JEN VFD 002 SZD	AO	02	Jennings Road PS Pump Speed Control	Percent

Jennings Road PS

Site ID JEN

Site # 85

Tag Name	I/O Type	Unit	Description	Eng. Unit
JEN VFD 001 SZ	AI	01	Jennings Road PS Pump Speed Feedback	Percent
JEN VFD 002 SZ	AI	02	Jennings Road PS Pump Speed Feedback	Percent
JEN MCP 001 MD	DO	01	Jennings Road PS Pump Start	N/A
JEN MCP 002 MD	DO	02	Jennings Road PS Pump Start	N/A
JEN MCP 001 MN_N	DO	01	Jennings Road PS Pump Stop	N/A
JEN MCP 002 MN_N	DO	02	Jennings Road PS Pump Stop	N/A
JEN VFD 001 TZ	AI	01	Jennings Road PS Pump Thermal State	Percent
JEN VFD 002 TZ	AI	02	Jennings Road PS Pump Thermal State	Percent
JEN VFD 001 EZ	AI	01	Jennings Road PS Pump Voltage to Motor	Volts
JEN VFD 002 EZ	AI	02	Jennings Road PS Pump Voltage to Motor	Volts
JEN RCP 001 EZ_BA	AI	01	Jennings Road PS Batteries Voltage	Volts
JEN RCP 001 H	DI	01	Jennings Road PS Door Open	N/A
JEN RCP 001 EY	DI	01	Jennings Road PS PMCR 120 VAC Present	N/A
JEN RCP 001 F_TVSS	DI	01	Jennings Road PS TVSS Fault	N/A
JEN RCP 001 JN_BA	DI	01	Jennings Road PS UPS Battery Mode	N/A
JEN RCP 001 Z_UPS	DI	01	Jennings Road PS UPS Charging Mode	N/A
JEN RCP 001 F_UPS	DI	01	Jennings Road PS UPS Fault	N/A

DI	DO	AI	AO	Total
22	5	27	2	56

Jewett-Holmwood PS

Site ID JHS

Site # 03

Tag Name	I/O Type	Unit	Description	Eng. Unit
JHS LS 001 H	DI	01	Jewett-Holmwood PS Building Flood	N/A
JHS TS 001 H/L	DI	01	Jewett-Holmwood PS Building High/Low Temp	N/A
JHS TT 001 TZ	AI	01	Jewett-Holmwood PS Building or Room Temperature	°F
JHS ZS 001 H	DI	01	Jewett-Holmwood PS Doors & Hatches Intrusion	N/A
JHS DR 001 D	DO	01	Jewett-Holmwood PS Doors & Hatches Open Door	N/A
JHS LS 001 H	DI	01	Jewett-Holmwood PS Pit Flood	N/A

Jewett-Holmwood PS Site ID JHS Site # 03

Tag Name	I/O Type	Unit	Description	Eng. Unit
JHS LIT 001 LZ	AI	01	Jewett-Holmwood PS Diesel Tank Level	Gallons
JHS GEN 001 IZ_A	AI	01	Jewett-Holmwood PS Generator Current Phase A	Amps
JHS GEN 001 IZ_B	AI	01	Jewett-Holmwood PS Generator Current Phase B	Amps
JHS GEN 001 IZ_C	AI	01	Jewett-Holmwood PS Generator Current Phase C	Amps
JHS GEN 001 F	DI	01	Jewett-Holmwood PS Generator Fault	N/A
JHS GEN 001 HSA_N	DI	01	Jewett-Holmwood PS Generator Not In Auto	N/A
JHS GEN 001 JZ	AI	01	Jewett-Holmwood PS Generator Real Power	KW
JHS XFER 001 F_G	DI	01	Jewett-Holmwood PS Transfer Switch Generator Running	N/A
JHS XFER 001 N_G	DI	01	Jewett-Holmwood PS Transfer Switch On Generator Power	N/A
JHS XFER 001 N_U	DI	01	Jewett-Holmwood PS Transfer Switch On Utility Power	N/A
JHS XFER 001 Y_U	DI	01	Jewett-Holmwood PS Transfer Switch Utility Power Available	N/A
JHS XFER 001 EZ_A	AI	01	Jewett-Holmwood PS Transfer Switch Voltage A-B	Volts
JHS XFER 001 EZ_B	AI	01	Jewett-Holmwood PS Transfer Switch Voltage B-C	Volts
JHS XFER 001 EZ_C	AI	01	Jewett-Holmwood PS Transfer Switch Voltage C-A	Volts
JHS PM 001 IZ_A	AI	01	Jewett-Holmwood PS Power Monitoring Phase A Current	Amps
JHS PM 001 IZ_B	AI	01	Jewett-Holmwood PS Power Monitoring Phase B Current	Amps
JHS PM 001 IZ_C	AI	01	Jewett-Holmwood PS Power Monitoring Phase C Current	Amps
JHS PM 001 JZ_R	AI	01	Jewett-Holmwood PS Power Monitoring Reactive Power	KVAR
JHS PM 001 JZ	AI	01	Jewett-Holmwood PS Power Monitoring Real Power	KW
JHS PM 001 EZ_AB	AI	01	Jewett-Holmwood PS Power Monitoring Voltage A-B	Volts
JHS PM 001 EZ_BC	AI	01	Jewett-Holmwood PS Power Monitoring Voltage B-C	Volts
JHS PM 001 EZ_CA	AI	01	Jewett-Holmwood PS Power Monitoring Voltage C-A	Volts
JHS VLVC 001 ZL	DI	01	Jewett-Holmwood PS Check Valve Closed	N/A
JHS VLVC 002 ZL	DI	02	Jewett-Holmwood PS Check Valve Closed	N/A
JHS VLVC 003 ZL	DI	03	Jewett-Holmwood PS Check Valve Closed	N/A
JHS VLVC 001 F	DI	01	Jewett-Holmwood PS Check Valve Fault	N/A
JHS VLVC 002 F	DI	02	Jewett-Holmwood PS Check Valve Fault	N/A
JHS VLVC 003 F	DI	03	Jewett-Holmwood PS Check Valve Fault	N/A
JHS VLVC 001 ZH	DI	01	Jewett-Holmwood PS Check Valve Open	N/A

Jewett-Holmwood PS Site ID JHS Site # 03

Tag Name	I/O Type	Unit	Description	Eng. Unit
JHS VLVC 002 ZH	DI	02	Jewett-Holmwood PS Check Valve Open	N/A
JHS VLVC 003 ZH	DI	03	Jewett-Holmwood PS Check Valve Open	N/A
JHS FIT 001 FZ	AI	01	Jewett-Holmwood PS Flow Meter Discharge Flow	MGD
JHS PIT 001 FZ	AI	01	Jewett-Holmwood PS Pressure Meter Discharge Pressure	PSI
JHS PIT 001 PZ	AI	01	Jewett-Holmwood PS Pressure Meter Suction Pressure	PSI
JHS VFD 001 HSB	DI	01	Jewett-Holmwood PS Pump Bypass Selected	N/A
JHS VFD 002 HSB	DI	02	Jewett-Holmwood PS Pump Bypass Selected	N/A
JHS VFD 003 HSB	DI	03	Jewett-Holmwood PS Pump Bypass Selected	N/A
JHS MCP 001 KX	AI	01	Jewett-Holmwood PS Pump Inhibit Start Time Remaining	Seconds
JHS MCP 002 KX	AI	02	Jewett-Holmwood PS Pump Inhibit Start Time Remaining	Seconds
JHS MCP 003 KX	AI	03	Jewett-Holmwood PS Pump Inhibit Start Time Remaining	Seconds
JHS VFD 001 IZ	AI	01	Jewett-Holmwood PS Pump Motor Current	Amps
JHS VFD 002 IZ	AI	02	Jewett-Holmwood PS Pump Motor Current	Amps
JHS VFD 003 IZ	AI	03	Jewett-Holmwood PS Pump Motor Current	Amps
JHS VFD 001 MTZ	AI	01	Jewett-Holmwood PS Pump Motor Thermal State	Percent
JHS VFD 002 MTZ	AI	02	Jewett-Holmwood PS Pump Motor Thermal State	Percent
JHS VFD 003 MTZ	AI	03	Jewett-Holmwood PS Pump Motor Thermal State	Percent
JHS MCP 001 MN	DI	01	Jewett-Holmwood PS Pump Running	N/A
JHS MCP 002 MN	DI	02	Jewett-Holmwood PS Pump Running	N/A
JHS MCP 003 MN	DI	03	Jewett-Holmwood PS Pump Running	N/A
JHS MCP 001 KZQ	AI	01	Jewett-Holmwood PS Pump Runtime	Hours
JHS MCP 002 KZQ	AI	02	Jewett-Holmwood PS Pump Runtime	Hours
JHS MCP 003 KZQ	AI	03	Jewett-Holmwood PS Pump Runtime	Hours
JHS MCP 001 HSS	DI	01	Jewett-Holmwood PS Pump SCADA Mode	N/A
JHS MCP 002 HSS	DI	02	Jewett-Holmwood PS Pump SCADA Mode	N/A
JHS MCP 003 HSS	DI	03	Jewett-Holmwood PS Pump SCADA Mode	N/A
JHS VFD 001 SZD	AO	01	Jewett-Holmwood PS Pump Speed Control	Percent
JHS VFD 002 SZD	AO	02	Jewett-Holmwood PS Pump Speed Control	Percent
JHS VFD 003 SZD	AO	03	Jewett-Holmwood PS Pump Speed Control	Percent

**Jewett-Holmwood PS Site ID JHS Site # 03**

Tag Name	I/O Type	Unit	Description	Eng. Unit
JHS VFD 001 SZ	AI	01	Jewett-Holmwood PS Pump Speed Feedback	Percent
JHS VFD 002 SZ	AI	02	Jewett-Holmwood PS Pump Speed Feedback	Percent
JHS VFD 003 SZ	AI	03	Jewett-Holmwood PS Pump Speed Feedback	Percent
JHS MCP 001 MD	DO	01	Jewett-Holmwood PS Pump Start	N/A
JHS MCP 002 MD	DO	02	Jewett-Holmwood PS Pump Start	N/A
JHS MCP 003 MD	DO	03	Jewett-Holmwood PS Pump Start	N/A
JHS MCP 001 MN_N	DO	01	Jewett-Holmwood PS Pump Stop	N/A
JHS MCP 002 MN_N	DO	02	Jewett-Holmwood PS Pump Stop	N/A
JHS MCP 003 MN_N	DO	03	Jewett-Holmwood PS Pump Stop	N/A
JHS VFD 001 TZ	AI	01	Jewett-Holmwood PS Pump Thermal State	Percent
JHS VFD 002 TZ	AI	02	Jewett-Holmwood PS Pump Thermal State	Percent
JHS VFD 003 TZ	AI	03	Jewett-Holmwood PS Pump Thermal State	Percent
JHS VFD 001 EZ	AI	01	Jewett-Holmwood PS Pump Voltage to Motor	Volts
JHS VFD 002 EZ	AI	02	Jewett-Holmwood PS Pump Voltage to Motor	Volts
JHS VFD 003 EZ	AI	03	Jewett-Holmwood PS Pump Voltage to Motor	Volts
JHS RCP 001 EZ_BA	AI	01	Jewett-Holmwood PS Batteries Voltage	Volts
JHS RCP 001 H	DI	01	Jewett-Holmwood PS Door Open	N/A
JHS RCP 001 EY	DI	01	Jewett-Holmwood PS PMCR 120 VAC Present	N/A
JHS RCP 001 F_TVSS	DI	01	Jewett-Holmwood PS TVSS Fault	N/A
JHS RCP 001 JN_BA	DI	01	Jewett-Holmwood PS UPS Battery Mode	N/A
JHS RCP 001 Z_UPS	DI	01	Jewett-Holmwood PS UPS Charging Mode	N/A
JHS RCP 001 F_UPS	DI	01	Jewett-Holmwood PS UPS Fault	N/A

DI	DO	AI	AO	Total
34	7	42	3	86

**Keller Rd PS Site ID KEL Site # 11**

Tag Name	I/O Type	Unit	Description	Eng. Unit
KEL LS 001 H	DI	01	Keller Rd PS Building Flood	N/A



Eng. Unit

Site # 11

Site ID KEL

Keller Rd PS

Description

Tag Name	I/O Type	Unit	Description	Eng. Unit
KEL TS 001 H/L	DI	01	Keller Rd PS Building High/Low Temp	N/A
KEL TT 001 TZ	AI	01	Keller Rd PS Building or Room Temperature	°F
KEL ZS 001 H	DI	01	Keller Rd PS Doors & Hatches Intrusion	N/A
KEL DR 001 D	DO	01	Keller Rd PS Doors & Hatches Open Door	N/A
KEL LS 001 H	DI	01	Keller Rd PS Pit Flood	Amps
KEL PM 001 IZ_A	AI	01	Keller Rd PS Power Monitoring Phase A Current	Amps
KEL PM 001 IZ_B	AI	01	Keller Rd PS Power Monitoring Phase B Current	Amps
KEL PM 001 IZ_C	AI	01	Keller Rd PS Power Monitoring Phase C Current	KVAR
KEL PM 001 JZ_R	AI	01	Keller Rd PS Power Monitoring Reactive Power	KW
KEL PM 001 JZ	AI	01	Keller Rd PS Power Monitoring Real Power	Volts
KEL PM 001 EZ_AB	AI	01	Keller Rd PS Power Monitoring Voltage A-B	Volts
KEL PM 001 EZ_BC	AI	01	Keller Rd PS Power Monitoring Voltage B-C	N/A
KEL PM 001 EZ_CA	AI	01	Keller Rd PS Power Monitoring Voltage C-A	N/A
KEL VLV 001 ZL	DI	01	Keller Rd PS Check Valve Closed	N/A
KEL VLV 002 ZL	DI	01	Keller Rd PS Check Valve Closed	N/A
KEL VLV 001 F	DI	01	Keller Rd PS Check Valve Fault	MGD
KEL VLV 002 F	DI	01	Keller Rd PS Check Valve Fault	PSI
KEL VLV 001 ZH	DI	01	Keller Rd PS Check Valve Open	PSI
KEL VLV 002 ZH	DI	01	Keller Rd PS Check Valve Open	Seconds
KEL FIT 001 FZ	AI	01	Keller Rd PS Flow Meter Discharge Pressure	Seconds
KEL PIT 001 FZ	AI	01	Keller Rd PS Pressure Meter Suction Pressure	N/A
KEL PIT 001 PZ	AI	01	Keller Rd PS Pressure Meter Suction Pressure	N/A
KEL MCP 001 KX	AI	01	Keller Rd PS Pump Inhibit Start Time Remaining	Hours
KEL MCP 002 KX	AI	01	Keller Rd PS Pump Inhibit Start Time Remaining	Hours
KEL MCP 001 MN	DI	01	Keller Rd PS Pump Running	N/A
KEL MCP 002 MN	DI	01	Keller Rd PS Pump Running	N/A
KEL MCP 001 KZQ	AI	01	Keller Rd PS Pump Runtime	Hours
KEL MCP 002 KZQ	AI	01	Keller Rd PS Pump Runtime	Hours
KEL MCP 001 HSS	DI	01	Keller Rd PS Pump SCADA Mode	N/A

Keller Rd PS Site ID KEL Site # 11

Tag Name	I/O Type	Unit	Description	Eng. Unit
KEL MCP 002 HSS	DI	02	Keller Rd PS Pump SCADA Mode	N/A
KEL MCP 001 MD	DO	01	Keller Rd PS Pump Start	N/A
KEL MCP 002 MD	DO	02	Keller Rd PS Pump Start	N/A
KEL MCP 001 MN_N	DO	01	Keller Rd PS Pump Stop	N/A
KEL MCP 002 MN_N	DO	02	Keller Rd PS Pump Stop	N/A
KEL RCP 001 EZ_BA	AI	01	Keller Rd PS Batteries Voltage	Volts
KEL RCP 001 H	DI	01	Keller Rd PS Door Open	N/A
KEL RCP 001 EY	DI	01	Keller Rd PS PMCR 120 VAC Present	N/A
KEL RCP 001 F_TVSS	DI	01	Keller Rd PS TVSS Fault	N/A
KEL RCP 001 JN_BA	DI	01	Keller Rd PS UPS Battery Mode	N/A
KEL RCP 001 Z_UPS	DI	01	Keller Rd PS UPS Charging Mode	N/A
KEL RCP 001 F_UPS	DI	01	Keller Rd PS UPS Fault	N/A

DI DO AI AO Total  
 20 5 17 0 42

Kulp Road TK Site ID KLP Site # 84

Tag Name	I/O Type	Unit	Description	Eng. Unit
KLP LS 001 H	DI	01	Kulp Road TK Building Flood	N/A
KLP TS 001 H/L	DI	01	Kulp Road TK Building High/Low Temp	N/A
KLP TT 001 TZ	AI	01	Kulp Road TK Building or Room Temperature	°F
KLP ZS 001 H	DI	01	Kulp Road TK Doors & Hatches Intrusion	N/A
KLP DR 001 D	DO	01	Kulp Road TK Doors & Hatches Open Door	N/A
KLP LS 001 H	DI	01	Kulp Road TK Pit Flood	N/A
KLP RCP 001 EZ_BA	AI	01	Kulp Road TK Batteries Voltage	Volts
KLP RCP 001 H	DI	01	Kulp Road TK Door Open	N/A
KLP RCP 001 EY	DI	01	Kulp Road TK PMCR 120 VAC Present	N/A
KLP RCP 001 F_TVSS	DI	01	Kulp Road TK TVSS Fault	N/A
KLP RCP 001 JN_BA	DI	01	Kulp Road TK UPS Battery Mode	N/A

**Kulp Road TK Site ID KLP Site # 84**

Tag Name	I/O Type	Unit	Description	Eng. Unit
KLP RCP 001 Z_UPS	DI	01	Kulp Road TK UPS Charging Mode	N/A
KLP RCP 001 F_UPS	DI	01	Kulp Road TK UPS Fault	N/A
KLP VLVS 001 B	DO	01	Kulp Road TK Altitude Valve Close	N/A
KLP VLVA 001 ZL	DI	01	Kulp Road TK Altitude Valve Closed	N/A
KLP VLVS 001 D	DO	01	Kulp Road TK Altitude Valve Open	N/A
KLP VLVA 001 ZH	DI	01	Kulp Road TK Altitude Valve Opened	N/A
KLP VLVA 001 Z	AI	01	Kulp Road TK Altitude Valve Position	Percent
KLP BEA 001 N	DI	01	Kulp Road TK Beacon On	N/A
KLP HT 001 N	DI	01	Kulp Road TK Heat Tape On	N/A
KLP HT 001 PY	DI	01	Kulp Road TK Heat Tape Power Available	N/A
KLP LIT 001 Z	AI	01	Kulp Road TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 15 3 4 0 22

**Lakeview PS Site ID LKV Site # 21**

Tag Name	I/O Type	Unit	Description	Eng. Unit
LKV LS 001 H	DI	01	Lakeview PS Building Flood	N/A
LKV TS 001 H/L	DI	01	Lakeview PS Building High/Low Temp	N/A
LKV TT 001 TZ	AI	01	Lakeview PS Building or Room Temperature	°F
LKV ZS 001 H	DI	01	Lakeview PS Doors & Hatches Intrusion	N/A
LKV DR 001 D	DO	01	Lakeview PS Doors & Hatches Open Door	N/A
LKV LS 001 H	DI	01	Lakeview PS Pit Flood	N/A
LKV PM 001 IZ_A	AI	01	Lakeview PS Power Monitoring Phase A Current	Amps
LKV PM 001 IZ_B	AI	01	Lakeview PS Power Monitoring Phase B Current	Amps
LKV PM 001 IZ_C	AI	01	Lakeview PS Power Monitoring Phase C Current	Amps
LKV PM 001 JZ_R	AI	01	Lakeview PS Power Monitoring Reactive Power	KVAR
LKV PM 001 JZ	AI	01	Lakeview PS Power Monitoring Real Power	KW
LKV PM 001 EZ_AB	AI	01	Lakeview PS Power Monitoring Voltage A-B	Volts

Lakeview PS Site ID LKV Site # 21

Tag Name	I/O Type	Unit	Description	Eng. Unit
LKV PM 001 EZ_BC	AI	01	Lakeview PS Power Monitoring Voltage B-C	Volts
LKV PM 001 EZ_CA	AI	01	Lakeview PS Power Monitoring Voltage C-A	Volts
LKV VLVC 001 ZL	DI	01	Lakeview PS Check Valve Closed	N/A
LKV VLVC 002 ZL	DI	02	Lakeview PS Check Valve Closed	N/A
LKV VLVC 001 F	DI	01	Lakeview PS Check Valve Fault	N/A
LKV VLVC 002 F	DI	02	Lakeview PS Check Valve Fault	N/A
LKV VLVC 001 ZH	DI	01	Lakeview PS Check Valve Open	N/A
LKV VLVC 002 ZH	DI	02	Lakeview PS Check Valve Open	N/A
LKV FIT 001 FZ	AI	01	Lakeview PS Flow Meter Discharge Flow	MGD
LKV PIT 001 FZ	AI	01	Lakeview PS Pressure Meter Discharge Pressure	PSI
LKV PIT 001 PZ	AI	01	Lakeview PS Pressure Meter Suction Pressure	PSI
LKV MCP 001 KX	AI	01	Lakeview PS Pump Inhibit Start Time Remaining	Seconds
LKV MCP 002 KX	AI	02	Lakeview PS Pump Inhibit Start Time Remaining	Seconds
LKV MCP 001 MN	DI	01	Lakeview PS Pump Running	N/A
LKV MCP 002 MN	DI	02	Lakeview PS Pump Running	N/A
LKV MCP 001 KZQ	AI	01	Lakeview PS Pump Runtime	Hours
LKV MCP 002 KZQ	AI	02	Lakeview PS Pump Runtime	Hours
LKV MCP 001 HSS	DI	01	Lakeview PS Pump SCADA Mode	N/A
LKV MCP 002 HSS	DI	02	Lakeview PS Pump SCADA Mode	N/A
LKV MCP 001 MD	DO	01	Lakeview PS Pump Start	N/A
LKV MCP 002 MD	DO	02	Lakeview PS Pump Start	N/A
LKV MCP 001 MN_N	DO	01	Lakeview PS Pump Stop	N/A
LKV MCP 002 MN_N	DO	02	Lakeview PS Pump Stop	N/A
LKV RCP 001 EZ_BA	AI	01	Lakeview PS Batteries Voltage	Volts
LKV RCP 001 H	DI	01	Lakeview PS Door Open	N/A
LKV RCP 001 EY	DI	01	Lakeview PS PMCR 120 VAC Present	N/A
LKV RCP 001 F_TVSS	DI	01	Lakeview PS TVSS Fault	N/A
LKV RCP 001 JN_BA	DI	01	Lakeview PS UPS Battery Mode	N/A
LKV RCP 001 Z_UPS	DI	01	Lakeview PS UPS Charging Mode	N/A

Lakeview PS Site ID LKV Site # 21

Tag Name	I/O Type	Unit	Description	Eng. Unit
LKV RCP 001 F_UPS	DI	01	Lakeview PS UPS Fault	N/A

DI	DO	AI	AO	Total
20	5	17	0	42

Leydecker PS Site ID LYD Site # 13

Tag Name	I/O Type	Unit	Description	Eng. Unit
LYD LS 001 H	DI	01	Leydecker PS Building Flood	N/A
LYD TS 001 H/L	DI	01	Leydecker PS Building High/Low Temp	N/A
LYD TT 001 TZ	AI	01	Leydecker PS Building or Room Temperature	°F
LYD ZS 001 H	DI	01	Leydecker PS Doors & Hatches Intrusion	N/A
LYD DR 001 D	DO	01	Leydecker PS Doors & Hatches Open Door	N/A
LYD LS 001 H	DI	01	Leydecker PS Pit Flood	N/A
LYD LIT 001 LZ	AI	01	Leydecker PS Diesel Tank Level	Gallons
LYD GEN 001 IZ_A	AI	01	Leydecker PS Generator Current Phase A	Amps
LYD GEN 001 IZ_B	AI	01	Leydecker PS Generator Current Phase B	Amps
LYD GEN 001 IZ_C	AI	01	Leydecker PS Generator Current Phase C	Amps
LYD GEN 001 F	DI	01	Leydecker PS Generator Fault	N/A
LYD GEN 001 HSA_	DI	01	Leydecker PS Generator Not In Auto	N/A
LYD GEN 001 JZ	AI	01	Leydecker PS Generator Real Power	KW
LYD XFER 001 F_G	DI	01	Leydecker PS Transfer Switch Generator Running	N/A
LYD XFER 001 N_G	DI	01	Leydecker PS Transfer Switch On Generator Power	N/A
LYD XFER 001 N_U	DI	01	Leydecker PS Transfer Switch On Utility Power	N/A
LYD XFER 001 Y_U	DI	01	Leydecker PS Transfer Switch Utility Power Available	N/A
LYD XFER 001 EZ_A	AI	01	Leydecker PS Transfer Switch Voltage A-B	Volts
LYD XFER 001 EZ_B	AI	01	Leydecker PS Transfer Switch Voltage B-C	Volts
LYD XFER 001 EZ_C	AI	01	Leydecker PS Transfer Switch Voltage C-A	Volts
LYD PM 001 IZ_A	AI	01	Leydecker PS Power Monitoring Phase A Current	Amps
LYD PM 001 IZ_B	AI	01	Leydecker PS Power Monitoring Phase B Current	Amps

Leydecker PS Site ID LYD Site # 13

Tag Name	I/O Type	Unit	Description	Eng. Unit
LYD PM 001 IZ_C	AI	01	Leydecker PS Power Monitoring Phase C Current	Amps
LYD PM 001 JZ_R	AI	01	Leydecker PS Power Monitoring Reactive Power	KVAR
LYD PM 001 JZ	AI	01	Leydecker PS Power Monitoring Real Power	KW
LYD PM 001 EZ_AB	AI	01	Leydecker PS Power Monitoring Voltage A-B	Volts
LYD PM 001 EZ_BC	AI	01	Leydecker PS Power Monitoring Voltage B-C	Volts
LYD PM 001 EZ_CA	AI	01	Leydecker PS Power Monitoring Voltage C-A	Volts
LYD VLVC 001 ZL	DI	01	Leydecker PS Check Valve Closed	N/A
LYD VLVC 002 ZL	DI	02	Leydecker PS Check Valve Closed	N/A
LYD VLVC 001 F	DI	01	Leydecker PS Check Valve Fault	N/A
LYD VLVC 002 F	DI	02	Leydecker PS Check Valve Fault	N/A
LYD VLVC 001 ZH	DI	01	Leydecker PS Check Valve Open	N/A
LYD VLVC 002 ZH	DI	02	Leydecker PS Check Valve Open	N/A
LYD FIT 001 FZ	AI	01	Leydecker PS Flow Meter Discharge Flow	MGD
LYD PIT 001 FZ	AI	01	Leydecker PS Pressure Meter Discharge Pressure	PSI
LYD PIT 001 PZ	AI	01	Leydecker PS Pressure Meter Suction Pressure	PSI
LYD MCP 001 KX	AI	01	Leydecker PS Pump Inhibit Start Time Remaining	Seconds
LYD MCP 002 KX	AI	02	Leydecker PS Pump Inhibit Start Time Remaining	Seconds
LYD MCP 001 MN	DI	01	Leydecker PS Pump Running	N/A
LYD MCP 002 MN	DI	02	Leydecker PS Pump Running	N/A
LYD MCP 001 KZQ	AI	01	Leydecker PS Pump Runtime	Hours
LYD MCP 002 KZQ	AI	02	Leydecker PS Pump Runtime	Hours
LYD MCP 001 HSS	DI	01	Leydecker PS Pump SCADA Mode	N/A
LYD MCP 002 HSS	DI	02	Leydecker PS Pump SCADA Mode	N/A
LYD MCP 001 MD	DO	01	Leydecker PS Pump Start	N/A
LYD MCP 002 MD	DO	02	Leydecker PS Pump Start	N/A
LYD MCP 001 MN_N	DO	01	Leydecker PS Pump Stop	N/A
LYD MCP 002 MN_N	DO	02	Leydecker PS Pump Stop	N/A
LYD RCP 001 EZ_BA	AI	01	Leydecker PS Batteries Voltage	Volts
LYD RCP 001 H	DI	01	Leydecker PS Door Open	N/A

Leydecker PS Site ID LYD Site # 13

Tag Name	I/O Type	Unit	Description	Eng. Unit
LYD RCP 001 EY	DI	01	Leydecker PS PMCR 120 VAC Present	N/A
LYD RCP 001 F_TVSS	DI	01	Leydecker PS TVSS Fault	N/A
LYD RCP 001 JN_BA	DI	01	Leydecker PS UPS Battery Mode	N/A
LYD RCP 001 Z_UPS	DI	01	Leydecker PS UPS Charging Mode	N/A
LYD RCP 001 F_UPS	DI	01	Leydecker PS UPS Fault	N/A

DI DO AI AO Total  
 26 5 25 0 56

Long Street TK Site ID LNG Site # 23

Tag Name	I/O Type	Unit	Description	Eng. Unit
LNG LS 001 H	DI	01	Long Street TK Building Flood	N/A
LNG TS 001 H/L	DI	01	Long Street TK Building High/Low Temp	N/A
LNG TT 001 TZ	AI	01	Long Street TK Building or Room Temperature	°F
LNG ZS 001 H	DI	01	Long Street TK Doors & Hatches Intrusion	N/A
LNG DR 001 D	DO	01	Long Street TK Doors & Hatches Open Door	N/A
LNG LS 001 H	DI	01	Long Street TK Pit Flood	N/A
LNG RCP 001 EZ_BA	AI	01	Long Street TK Batteries Voltage	Volts
LNG RCP 001 H	DI	01	Long Street TK Door:Open	N/A
LNG RCP 001 EY	DI	01	Long Street TK PMCR 120 VAC Present	N/A
LNG RCP 001 F_TVSS	DI	01	Long Street TK TVSS Fault	N/A
LNG RCP 001 JN_BA	DI	01	Long Street TK UPS Battery Mode	N/A
LNG RCP 001 Z_UPS	DI	01	Long Street TK UPS Charging Mode	N/A
LNG RCP 001 F_UPS	DI	01	Long Street TK UPS Fault	N/A
LNG VLVS 001 B	DO	01	Long Street TK Altitude Valve Close	N/A
LNG VLVA 001 ZL	DI	01	Long Street TK Altitude Valve Closed	N/A
LNG VLVS 001 D	DO	01	Long Street TK Altitude Valve Open	N/A
LNG VLVA 001 ZH	DI	01	Long Street TK Altitude Valve Opened	N/A
LNG VLVA 001 Z	AI	01	Long Street TK Altitude Valve Position	Percent

Long Street TK Site ID LNG Site # 23

Tag Name	I/O Type	Unit	Description	Eng. Unit
LNG BEA 001 N	DI	01	Long Street TK Beacon On	N/A
LNG HT 001 N	DI	01	Long Street TK Heat Tape On	N/A
LNG HT 001 PY	DI	01	Long Street TK Heat Tape Power Available	N/A
LNG LIT 001 Z	AI	01	Long Street TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 15 3 4 0 22

Marilla PS Site ID MRS Site # 46

Tag Name	I/O Type	Unit	Description	Eng. Unit
MRS LS 001 H	DI	01	Marilla PS Building Flood	N/A
MRS TS 001 H/L	DI	01	Marilla PS Building High/Low Temp	N/A
MRS TT 001 TZ	AI	01	Marilla PS Building or Room Temperature	°F
MRS ZS 001 H	DI	01	Marilla PS Doors & Hatches Intrusion	N/A
MRS DR 001 D	DO	01	Marilla PS Doors & Hatches Open Door	N/A
MRS LS 001 H	DI	01	Marilla PS Pit Flood	N/A
MRS PM 001 IZ_A	AI	01	Marilla PS Power Monitoring Phase A Current	Amps
MRS PM 001 IZ_B	AI	01	Marilla PS Power Monitoring Phase B Current	Amps
MRS PM 001 IZ_C	AI	01	Marilla PS Power Monitoring Phase C Current	Amps
MRS PM 001 JZ_R	AI	01	Marilla PS Power Monitoring Reactive Power	KVAR
MRS PM 001 JZ	AI	01	Marilla PS Power Monitoring Real Power	KW
MRS PM 001 EZ_AB	AI	01	Marilla PS Power Monitoring Voltage A-B	Volts
MRS PM 001 EZ_BC	AI	01	Marilla PS Power Monitoring Voltage B-C	Volts
MRS PM 001 EZ_CA	AI	01	Marilla PS Power Monitoring Voltage C-A	Volts
MRS VLVC 001 ZL	DI	01	Marilla PS Check Valve Closed	N/A
MRS VLVC 002 ZL	DI	02	Marilla PS Check Valve Closed	N/A
MRS VLVC 001 F	DI	01	Marilla PS Check Valve Fault	N/A
MRS VLVC 002 F	DI	02	Marilla PS Check Valve Fault	N/A
MRS VLVC 001 ZH	DI	01	Marilla PS Check Valve Open	N/A



Marilla PS Site ID MRS Site # 46

Tag Name	I/O Type	Unit	Description	Eng. Unit
MRS VLVC 002 ZH	DI	02	Marilla PS Check Valve Open	N/A
MRS FIT 001 FZ	AI	01	Marilla PS Flow Meter Discharge Flow	MGD
MRS PIT 001 FZ	AI	01	Marilla PS Pressure Meter Discharge Pressure	PSI
MRS PIT 001 PZ	AI	01	Marilla PS Pressure Meter Suction Pressure	PSI
MRS MCP 001 KX	AI	01	Marilla PS Pump Inhibit Start Time Remaining	Seconds
MRS MCP 002 KX	AI	02	Marilla PS Pump Inhibit Start Time Remaining	Seconds
MRS MCP 001 MN	DI	01	Marilla PS Pump Running	N/A
MRS MCP 002 MN	DI	02	Marilla PS Pump Running	N/A
MRS MCP 001 KZQ	AI	01	Marilla PS Pump Runtime	Hours
MRS MCP 002 KZQ	AI	02	Marilla PS Pump Runtime	Hours
MRS MCP 001 HSS	DI	01	Marilla PS Pump SCADA Mode	N/A
MRS MCP 002 HSS	DI	02	Marilla PS Pump SCADA Mode	N/A
MRS MCP 001 MD	DO	01	Marilla PS Pump Start	N/A
MRS MCP 002 MD	DO	02	Marilla PS Pump Start	N/A
MRS MCP 001 MN_N	DO	01	Marilla PS Pump Stop	N/A
MRS MCP 002 MN_N	DO	02	Marilla PS Pump Stop	N/A
MRS RCP 001 EZ_BA	AI	01	Marilla PS Batteries Voltage	Volts
MRS RCP 001 H	DI	01	Marilla PS Door Open	N/A
MRS RCP 001 EY	DI	01	Marilla PS PMCR 120 VAC Present	N/A
MRS RCP 001 F_TVSS	DI	01	Marilla PS TVSS Fault	N/A
MRS RCP 001 JN_BA	DI	01	Marilla PS UPS Battery Mode	N/A
MRS RCP 001 Z_UPS	DI	01	Marilla PS UPS Charging Mode	N/A
MRS RCP 001 F_UPS	DI	01	Marilla PS UPS Fault	N/A

DI	DO	AI	AO	Total
20	5	17	0	42

Marilla TK Site ID MRT Site # 47

Tag Name	I/O Type	Unit	Description	Eng. Unit
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Marilla TK Site ID MRT Site # 47

Tag Name	I/O Type	Unit	Description	Eng. Unit
MRT LS 001 H	DI	01	Marilla TK Building Flood	N/A
MRT TS 001 H/L	DI	01	Marilla TK Building High/Low Temp	N/A
MRT TT 001 TZ	AI	01	Marilla TK Building or Room Temperature	°F
MRT ZS 001 H	DI	01	Marilla TK Doors & Hatches Intrusion	N/A
MRT DR 001 D	DO	01	Marilla TK Doors & Hatches Open Door	N/A
MRT LS 001 H	DI	01	Marilla TK Pit Flood	N/A
MRT LIT 001 LZ	AI	01	Marilla TK Diesel Tank Level	Gallons
MRT GEN 001 IZ_A	AI	01	Marilla TK Generator Current Phase A	Amps
MRT GEN 001 IZ_B	AI	01	Marilla TK Generator Current Phase B	Amps
MRT GEN 001 IZ_C	AI	01	Marilla TK Generator Current Phase C	Amps
MRT GEN 001 F	DI	01	Marilla TK Generator Fault	N/A
MRT GEN 001 HSA_	DI	01	Marilla TK Generator Not In Auto	N/A
MRT GEN 001 JZ	AI	01	Marilla TK Generator Real Power	KW
MRT XFER 001 F_G	DI	01	Marilla TK Transfer Switch Generator Running	N/A
MRT XFER 001 N_G	DI	01	Marilla TK Transfer Switch On Generator Power	N/A
MRT XFER 001 N_U	DI	01	Marilla TK Transfer Switch On Utility Power	N/A
MRT XFER 001 Y_U	DI	01	Marilla TK Transfer Switch Utility Power Available	N/A
MRT XFER 001 EZ_	AI	01	Marilla TK Transfer Switch Voltage A-B	Volts
MRT XFER 001 EZ_B	AI	01	Marilla TK Transfer Switch Voltage B-C	Volts
MRT XFER 001 EZ_C	AI	01	Marilla TK Transfer Switch Voltage C-A	Volts
MRT RCP 001 EZ_BA	AI	01	Marilla TK Batteries Voltage	Volts
MRT RCP 001 H	DI	01	Marilla TK Door Open	N/A
MRT RCP 001 EY	DI	01	Marilla TK PMCR 120 VAC Present	N/A
MRT RCP 001 F_TVS	DI	01	Marilla TK TVSS Fault	N/A
MRT RCP 001 JN_BA	DI	01	Marilla TK UPS Battery Mode	N/A
MRT RCP 001 Z_UPS	DI	01	Marilla TK UPS Charging Mode	N/A
MRT RCP 001 F_UPS	DI	01	Marilla TK UPS Fault	N/A
MRT VLVS 001 B	DO	01	Marilla TK Altitude Valve Close	N/A
MRT VLVA 001 ZL	DI	01	Marilla TK Altitude Valve Closed	N/A

Marilla TK Site ID MRT Site # 47

Tag Name	I/O Type	Unit	Description	Eng. Unit
MRT VLVS 001 D	DO	01	Marilla TK Altitude Valve Open	N/A
MRT VLVA 001 ZH	DI	01	Marilla TK Altitude Valve Opened	N/A
MRT VLVA 001 Z	AI	01	Marilla TK Altitude Valve Position	Percent
MRT BEA 001 N	DI	01	Marilla TK Beacon On	N/A
MRT HT 001 N	DI	01	Marilla TK Heat Tape On	N/A
MRT HT 001 PY	DI	01	Marilla TK Heat Tape Power Available	N/A
MRT LIT 001 Z	AI	01	Marilla TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 21 3 12 0 36

Newstead TK Site ID NWS Site # 87

Tag Name	I/O Type	Unit	Description	Eng. Unit
NWS LS 001 H	DI	01	Newstead TK Building Flood	N/A
NWS TS 001 H/L	DI	01	Newstead TK Building High/Low Temp	N/A
NWS TT 001 TZ	AI	01	Newstead TK Building or Room Temperature	°F
NWS ZS 001 H	DI	01	Newstead TK Doors & Hatches Intrusion	N/A
NWS DR 001 D	DO	01	Newstead TK Doors & Hatches Open Door	N/A
NWS LS 001 H	DI	01	Newstead TK Pit-Flood	N/A
NWS RCP 001 EZ_B	AI	01	Newstead TK Batteries Voltage	Volts
NWS RCP 001 H	DI	01	Newstead TK Door Open	N/A
NWS RCP 001 EY	DI	01	Newstead TK PMCR 120 VAC Present	N/A
NWS RCP 001 F_TVS	DI	01	Newstead TK TVSS Fault	N/A
NWS RCP 001 JN_BA	DI	01	Newstead TK UPS Battery Mode	N/A
NWS RCP 001 Z_UPS	DI	01	Newstead TK UPS Charging Mode	N/A
NWS RCP 001 F_UPS	DI	01	Newstead TK UPS Fault	N/A
NWS VLVS 001 B	DO	01	Newstead TK Altitude Valve Close	N/A
NWS VLVA 001 ZL	DI	01	Newstead TK Altitude Valve Closed	N/A
NWS VLVS 001 D	DO	01	Newstead TK Altitude Valve Open	N/A

Newstead TK Site ID NWS Site # 87

Tag Name	I/O Type	Unit	Description	Eng. Unit
NWS VLVA 001 ZH	DI	01	Newstead TK Altitude Valve Opened	N/A
NWS VLVA 001 Z	AI	01	Newstead TK Altitude Valve Position	Percent
NWS BEA 001 N	DI	01	Newstead TK Beacon On	N/A
NWS HT 001 N	DI	01	Newstead TK Heat Tape On	N/A
NWS HT 001 PY	DI	01	Newstead TK Heat Tape Power Available	N/A
NWS LIT 001 Z	AI	01	Newstead TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 15 3 4 0 22

North Boston PS Site ID NOB Site # 32

Tag Name	I/O Type	Unit	Description	Eng. Unit
NOB LS 001 H	DI	01	North Boston PS Building Flood	N/A
NOB TS 001 H/L	DI	01	North Boston PS Building High/Low Temp	N/A
NOB TT 001 TZ	AI	01	North Boston PS Building or Room Temperature	°F
NOB ZS 001 H	DI	01	North Boston PS Doors & Hatches Intrusion	N/A
NOB DR 001 D	DO	01	North Boston PS Doors & Hatches Open Door	N/A
NOB LS 001 H	DI	01	North Boston PS Pit Flood	N/A
NOB PM 001 IZ_A	AI	01	North Boston PS Power Monitoring Phase A Current	Amps
NOB PM 001 IZ_B	AI	01	North Boston PS Power Monitoring Phase B Current	Amps
NOB PM 001 IZ_C	AI	01	North Boston PS Power Monitoring Phase C Current	Amps
NOB PM 001 JZ_R	AI	01	North Boston PS Power Monitoring Reactive Power	KVAR
NOB PM 001 JZ	AI	01	North Boston PS Power Monitoring Real Power	KW
NOB PM 001 EZ_AB	AI	01	North Boston PS Power Monitoring Voltage A-B	Volts
NOB PM 001 EZ_BC	AI	01	North Boston PS Power Monitoring Voltage B-C	Volts
NOB PM 001 EZ_CA	AI	01	North Boston PS Power Monitoring Voltage C-A	Volts
NOB VLVC 001 ZL	DI	01	North Boston PS Check Valve Closed	N/A
NOB VLVC 002 ZL	DI	02	North Boston PS Check Valve Closed	N/A
NOB VLVC 001 F	DI	01	North Boston PS Check Valve Fault	N/A

North Boston PS Site ID NOB Site # 32

Tag Name	I/O Type	Unit	Description	Eng. Unit
NOB VLVC 002 F	DI	02	North Boston PS Check Valve Fault	N/A
NOB VLVC 001 ZH	DI	01	North Boston PS Check Valve Open	N/A
NOB VLVC 002 ZH	DI	02	North Boston PS Check Valve Open	N/A
NOB FIT 001 FZ	AI	01	North Boston PS Flow Meter Discharge Flow	MGD
NOB PIT 001 FZ	AI	01	North Boston PS Pressure Meter Discharge Pressure	PSI
NOB PIT 001 PZ	AI	01	North Boston PS Pressure Meter Suction Pressure	PSI
NOB MCP 001 KX	AI	01	North Boston PS Pump Inhibit Start Time Remaining	Seconds
NOB MCP 002 KX	AI	02	North Boston PS Pump Inhibit Start Time Remaining	Seconds
NOB MCP 001 MN	DI	01	North Boston PS Pump Running	N/A
NOB MCP 002 MN	DI	02	North Boston PS Pump Running	N/A
NOB MCP 001 KZQ	AI	01	North Boston PS Pump Runtime	Hours
NOB MCP 002 KZQ	AI	02	North Boston PS Pump Runtime	Hours
NOB MCP 001 HSS	DI	01	North Boston PS Pump SCADA Mode	N/A
NOB MCP 002 HSS	DI	02	North Boston PS Pump SCADA Mode	N/A
NOB MCP 001 MD	DO	01	North Boston PS Pump Start	N/A
NOB MCP 002 MD	DO	02	North Boston PS Pump Start	N/A
NOB MCP 001 MN_N	DO	01	North Boston PS Pump Stop	N/A
NOB MCP 002 MN_N	DO	02	North Boston PS Pump Stop	N/A
NOB RCP 001 EZ_BA	AI	01	North Boston PS Batteries Voltage	Volts
NOB RCP 001 H	DI	01	North Boston PS Door Open	N/A
NOB RCP 001 EY	DI	01	North Boston PS PMCR 120 VAC Present	N/A
NOB RCP 001 F_TVSS	DI	01	North Boston PS TVSS Fault	N/A
NOB RCP 001 JN_BA	DI	01	North Boston PS UPS Battery Mode	N/A
NOB RCP 001 Z_UPS	DI	01	North Boston PS UPS Charging Mode	N/A
NOB RCP 001 F_UPS	DI	01	North Boston PS UPS Fault	N/A

DI	DO	AI	AO	Total
20	5	17	0	42

Pembroke PS (MCWA) Site ID PEM Site # 07A

Tag Name	I/O Type	Unit	Description	Eng. Unit
PEM XFER 001 Y_U	DI	01	Pembroke PS (MCWA) Transfer Switch Utility Power Available	N/A
PEM FIT 001 FZ	AI	01	Pembroke PS (MCWA) Flow Meter Discharge Flow	MGD
PEM PIT 001 PZ	AI	01	Pembroke PS (MCWA) Pressure Meter Suction Pressure	PSI
PEM MCP 001 MN	DI	01	Pembroke PS (MCWA) Pump Running	N/A
PEM MCP 002 MN	DI	02	Pembroke PS (MCWA) Pump Running	N/A

DI DO AI AO Total  
 3 0 2 0 5

Pine Hill PS & TK Site ID PIH Site # 02

Tag Name	I/O Type	Unit	Description	Eng. Unit
PIH LS 001 H	DI	01	Pine Hill PS & TK Building Flood	N/A
PIH TS 001 H/L	DI	01	Pine Hill PS & TK Building High/Low Temp	N/A
PIH TT 001 TZ	AI	01	Pine Hill PS & TK Building or Room Temperature	°F
PIH ZS 001 H	DI	01	Pine Hill PS & TK Doors & Hatches Intrusion	N/A
PIH DR 001 D	DO	01	Pine Hill PS & TK Doors & Hatches Open Door	N/A
PIH LS 001 H	DI	01	Pine Hill PS & TK Pit Flood	N/A
PIH PM 001 IZ_A	AI	01	Pine Hill PS & TK Power Monitoring Phase A Current	Amps
PIH PM 001 IZ_B	AI	01	Pine Hill PS & TK Power Monitoring Phase B Current	Amps
PIH PM 001 IZ_C	AI	01	Pine Hill PS & TK Power Monitoring Phase C Current	Amps
PIH PM 001 JZ_R	AI	01	Pine Hill PS & TK Power Monitoring Reactive Power	KVAR
PIH PM 001 JZ	AI	01	Pine Hill PS & TK Power Monitoring Real Power	KW
PIH PM 001 EZ_AB	AI	01	Pine Hill PS & TK Power Monitoring Voltage A-B	Volts
PIH PM 001 EZ_BC	AI	01	Pine Hill PS & TK Power Monitoring Voltage B-C	Volts
PIH PM 001 EZ_CA	AI	01	Pine Hill PS & TK Power Monitoring Voltage C-A	Volts
PIH VLVC 001 ZL	DI	01	Pine Hill PS & TK Check Valve Closed	N/A
PIH VLVC 002 ZL	DI	02	Pine Hill PS & TK Check Valve Closed	N/A
PIH VLVC 001 F	DI	01	Pine Hill PS & TK Check Valve Fault	N/A
PIH VLVC 002 F	DI	02	Pine Hill PS & TK Check Valve Fault	N/A

Pine Hill PS & TK

Site ID PIH

Site # 02

Tag Name	I/O Type	Unit	Description	Eng. Unit
PIH VLVC 001 ZH	DI	01	Pine Hill PS & TK Check Valve Open	N/A
PIH VLVC 002 ZH	DI	02	Pine Hill PS & TK Check Valve Open	N/A
PIH FIT 001 FZ	AI	01	Pine Hill PS & TK Flow Meter Discharge Flow	MGD
PIH PIT 001 FZ	AI	01	Pine Hill PS & TK Pressure Meter Discharge Pressure	PSI
PIH PIT 001 PZ	AI	01	Pine Hill PS & TK Pressure Meter Suction Pressure	PSI
PIH VFD 002 HSB	DI	02	Pine Hill PS & TK Pump Bypass Selected	N/A
PIH MCP 001 KX	AI	01	Pine Hill PS & TK Pump Inhibit Start Time Remaining	Seconds
PIH MCP 002 KX	AI	02	Pine Hill PS & TK Pump Inhibit Start Time Remaining	Seconds
PIH VFD 002 IZ	AI	02	Pine Hill PS & TK Pump Motor Current	Amps
PIH VFD 002 MTZ	AI	02	Pine Hill PS & TK Pump Motor Thermal State	Percent
PIH MCP 001 MN	DI	01	Pine Hill PS & TK Pump Running	N/A
PIH MCP 002 MN	DI	02	Pine Hill PS & TK Pump Running	N/A
PIH MCP 001 KZQ	AI	01	Pine Hill PS & TK Pump Runtime	Hours
PIH MCP 002 KZQ	AI	02	Pine Hill PS & TK Pump Runtime	Hours
PIH MCP 001 HSS	DI	01	Pine Hill PS & TK Pump SCADA Mode	N/A
PIH MCP 002 HSS	DI	02	Pine Hill PS & TK Pump SCADA Mode	N/A
PIH VFD 002 SZD	AO	02	Pine Hill PS & TK Pump Speed Control	Percent
PIH VFD 002 SZ	AI	02	Pine Hill PS & TK Pump Speed Feedback	Percent
PIH MCP 001 MD	DO	01	Pine Hill PS & TK Pump Start	N/A
PIH MCP 002 MD	DO	02	Pine Hill PS & TK Pump Start	N/A
PIH MCP 001 MN_N	DO	01	Pine Hill PS & TK Pump Stop	N/A
PIH MCP 002 MN_N	DO	02	Pine Hill PS & TK Pump Stop	N/A
PIH VFD 002 TZ	AI	02	Pine Hill PS & TK Pump Thermal State	Percent
PIH VFD 002 EZ	AI	02	Pine Hill PS & TK Pump Voltage to Motor	Volts
PIH RCP 001 EZ_BA	AI	01	Pine Hill PS & TK Batteries Voltage	Volts
PIH RCP 001 H	DI	01	Pine Hill PS & TK Door Open	N/A
PIH RCP 001 EY	DI	01	Pine Hill PS & TK PMCR 120 VAC Present	N/A
PIH RCP 001 F_TVSS	DI	01	Pine Hill PS & TK TVSS Fault	N/A
PIH RCP 001 JN_BAT	DI	01	Pine Hill PS & TK UPS Battery Mode	N/A

Pine Hill PS & TK Site ID PIH Site # 02

Tag Name	I/O Type	Unit	Description	Eng. Unit
PIH RCP 001 Z UPS	DI	01	Pine Hill PS & TK UPS Charging Mode	N/A
PIH RCP 001 F UPS	DI	01	Pine Hill PS & TK UPS Fault	N/A
PIH VLVS 001 B	DO	01	Pine Hill PS & TK Altitude Valve Close	N/A
PIH VLVS 001 B	DO	01	Pine Hill PS & TK Altitude Valve Close	N/A
PIH VLVA 001 ZL	DI	01	Pine Hill PS & TK Altitude Valve Closed	N/A
PIH VLVA 001 ZL	DI	01	Pine Hill PS & TK Altitude Valve Closed	N/A
PIH VLVS 001 D	DO	01	Pine Hill PS & TK Altitude Valve Open	N/A
PIH VLVA 001 ZH	DI	01	Pine Hill PS & TK Altitude Valve Opened	N/A
PIH VLVA 001 ZH	DI	01	Pine Hill PS & TK Altitude Valve Opened	N/A
PIH VLVA 001 Z	AI	01	Pine Hill PS & TK Altitude Valve Position	Percent
PIH VLVA 001 Z	AI	01	Pine Hill PS & TK Altitude Valve Position	Percent
PIH BEA 001 N	DI	01	Pine Hill PS & TK Beacon On	N/A
PIH VLVS 001 B	DO	01	Pine Hill PS & TK Control Valve Close	N/A
PIH VLVS 002 B	DO	02	Pine Hill PS & TK Control Valve Close	N/A
PIH VLVS 003 B	DO	03	Pine Hill PS & TK Control Valve Close	N/A
PIH VLVA 001 ZL	DI	01	Pine Hill PS & TK Control Valve Closed	N/A
PIH VLVA 002 ZL	DI	02	Pine Hill PS & TK Control Valve Closed	N/A
PIH VLVA 003 ZL	DI	03	Pine Hill PS & TK Control Valve Closed	N/A
PIH VLVS 001 D	DO	01	Pine Hill PS & TK Control Valve Open	N/A
PIH VLVS 002 D	DO	02	Pine Hill PS & TK Control Valve Open	N/A
PIH VLVS 003 D	DO	03	Pine Hill PS & TK Control Valve Open	N/A
PIH VLVA 001 ZH	DI	01	Pine Hill PS & TK Control Valve Opened	N/A
PIH VLVA 002 ZH	DI	02	Pine Hill PS & TK Control Valve Opened	N/A
PIH VLVA 003 ZH	DI	03	Pine Hill PS & TK Control Valve Opened	N/A
PIH VLVA 001 Z	AI	01	Pine Hill PS & TK Control Valve Position	Percent
PIH VLVA 002 Z	AI	02	Pine Hill PS & TK Control Valve Position	Percent
PIH VLVA 003 Z	AI	03	Pine Hill PS & TK Control Valve Position	Percent
PIH HT 001 N	DI	01	Pine Hill PS & TK Heat Tape On	N/A
PIH HT 001 PY	DI	01	Pine Hill PS & TK Heat Tape Power Available	N/A



Pine Hill PS & TK Site ID PIH Site # 02

Tag Name	I/O Type	Unit	Description	Eng. Unit
PIH LIT 001 Z	AI	01	Pine Hill PS & TK Tank/Standpipe Level	Feet
PIH LIT 001 Z	AI	01	Pine Hill PS & TK Tank/Standpipe Level	Feet

DI	DO	AI	AO	Total
34	14	29	1	78

Pleasantview TK Site ID PLV Site # 05

Tag Name	I/O Type	Unit	Description	Eng. Unit
PLV LS 001 H	DI	01	Pleasantview TK Building Flood	N/A
PLV TS 001 H/L	DI	01	Pleasantview TK Building High/Low Temp	N/A
PLV TT 001 TZ	AI	01	Pleasantview TK Building or Room Temperature	°F
PLV ZS 001 H	DI	01	Pleasantview TK Doors & Hatches Intrusion	N/A
PLV DR 001 D	DO	01	Pleasantview TK Doors & Hatches Open Door	N/A
PLV LS 001 H	DI	01	Pleasantview TK Pit Flood	N/A
PLV RCP 001 EZ_BA	AI	01	Pleasantview TK Batteries Voltage	Volts
PLV RCP 001 H	DI	01	Pleasantview TK Door Open	N/A
PLV RCP 001 EY	DI	01	Pleasantview TK PMCR 120 VAC Present	N/A
PLV RCP 001 F_TVS	DI	01	Pleasantview TK TVSS Fault	N/A
PLV RCP 001 JN_BA	DI	01	Pleasantview TK UPS Battery Mode	N/A
PLV RCP 001 Z_UPS	DI	01	Pleasantview TK UPS Charging Mode	N/A
PLV RCP 001 F_UPS	DI	01	Pleasantview TK UPS Fault	N/A
PLV VLVS 001 B	DO	01	Pleasantview TK Altitude Valve Close	N/A
PLV VLVA 001 ZL	DI	01	Pleasantview TK Altitude Valve Closed	N/A
PLV VLVS 001 D	DO	01	Pleasantview TK Altitude Valve Open	N/A
PLV VLVA 001 ZH	DI	01	Pleasantview TK Altitude Valve Opened	N/A
PLV VLVA 001 Z	AI	01	Pleasantview TK Altitude Valve Position	Percent
PLV BEA 001 N	DI	01	Pleasantview TK Beacon On	N/A
PLV HT 001 N	DI	01	Pleasantview TK Heat Tape On	N/A
PLV HT 001 PY	DI	01	Pleasantview TK Heat Tape Power Available	N/A

Pleasantview TK Site ID PLV Site # 05

Tag Name	I/O Type	Unit	Description	Eng. Unit
PLV_LJT_001_Z	AI	01	Pleasantview TK Tank/Standpipe Level	Feet

DI	DO	AI	AO	Total
15	3	4	0	22

Rice Hill TK Site ID RCH Site # 18

Tag Name	I/O Type	Unit	Description	Eng. Unit
RCH AS 001 H	DI	01	Rice Hill TK Chlorine Containment Sump Leak	N/A
RCH CFCP 001 MNZ	DI	01	Rice Hill TK Chlorine System Fault	N/A
RCH CFCP 001 SZD	AI	01	Rice Hill TK Chlorine System Feed Rate	PPM
RCH CFCP 001 OO	DO	01	Rice Hill TK Chlorine System Pause	N/A
RCH LT 001 LZ	AI	01	Rice Hill TK Day Tank Level	Lbs.
RCH AIT 001 AZ	AI	01	Rice Hill TK Effluent Chlorine Analyzer Chlorine Residual	PPM
RCH AIT 001 AZ	AI	01	Rice Hill TK Influent Chlorine Analyzer Chlorine Residual	PPM
RCH FS 001 H	DI	01	Rice Hill TK Eyewash stations and showers In Use	N/A
RCH LS 001 H	DI	01	Rice Hill TK Building Flood	N/A
RCH TS 001 H/L	DI	01	Rice Hill TK Building High/Low Temp	N/A
RCH TT 001 TZ	AI	01	Rice Hill TK Building or Room Temperature	°F
RCH ZS 001 H	DI	01	Rice Hill TK Doors & Hatches Intrusion	N/A
RCH DR 001 D	DO	01	Rice Hill TK Doors & Hatches Open Door	N/A
RCH LS 001 H	DI	01	Rice Hill TK Pit Flood	N/A
RCH LIT 001 LZ	AI	01	Rice Hill TK Diesel Tank Level	Gallons
RCH GEN 001 IZ_A	AI	01	Rice Hill TK Generator Current Phase A	Amps
RCH GEN 001 IZ_B	AI	01	Rice Hill TK Generator Current Phase B	Amps
RCH GEN 001 IZ_C	AI	01	Rice Hill TK Generator Current Phase C	Amps
RCH GEN 001 F	DI	01	Rice Hill TK Generator Fault	N/A
RCH GEN 001 HSA_	DI	01	Rice Hill TK Generator Not In Auto	N/A
RCH GEN 001 JZ	AI	01	Rice Hill TK Generator Real Power	KW
RCH XFER 001 F_G	DI	01	Rice Hill TK Transfer Switch Generator Running	N/A

Rice Hill TK Site ID RCH Site # 18

Tag Name	I/O Type	Unit	Description	Eng. Unit
RCH XFER 001 N_G	DI	01	Rice Hill TK Transfer Switch On Generator Power	N/A
RCH XFER 001 N_U	DI	01	Rice Hill TK Transfer Switch On Utility Power	N/A
RCH XFER 001 Y_U	DI	01	Rice Hill TK Transfer Switch Utility Power Available	N/A
RCH XFER 001 EZ_A	AI	01	Rice Hill TK Transfer Switch Voltage A-B	Volts
RCH XFER 001 EZ_B	AI	01	Rice Hill TK Transfer Switch Voltage B-C	Volts
RCH XFER 001 EZ_C	AI	01	Rice Hill TK Transfer Switch Voltage C-A	Volts
RCH RCP 001 EZ_BA	AI	01	Rice Hill TK Batteries Voltage	Volts
RCH RCP 001 H	DI	01	Rice Hill TK Door Open	N/A
RCH RCP 001 EY	DI	01	Rice Hill TK PMCR 120 VAC Present	N/A
RCH RCP 001 F_TVSS	DI	01	Rice Hill TK TVSS Fault	N/A
RCH RCP 001 JN_BA	DI	01	Rice Hill TK UPS Battery Mode	N/A
RCH RCP 001 Z_UPS	DI	01	Rice Hill TK UPS Charging Mode	N/A
RCH RCP 001 F_UPS	DI	01	Rice Hill TK UPS Fault	N/A
RCH VLVS 001 B	DO	01	Rice Hill TK Altitude Valve Close	N/A
RCH VLVA 001 ZL	DI	01	Rice Hill TK Altitude Valve Closed	N/A
RCH VLVS 001 D	DO	01	Rice Hill TK Altitude Valve Open	N/A
RCH VLVA 001 ZH	DI	01	Rice Hill TK Altitude Valve Opened	N/A
RCH VLVA 001 Z	AI	01	Rice Hill TK Altitude Valve Position	Percent
RCH BEA 001 N	DI	01	Rice Hill TK Beacon On	N/A
RCH HT 001 N	DI	01	Rice Hill TK Heat Tape On	N/A
RCH HT 001 PY	DI	01	Rice Hill TK Heat Tape Power Available	N/A
RCH LIT 001 Z	AI	01	Rice Hill TK Tank/Standpipe Level	Feet

DI	DO	AI	AO	Total
24	4	16	0	44

Sandridge TK Site ID SAN Site # 07

Tag Name	I/O Type	Unit	Description	Eng. Unit
SAN LS 001 H	DI	01	Sandridge TK Building Flood	N/A

Sandridge TK Site ID SAN Site # 07

Tag Name	I/O Type	Unit	Description	Eng. Unit
SAN TS 001 H/L	DI	01	Sandridge TK Building High/Low Temp	N/A
SAN TT 001 TZ	AI	01	Sandridge TK Building or Room Temperature	°F
SAN ZS 001 H	DI	01	Sandridge TK Doors & Hatches Intrusion	N/A
SAN DR 001 D	DO	01	Sandridge TK Doors & Hatches Open Door	N/A
SAN LS 001 H	DI	01	Sandridge TK Pit Flood	N/A
SAN RCP 001 EZ_BA	AI	01	Sandridge TK Batteries Voltage	Volts
SAN RCP 001 H	DI	01	Sandridge TK Door Open	N/A
SAN RCP 001 EY	DI	01	Sandridge TK PMCR 120 V AC Present	N/A
SAN RCP 001 F_TVSS	DI	01	Sandridge TK TVSS Fault	N/A
SAN RCP 001 JN_BA	DI	01	Sandridge TK UPS Battery Mode	N/A
SAN RCP 001 Z_UPS	DI	01	Sandridge TK UPS Charging Mode	N/A
SAN RCP 001 F_UPS	DI	01	Sandridge TK UPS Fault	N/A
SAN VLVS 001 B	DO	01	Sandridge TK Altitude Valve Close	N/A
SAN VLVA 001 ZL	DI	01	Sandridge TK Altitude Valve Closed	N/A
SAN VLVS 001 D	DO	01	Sandridge TK Altitude Valve Open	N/A
SAN VLVA 001 ZH	DI	01	Sandridge TK Altitude Valve Opened	N/A
SAN VLVA 001 Z	AI	01	Sandridge TK Altitude Valve Position	Percent
SAN BEA 001 N	DI	01	Sandridge TK Beacon On	N/A
SAN HT 001 N	DI	01	Sandridge TK Heat Tape On	N/A
SAN HT 001 PY	DI	01	Sandridge TK Heat Tape Power Available	N/A
SAN LIT 001 Z	AI	01	Sandridge TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 15 3 4 0 22

Scherff Road TK Site ID SHF Site # 37

Tag Name	I/O Type	Unit	Description	Eng. Unit
SHF LS 001 H	DI	01	Scherff Road TK Building Flood	N/A
SHF TS 001 H/L	DI	01	Scherff Road TK Building High/Low Temp	N/A

Scherff Road TK Site ID SHF Site # 37

Tag Name	I/O Type	Unit	Description	Eng. Unit
SHF TT 001 TZ	AI	01	Scherff Road TK Building or Room Temperature	°F
SHF ZS 001 H	DI	01	Scherff Road TK Doors & Hatches Intrusion	N/A
SHF DR 001 D	DO	01	Scherff Road TK Doors & Hatches Open Door	N/A
SHF LS 001 H	DI	01	Scherff Road TK Pit Flood	N/A
SHF RCP 001 EZ_BA	AI	01	Scherff Road TK Batteries Voltage	Volts
SHF RCP 001 H	DI	01	Scherff Road TK Door Open	N/A
SHF RCP 001 EY	DI	01	Scherff Road TK PMCR 120 VAC Present	N/A
SHF RCP 001 F_TVS	DI	01	Scherff Road TK TVSS Fault	N/A
SHF RCP 001 JN_BA	DI	01	Scherff Road TK UPS Battery Mode	N/A
SHF RCP 001 Z_UPS	DI	01	Scherff Road TK UPS Charging Mode	N/A
SHF RCP 001 F_UPS	DI	01	Scherff Road TK UPS Fault	N/A
SHF VLVS 001 B	DO	01	Scherff Road TK Altitude Valve Close	N/A
SHF VLVA 001 ZL	DI	01	Scherff Road TK Altitude Valve Closed	N/A
SHF VLVS 001 D	DO	01	Scherff Road TK Altitude Valve Open	N/A
SHF VLVA 001 ZH	DI	01	Scherff Road TK Altitude Valve Opened	N/A
SHF VLVA 001 Z	AI	01	Scherff Road TK Altitude Valve Position	Percent
SHF BEA 001 N	DI	01	Scherff Road TK Beacon On	N/A
SHF HT 001 N	DI	01	Scherff Road TK Heat Tape On	N/A
SHF HT 001 PY	DI	01	Scherff Road TK Heat Tape Power Available	N/A
SHF LIT 001 Z	AI	01	Scherff Road TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 15 3 4 0 22

Shadagee Road PS Site ID SDG Site # 89

Tag Name	I/O Type	Unit	Description	Eng. Unit
SDG LS 001 H	DI	01	Shadagee Road PS Building Flood	N/A
SDG TS 001 H/L	DI	01	Shadagee Road PS Building High/Low Temp	N/A
SDG TT 001 TZ	AI	01	Shadagee Road PS Building or Room Temperature	°F

Shadagee Road PS Site ID SDG Site # 89

Tag Name	I/O Type	Unit	Description	Eng. Unit
SDG ZS 001 H	DI	01	Shadagee Road PS Doors & Hatches Intrusion	N/A
SDG DR 001 D	DO	01	Shadagee Road PS Doors & Hatches Open Door	N/A
SDG LS 001 H	DI	01	Shadagee Road PS Pit Flood	N/A
SDG LIT 001 LZ	AI	01	Shadagee Road PS Diesel Tank Level	Gallons
SDG GEN 001 IZ_A	AI	01	Shadagee Road PS Generator Current Phase A	Amps
SDG GEN 001 IZ_B	AI	01	Shadagee Road PS Generator Current Phase B	Amps
SDG GEN 001 IZ_C	AI	01	Shadagee Road PS Generator Current Phase C	Amps
SDG GEN 001 F	DI	01	Shadagee Road PS Generator Fault	N/A
SDG GEN 001 HSA_	DI	01	Shadagee Road PS Generator Not In Auto	N/A
SDG GEN 001 JZ	AI	01	Shadagee Road PS Generator Real Power	KW
SDG XFER 001 F_G	DI	01	Shadagee Road PS Transfer Switch Generator Running	N/A
SDG XFER 001 N_G	DI	01	Shadagee Road PS Transfer Switch On Generator Power	N/A
SDG XFER 001 N_U	DI	01	Shadagee Road PS Transfer Switch On Utility Power	N/A
SDG XFER 001 Y_U	DI	01	Shadagee Road PS Transfer Switch Utility Power Available	N/A
SDG XFER 001 EZ_A	AI	01	Shadagee Road PS Transfer Switch Voltage A-B	Volts
SDG XFER 001 EZ_B	AI	01	Shadagee Road PS Transfer Switch Voltage B-C	Volts
SDG XFER 001 EZ_C	AI	01	Shadagee Road PS Transfer Switch Voltage C-A	Volts
SDG PM 001 IZ_A	AI	01	Shadagee Road PS Power Monitoring Phase A Current	Amps
SDG PM 001 IZ_B	AI	01	Shadagee Road PS Power Monitoring Phase B Current	Amps
SDG PM 001 IZ_C	AI	01	Shadagee Road PS Power Monitoring Phase C Current	Amps
SDG PM 001 JZ_R	AI	01	Shadagee Road PS Power Monitoring Reactive Power	KVAR
SDG PM 001 JZ	AI	01	Shadagee Road PS Power Monitoring Real Power	KW
SDG PM 001 EZ_AB	AI	01	Shadagee Road PS Power Monitoring Voltage A-B	Volts
SDG PM 001 EZ_BC	AI	01	Shadagee Road PS Power Monitoring Voltage B-C	Volts
SDG PM 001 EZ_CA	AI	01	Shadagee Road PS Power Monitoring Voltage C-A	Volts
SDG VLVC 001 ZL	DI	01	Shadagee Road PS Check Valve Closed	N/A
SDG VLVC 002 ZL	DI	02	Shadagee Road PS Check Valve Closed	N/A
SDG VLVC 001 F	DI	01	Shadagee Road PS Check Valve Fault	N/A
SDG VLVC 002 F	DI	02	Shadagee Road PS Check Valve Fault	N/A

Shadagee Road PS Site ID SDG Site # 89

Tag Name	I/O Type	Unit	Description	Eng. Unit
SDG VLVC 001 ZH	DI	01	Shadagee Road PS Check Valve Open	N/A
SDG VLVC 002 ZH	DI	02	Shadagee Road PS Check Valve Open	N/A
SDG FIT 001 FZ	AI	01	Shadagee Road PS Flow Meter Discharge Flow	MGD
SDG PIT 001 FZ	AI	01	Shadagee Road PS Pressure Meter Discharge Pressure	PSI
SDG PIT 001 PZ	AI	01	Shadagee Road PS Pressure Meter Suction Pressure	PSI
SDG VFD 001 HSB	DI	01	Shadagee Road PS Pump Bypass Selected	N/A
SDG VFD 002 HSB	DI	02	Shadagee Road PS Pump Bypass Selected	N/A
SDG MCP 001 KX	AI	01	Shadagee Road PS Pump Inhibit Start Time Remaining	Seconds
SDG MCP 002 KX	AI	02	Shadagee Road PS Pump Inhibit Start Time Remaining	Seconds
SDG VFD 001 IZ	AI	01	Shadagee Road PS Pump Motor Current	Amps
SDG VFD 002 IZ	AI	02	Shadagee Road PS Pump Motor Current	Amps
SDG VFD 001 MTZ	AI	01	Shadagee Road PS Pump Motor Thermal State	Percent
SDG VFD 002 MTZ	AI	02	Shadagee Road PS Pump Motor Thermal State	Percent
SDG MCP 001 MN	DI	01	Shadagee Road PS Pump Running	N/A
SDG MCP 002 MN	DI	02	Shadagee Road PS Pump Running	N/A
SDG MCP 001 KZQ	AI	01	Shadagee Road PS Pump Runtime	Hours
SDG MCP 002 KZQ	AI	02	Shadagee Road PS Pump Runtime	Hours
SDG MCP 001 HSS	DI	01	Shadagee Road PS Pump SCADA Mode	N/A
SDG MCP 002 HSS	DI	02	Shadagee Road PS Pump SCADA Mode	N/A
SDG VFD 001 SZD	AO	01	Shadagee Road PS Pump Speed Control	Percent
SDG VFD 002 SZD	AO	02	Shadagee Road PS Pump Speed Control	Percent
SDG VFD 001 SZ	AI	01	Shadagee Road PS Pump Speed Feedback	Percent
SDG VFD 002 SZ	AI	02	Shadagee Road PS Pump Speed Feedback	Percent
SDG MCP 001 MD	DO	01	Shadagee Road PS Pump Start	N/A
SDG MCP 002 MD	DO	02	Shadagee Road PS Pump Start	N/A
SDG MCP 001 MN_N	DO	01	Shadagee Road PS Pump Stop	N/A
SDG MCP 002 MN_N	DO	02	Shadagee Road PS Pump Stop	N/A
SDG VFD 001 TZ	AI	01	Shadagee Road PS Pump Thermal State	Percent
SDG VFD 002 TZ	AI	02	Shadagee Road PS Pump Thermal State	Percent

Shadagee Road PS Site ID SDG Site # 89

Tag Name	I/O Type	Unit	Description	Eng. Unit
SDG VFD 001 EZ	AI	01	Shadagee Road PS Pump Voltage to Motor	Volts
SDG VFD 002 EZ	AI	02	Shadagee Road PS Pump Voltage to Motor	Volts
SDG RCP 001 EZ_BA	AI	01	Shadagee Road PS Batteries Voltage	Volts
SDG RCP 001 H	DI	01	Shadagee Road PS Door Open	N/A
SDG RCP 001 EY	DI	01	Shadagee Road PS PMCR 120 VAC Present	N/A
SDG RCP 001 F_TVSS	DI	01	Shadagee Road PS TVSS Fault	N/A
SDG RCP 001 JN_BA	DI	01	Shadagee Road PS UPS Battery Mode	N/A
SDG RCP 001 Z_UPS	DI	01	Shadagee Road PS UPS Charging Mode	N/A
SDG RCP 001 F_UPS	DI	01	Shadagee Road PS UPS Fault	N/A

DI DO AI AO Total  
 28 5 35 2 70

Sturgeon Point Site ID STP Site # 20

Tag Name	I/O Type	Unit	Description	Eng. Unit
STP FIT 001 FZ	AI	01	Sturgeon Point Flow Meter Discharge Flow	MGD
STP PIT 001 FZ	AI	01	Sturgeon Point Pressure Meter Discharge Pressure	PSI
STP VFD 003 HSB	DI	03	Sturgeon Point Pump Bypass Selected	N/A
STP VFD 004 HSB	DI	04	Sturgeon Point Pump Bypass Selected	N/A
STP VFD 005 HSB	DI	05	Sturgeon Point Pump Bypass Selected	N/A
STP MCP 001 KX	AI	01	Sturgeon Point Pump Inhibit Start Time Remaining	Seconds
STP MCP 002 KX	AI	02	Sturgeon Point Pump Inhibit Start Time Remaining	Seconds
STP MCP 003 KX	AI	03	Sturgeon Point Pump Inhibit Start Time Remaining	Seconds
STP MCP 004 KX	AI	04	Sturgeon Point Pump Inhibit Start Time Remaining	Seconds
STP MCP 005 KX	AI	05	Sturgeon Point Pump Inhibit Start Time Remaining	Seconds
STP MCP 006 KX	AI	06	Sturgeon Point Pump Inhibit Start Time Remaining	Seconds
STP MCP 007 KX	AI	07	Sturgeon Point Pump Inhibit Start Time Remaining	Seconds
STP VFD 003 IZ	AI	03	Sturgeon Point Pump Motor Current	Amps
STP VFD 004 IZ	AI	04	Sturgeon Point Pump Motor Current	Amps



Sturgeon Point Site ID STP Site # 20

Tag Name	I/O Type	Unit	Description	Eng. Unit
STP VFD 005 IZ	AI	05	Sturgeon Point Pump Motor Current	Amps
STP VFD 003 MTZ	AI	03	Sturgeon Point Pump Motor Thermal State	Percent
STP VFD 004 MTZ	AI	04	Sturgeon Point Pump Motor Thermal State	Percent
STP VFD 005 MTZ	AI	05	Sturgeon Point Pump Motor Thermal State	Percent
STP MCP 001 MN	DI	01	Sturgeon Point Pump Running	N/A
STP MCP 002 MN	DI	02	Sturgeon Point Pump Running	N/A
STP MCP 003 MN	DI	03	Sturgeon Point Pump Running	N/A
STP MCP 004 MN	DI	04	Sturgeon Point Pump Running	N/A
STP MCP 005 MN	DI	05	Sturgeon Point Pump Running	N/A
STP MCP 006 MN	DI	06	Sturgeon Point Pump Running	N/A
STP MCP 007 MN	DI	07	Sturgeon Point Pump Running	N/A
STP MCP 001 KZQ	AI	01	Sturgeon Point Pump Runtime	Hours
STP MCP 002 KZQ	AI	02	Sturgeon Point Pump Runtime	Hours
STP MCP 003 KZQ	AI	03	Sturgeon Point Pump Runtime	Hours
STP MCP 004 KZQ	AI	04	Sturgeon Point Pump Runtime	Hours
STP MCP 005 KZQ	AI	05	Sturgeon Point Pump Runtime	Hours
STP MCP 006 KZQ	AI	06	Sturgeon Point Pump Runtime	Hours
STP MCP 007 KZQ	AI	07	Sturgeon Point Pump Runtime	Hours
STP VFD 003 SZ	AI	03	Sturgeon Point Pump Speed Feedback	Percent
STP VFD 004 SZ	AI	04	Sturgeon Point Pump Speed Feedback	Percent
STP VFD 005 SZ	AI	05	Sturgeon Point Pump Speed Feedback	Percent
STP VFD 003 TZ	AI	03	Sturgeon Point Pump Thermal State	Percent
STP VFD 004 TZ	AI	04	Sturgeon Point Pump Thermal State	Percent
STP VFD 005 TZ	AI	05	Sturgeon Point Pump Thermal State	Percent
STP VFD 003 EZ	AI	03	Sturgeon Point Pump Voltage to Motor	Volts
STP VFD 004 EZ	AI	04	Sturgeon Point Pump Voltage to Motor	Volts
STP VFD 005 EZ	AI	05	Sturgeon Point Pump Voltage to Motor	Volts
STP LIT 0 Z	AI		Sturgeon Point Clear Well 1 Level	MG
STP LIT 0 Z	AI		Sturgeon Point Clear Well 2 Level	MG

Sturgeon Point Site ID STP Site # 20

Tag Name	I/O Type	Unit	Description	Eng. Unit
STP FIT 0 Q	AI		Sturgeon Point Effluent Daily Total Flow	MGD
STP TBD 0	DI		Sturgeon Point Electrical Service 48 Volt Station Battery Low	N/A
STP ES 0 EZ_35A	AI		Sturgeon Point Electrical Service BUS 35A Voltage	Volts
STP ES 0 EZ_35B	AI		Sturgeon Point Electrical Service BUS 35B Voltage	Volts
STP ES 0 IZ_5A	AI		Sturgeon Point Electrical Service BUS 5A Current	AMPS
STP ES 0 JZ_5A	AI		Sturgeon Point Electrical Service BUS 5A Power	KW
STP ES 0 EZ_5A	AI		Sturgeon Point Electrical Service BUS 5A Voltage	Volts
STP ES 0 IZ_5B	AI		Sturgeon Point Electrical Service BUS 5B Current	AMPS
STP ES 0 JZ_5B	AI		Sturgeon Point Electrical Service BUS 5B Power	KW
STP ES 0 EZ_5B	AI		Sturgeon Point Electrical Service BUS 5B Voltage	Volts
STP TBD 0	DI		Sturgeon Point Electrical Service Charger Fail	N/A
STP TBD 0	DI		Sturgeon Point Electrical Service Charger Fail	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 35-A-1-1 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 35-A-1-2 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 35-B-2-1 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 35-B-2-2 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-A-1-0 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-A-1-1 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-A-1-2 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-A-1-3 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-A-1-5 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-B-2-0 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-B-2-1 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-B-2-2 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-B-2-3 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-B-2-4 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-B-2-5 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-B-2-6 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-B-3-0 Status	N/A

Sturgeon Point Site ID STP Site # 20

Tag Name	I/O Type	Unit	Description	Eng. Unit
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-B-3-1 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-B-3-2 Status	N/A
STP CB 0 D	DI		Sturgeon Point Electrical Service Circuit Breaker 5-B-3-3 Status	N/A
STP GEN 0	DI		Sturgeon Point Generator 1 Day Tank Low	N/A
STP GEN 0	DI		Sturgeon Point Generator 1 Fail	N/A
STP GEN 0	DI		Sturgeon Point Generator 1 Status	N/A
STP GEN 0	DI		Sturgeon Point Generator 2 Day Tank Low	N/A
STP GEN 0	DI		Sturgeon Point Generator 2 Fail	N/A
STP GEN 0	DI		Sturgeon Point Generator 2 Status	N/A
STP GEN 0	DI		Sturgeon Point Generator 3 Day Tank Low	N/A
STP GEN 0	DI		Sturgeon Point Generator 3 Fail	N/A
STP GEN 0	DI		Sturgeon Point Generator 3 Status	N/A
STP GEN 0	AI		Sturgeon Point Generator Fuel Tank Level	Gallons
STP 0	AO		Sturgeon Point Tank GUN Tank Level	MG

DI	DO	AI	AO	Total
42	0	43	1	86

Trevett Road PS Site ID TVS Site # 80

Tag Name	I/O Type	Unit	Description	Eng. Unit
TVS LS 001 H	DI	01	Trevett Road PS Building Flood	N/A
TVS TS 001 H/L	DI	01	Trevett Road PS Building High/Low Temp	N/A
TVS TT 001 TZ	AI	01	Trevett Road PS Building or Room Temperature	°F
TVS ZS 001 H	DI	01	Trevett Road PS Doors & Hatches Intrusion	N/A
TVS DR 001 D	DO	01	Trevett Road PS Doors & Hatches Open Door	N/A
TVS LS 001 H	DI	01	Trevett Road PS Pit Flood	N/A
TVS PM 001 IZ_A	AI	01	Trevett Road PS Power Monitoring Phase A Current	Amps
TVS PM 001 IZ_B	AI	01	Trevett Road PS Power Monitoring Phase B Current	Amps
TVS PM 001 IZ_C	AI	01	Trevett Road PS Power Monitoring Phase C Current	Amps

Trevett Road PS Site ID TVS Site # 80

Tag Name	I/O Type	Unit	Description	Eng. Unit
TVS PM 001 JZ_R	AI	01	Trevett Road PS Power Monitoring Reactive Power	KVAR
TVS PM 001 JZ	AI	01	Trevett Road PS Power Monitoring Real Power	KW
TVS PM 001 EZ_AB	AI	01	Trevett Road PS Power Monitoring Voltage A-B	Volts
TVS PM 001 EZ_BC	AI	01	Trevett Road PS Power Monitoring Voltage B-C	Volts
TVS PM 001 EZ_CA	AI	01	Trevett Road PS Power Monitoring Voltage C-A	Volts
TVS VLVC 001 ZL	DI	01	Trevett Road PS Check Valve Closed	N/A
TVS VLVC 002 ZL	DI	02	Trevett Road PS Check Valve Closed	N/A
TVS VLVC 001 F	DI	01	Trevett Road PS Check Valve Fault	N/A
TVS VLVC 002 F	DI	02	Trevett Road PS Check Valve Fault	N/A
TVS VLVC 001 ZH	DI	01	Trevett Road PS Check Valve Open	N/A
TVS VLVC 002 ZH	DI	02	Trevett Road PS Check Valve Open	N/A
TVS FIT 001 FZ	AI	01	Trevett Road PS Flow Meter Discharge Flow	MGD
TVS PIT 001 FZ	AI	01	Trevett Road PS Pressure Meter Discharge Pressure	PSI
TVS PIT 001 PZ	AI	01	Trevett Road PS Pressure Meter Suction Pressure	PSI
TVS VFD 001 HSB	DI	01	Trevett Road PS Pump Bypass Selected	N/A
TVS VFD 002 HSB	DI	02	Trevett Road PS Pump Bypass Selected	N/A
TVS MCP 001 KX	AI	01	Trevett Road PS Pump Inhibit Start Time Remaining	Seconds
TVS MCP 002 KX	AI	02	Trevett Road PS Pump Inhibit Start Time Remaining	Seconds
TVS VFD 001 IZ	AI	01	Trevett Road PS Pump Motor Current	Amps
TVS VFD 002 IZ	AI	02	Trevett Road PS Pump Motor Current	Amps
TVS VFD 001 MTZ	AI	01	Trevett Road PS Pump Motor Thermal State	Percent
TVS VFD 002 MTZ	AI	02	Trevett Road PS Pump Motor Thermal State	Percent
TVS MCP 001 MN	DI	01	Trevett Road PS Pump Running	N/A
TVS MCP 002 MN	DI	02	Trevett Road PS Pump Running	N/A
TVS MCP 001 KZQ	AI	01	Trevett Road PS Pump Runtime	Hours
TVS MCP 002 KZQ	AI	02	Trevett Road PS Pump Runtime	Hours
TVS MCP 001 HSS	DI	01	Trevett Road PS Pump SCADA Mode	N/A
TVS MCP 002 HSS	DI	02	Trevett Road PS Pump SCADA Mode	N/A
TVS VFD 001 SZD	AO	01	Trevett Road PS Pump Speed Control	Percent

Trevett Road PS Site ID TVS Site # 80

Tag Name	I/O Type	Unit	Description	Eng. Unit
TVS VFD 002 SZD	AO	02	Trevett Road PS Pump Speed Control	Percent
TVS VFD 001 SZ	AI	01	Trevett Road PS Pump Speed Feedback	Percent
TVS VFD 002 SZ	AI	02	Trevett Road PS Pump Speed Feedback	Percent
TVS MCP 001 MD	DO	01	Trevett Road PS Pump Start	N/A
TVS MCP 002 MD	DO	02	Trevett Road PS Pump Start	N/A
TVS MCP 001 MN_N	DO	01	Trevett Road PS Pump Stop	N/A
TVS MCP 002 MN_N	DO	02	Trevett Road PS Pump Stop	N/A
TVS VFD 001 TZ	AI	01	Trevett Road PS Pump Thermal State	Percent
TVS VFD 002 TZ	AI	02	Trevett Road PS Pump Thermal State	Percent
TVS VFD 001 EZ	AI	01	Trevett Road PS Pump Voltage to Motor	Volts
TVS VFD 002 EZ	AI	02	Trevett Road PS Pump Voltage to Motor	Volts
TVS RCP 001 EZ_BA	AI	01	Trevett Road PS Batteries Voltage	Volts
TVS RCP 001 H	DI	01	Trevett Road PS Door Open	N/A
TVS RCP 001 EY	DI	01	Trevett Road PS PMCR 120 VAC Present	N/A
TVS RCP 001 F_TVS	DI	01	Trevett Road PS TVSS Fault	N/A
TVS RCP 001 JN_BA	DI	01	Trevett Road PS UPS Battery Mode	N/A
TVS RCP 001 Z_UPS	DI	01	Trevett Road PS UPS Charging Mode	N/A
TVS RCP 001 F_UPS	DI	01	Trevett Road PS UPS Fault	N/A

DI DO AI AO Total  
 22 5 27 2 56

Trevett Road TK Site ID TVT Site # 88

Tag Name	I/O Type	Unit	Description	Eng. Unit
TVT AS 001 H	DI	01	Trevett Road TK Chlorine Containment Sump Leak	N/A
TVT CFCP 001 MNZ	DI	01	Trevett Road TK Chlorine System Fault	N/A
TVT CFCP 001 SZD	AI	01	Trevett Road TK Chlorine System Feed Rate	PPM
TVT CFCP 001 OO	DO	01	Trevett Road TK Chlorine System Pause	N/A
TVT LT 001 LZ	AI	01	Trevett Road TK Day Tank Level	Lbs.

Trevett Road TK Site ID TVT Site # 88

Tag Name	I/O Type	Unit	Description	Eng. Unit
TVT AIT 001 AZ	AI	01	Trevett Road TK Effluent Chlorine Analyzer Chlorine Residual	PPM
TVT AIT 001 AZ	AI	01	Trevett Road TK Influent Chlorine Analyzer Chlorine Residual	PPM
TVT FS 001 H	DI	01	Trevett Road TK Eyewash stations and showers In Use	N/A
TVT LS 001 H	DI	01	Trevett Road TK Building Flood	N/A
TVT TS 001 H/L	DI	01	Trevett Road TK Building High/Low Temp	N/A
TVT TT 001 TZ	AI	01	Trevett Road TK Building or Room Temperature	°F
TVT ZS 001 H	DI	01	Trevett Road TK Doors & Hatches Intrusion	N/A
TVT DR 001 D	DO	01	Trevett Road TK Doors & Hatches Open Door	N/A
TVT LS 001 H	DI	01	Trevett Road TK Pit Flood	N/A
TVT LIT 001 LZ	AI	01	Trevett Road TK Diesel Tank Level	Gallons
TVT GEN 001 IZ_A	AI	01	Trevett Road TK Generator Current Phase A	Amps
TVT GEN 001 IZ_B	AI	01	Trevett Road TK Generator Current Phase B	Amps
TVT GEN 001 IZ_C	AI	01	Trevett Road TK Generator Current Phase C	Amps
TVT GEN 001 F	DI	01	Trevett Road TK Generator Fault	N/A
TVT GEN 001 HSA_	DI	01	Trevett Road TK Generator Not In Auto	N/A
TVT GEN 001 JZ	AI	01	Trevett Road TK Generator Real Power	KW
TVT XFER 001 F_G	DI	01	Trevett Road TK Transfer Switch Generator Running	N/A
TVT XFER 001 N_G	DI	01	Trevett Road TK Transfer Switch On Generator Power	N/A
TVT XFER 001 N_U	DI	01	Trevett Road TK Transfer Switch On Utility Power	N/A
TVT XFER 001 Y_U	DI	01	Trevett Road TK Transfer Switch Utility Power Available	N/A
TVT XFER 001 EZ_A	AI	01	Trevett Road TK Transfer Switch Voltage A-B	Volts
TVT XFER 001 EZ_B	AI	01	Trevett Road TK Transfer Switch Voltage B-C	Volts
TVT XFER 001 EZ_C	AI	01	Trevett Road TK Transfer Switch Voltage C-A	Volts
TVT RCP 001 EZ_BA	AI	01	Trevett Road TK Batteries Voltage	Volts
TVT RCP 001 H	DI	01	Trevett Road TK Door Open	N/A
TVT RCP 001 EY	DI	01	Trevett Road TK PMCR 120 VAC Present	N/A
TVT RCP 001 F_TVSS	DI	01	Trevett Road TK TVSS Fault	N/A
TVT RCP 001 JN_BA	DI	01	Trevett Road TK UPS Battery Mode	N/A
TVT RCP 001 Z_UPS	DI	01	Trevett Road TK UPS Charging Mode	N/A

Trevett Road TK Site ID TVT Site # 88

Tag Name	I/O Type	Unit	Description	Eng. Unit
TVT RCP 001 F UPS	DI	01	Trevett Road TK UPS Fault	N/A
TVT VLVS 001 B	DO	01	Trevett Road TK Altitude Valve Close	N/A
TVT VLVA 001 ZL	DI	01	Trevett Road TK Altitude Valve Closed	N/A
TVT VLVS 001 D	DO	01	Trevett Road TK Altitude Valve Open	N/A
TVT VLVA 001 ZH	DI	01	Trevett Road TK Altitude Valve Opened	N/A
TVT VLVA 001 Z	AI	01	Trevett Road TK Altitude Valve Position	Percent
TVT BEA 001 N	DI	01	Trevett Road TK Beacon On	N/A
TVT HT 001 N	DI	01	Trevett Road TK Heat Tape On	N/A
TVT HT 001 PY	DI	01	Trevett Road TK Heat Tape Power Available	N/A
TVT LIT 001 Z	AI	01	Trevett Road TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
 24 4 16 0 44

Van de Water Site ID VDW Site # 40

Tag Name	I/O Type	Unit	Description	Eng. Unit
VDW FIT 001 FZ	AI	01	Van de Water Flow Meter Discharge Flow	MGD
VDW PIT 001 FZ	AI	01	Van de Water Pressure Meter Discharge Pressure	PSI
VDW VFD 004 HSB	DI	04	Van de Water Pump Bypass Selected	N/A
VDW VFD 005 HSB	DI	05	Van de Water Pump Bypass Selected	N/A
VDW MCP 001 KX	AI	01	Van de Water Pump Inhibit Start Time Remaining	Seconds
VDW MCP 002 KX	AI	02	Van de Water Pump Inhibit Start Time Remaining	Seconds
VDW MCP 003 KX	AI	03	Van de Water Pump Inhibit Start Time Remaining	Seconds
VDW MCP 004 KX	AI	04	Van de Water Pump Inhibit Start Time Remaining	Seconds
VDW MCP 005 KX	AI	05	Van de Water Pump Inhibit Start Time Remaining	Seconds
VDW MCP 006 KX	AI	06	Van de Water Pump Inhibit Start Time Remaining	Seconds
VDW VFD 004 IZ	AI	04	Van de Water Pump Motor Current	Amps
VDW VFD 005 IZ	AI	05	Van de Water Pump Motor Current	Amps
VDW VFD 004 MTZ	AI	04	Van de Water Pump Motor Thermal State	Percent

Van de Water Site ID VDW Site # 40

Tag Name	I/O Type	Unit	Description	Eng. Unit
VDW_VFD_005_MTZ	AI	05	Van de Water Pump Motor Thermal State	Percent
VDW_MCP_001_MN	DI	01	Van de Water Pump Running	N/A
VDW_MCP_002_MN	DI	02	Van de Water Pump Running	N/A
VDW_MCP_003_MN	DI	03	Van de Water Pump Running	N/A
VDW_MCP_004_MN	DI	04	Van de Water Pump Running	N/A
VDW_MCP_005_MN	DI	05	Van de Water Pump Running	N/A
VDW_MCP_006_MN	DI	06	Van de Water Pump Running	N/A
VDW_MCP_001_KZQ	AI	01	Van de Water Pump Runtime	Hours
VDW_MCP_002_KZQ	AI	02	Van de Water Pump Runtime	Hours
VDW_MCP_003_KZQ	AI	03	Van de Water Pump Runtime	Hours
VDW_MCP_004_KZQ	AI	04	Van de Water Pump Runtime	Hours
VDW_MCP_005_KZQ	AI	05	Van de Water Pump Runtime	Hours
VDW_MCP_006_KZQ	AI	06	Van de Water Pump Runtime	Hours
VDW_VFD_004_SZ	AI	04	Van de Water Pump Speed Feedback	Percent
VDW_VFD_005_SZ	AI	05	Van de Water Pump Speed Feedback	Percent
VDW_VFD_004_TZ	AI	04	Van de Water Pump Thermal State	Percent
VDW_VFD_005_TZ	AI	05	Van de Water Pump Thermal State	Percent
VDW_VFD_004_EZ	AI	04	Van de Water Pump Voltage to Motor	Volts
VDW_VFD_005_EZ	AI	05	Van de Water Pump Voltage to Motor	Volts
VDW_CB_0_D	DI		Van de Water Electrical Service Circuit Breaker 23-A-1 Status	N/A
VDW_CB_0_D	DI		Van de Water Electrical Service Circuit Breaker 23-B-1 Status	N/A
VDW_CB_0_D	DI		Van de Water Electrical Service Circuit Breaker 5-A-3-3F Status	N/A
VDW_CB_0_D	DI		Van de Water Electrical Service Circuit Breaker 5-A-3-4F Status	N/A
VDW_CB_0_D	DI		Van de Water Electrical Service Circuit Breaker 5-A-3-5F Status	N/A
VDW_CB_0_D	DI		Van de Water Electrical Service Circuit Breaker 5-A-3-6F Status	N/A
VDW_CB_0_D	DI		Van de Water Electrical Service Circuit Breaker 5-B-4-1F Status	N/A
VDW_CB_0_D	DI		Van de Water Electrical Service Circuit Breaker 5-B-4-8F Status	N/A
VDW_CB_0_D	DI		Van de Water Electrical Service Circuit Breaker 5-B-4-9F Status	N/A
VDW_TBD_0	DI		Van de Water Electrical Service Generator 5-A Status	N/A



Van de Water Site ID VDW Site # 40

Tag Name	I/O Type	Unit	Description	Eng. Unit
VDW TBD 0	DI		Van de Water Electrical Service PLC Status	N/A
VDW TBD 0	AI		Van de Water Electrical Service Switchgear A BUS AMPS	AMPS
VDW TBD 0	AI		Van de Water Electrical Service Switchgear A BUS VOLTS	VOLTS
VDW TBD 0	AI		Van de Water Electrical Service Switchgear A KILOWATTS	KW
VDW TBD 0	AI		Van de Water Electrical Service Switchgear B BUS AMPS	AMPS
VDW TBD 0	AI		Van de Water Electrical Service Switchgear B BUS VOLTS	VOLTS
VDW TBD 0	AI		Van de Water Electrical Service Switchgear B KILOWATTS	KW
VDW TX 0	DI		Van de Water Electrical Service Transformer 5-A Status	N/A
VDW TX 0	DI		Van de Water Electrical Service Transformer A High Pressure Alarm	N/A
VDW TX 0	DI		Van de Water Electrical Service Transformer A High Temperature Alarm	N/A
VDW TX 0	DI		Van de Water Electrical Service Transformer A Oil Level Low Alarm	N/A
VDW TX 0	DI		Van de Water Electrical Service Transformer B High Pressure Alarm	N/A
VDW TX 0	DI		Van de Water Electrical Service Transformer B High Temperature Alarm	N/A
VDW TX 0	DI		Van de Water Electrical Service Transformer B Oil Level Low Alarm	N/A
VDW 0	AI		Van de Water Station Flow Daily Water Flow	MGD
VDW LIT 001	AI	01	Van de Water Tank CLEARWELL Level	FT

DI DO AI AO Total  
 26 0 32 0 58

Veterans Park PS & TK Site ID VPK Site # 78

Tag Name	I/O Type	Unit	Description	Eng. Unit
VPK LS 001 H	DI	01	Veterans Park PS & TK Building Flood	N/A
VPK TS 001 H/L	DI	01	Veterans Park PS & TK Building High/Low Temp	N/A
VPK ZS 001 H	DI	01	Veterans Park PS & TK Doors & Hatches Intrusion	N/A
VPK DR 001 D	DO	01	Veterans Park PS & TK Doors & Hatches Open Door	N/A
VPK LS 001 H	DI	01	Veterans Park PS & TK Pit Flood	N/A
VPK LIT 001 LZ	AI	01	Veterans Park PS & TK Diesel Tank Level	Gallons
VPK GEN 001 IZ_A	AI	01	Veterans Park PS & TK Generator Current Phase A	Amps

Veterans Park PS & TK Site ID VPK Site # 78

Tag Name	I/O Type	Unit	Description	Eng. Unit
VPK GEN 001 IZ_B	AI	01	Veterans Park PS & TK Generator Current Phase B	Amps
VPK GEN 001 IZ_C	AI	01	Veterans Park PS & TK Generator Current Phase C	Amps
VPK GEN 001 F	DI	01	Veterans Park PS & TK Generator Fault	N/A
VPK GEN 001 HSA	DI	01	Veterans Park PS & TK Generator Not In Auto	N/A
VPK GEN 001 JZ	AI	01	Veterans Park PS & TK Generator Real Power	KW
VPK XFER 001 F_G	DI	01	Veterans Park PS & TK Transfer Switch Generator Running	N/A
VPK XFER 001 N_G	DI	01	Veterans Park PS & TK Transfer Switch On Generator Power	N/A
VPK XFER 001 N_U	DI	01	Veterans Park PS & TK Transfer Switch On Utility Power	N/A
VPK XFER 001 Y_U	DI	01	Veterans Park PS & TK Transfer Switch Utility Power Available	N/A
VPK XFER 001 EZ_A	AI	01	Veterans Park PS & TK Transfer Switch Voltage A-B	Volts
VPK XFER 001 EZ_B	AI	01	Veterans Park PS & TK Transfer Switch Voltage B-C	Volts
VPK XFER 001 EZ_C	AI	01	Veterans Park PS & TK Transfer Switch Voltage C-A	Volts
VPK PM 001 IZ_A	AI	01	Veterans Park PS & TK Power Monitoring Phase A Current	Amps
VPK PM 001 IZ_B	AI	01	Veterans Park PS & TK Power Monitoring Phase B Current	Amps
VPK PM 001 IZ_C	AI	01	Veterans Park PS & TK Power Monitoring Phase C Current	Amps
VPK PM 001 JZ_R	AI	01	Veterans Park PS & TK Power Monitoring Reactive Power	KVAR
VPK PM 001 JZ	AI	01	Veterans Park PS & TK Power Monitoring Real Power	KW
VPK PM 001 EZ_AB	AI	01	Veterans Park PS & TK Power Monitoring Voltage A-B	Volts
VPK PM 001 EZ_BC	AI	01	Veterans Park PS & TK Power Monitoring Voltage B-C	Volts
VPK PM 001 EZ_CA	AI	01	Veterans Park PS & TK Power Monitoring Voltage C-A	Volts
VPK VLVC 001 ZL	DI	01	Veterans Park PS & TK Check Valve Closed	N/A
VPK VLVC 002 ZL	DI	02	Veterans Park PS & TK Check Valve Closed	N/A
VPK VLVC 003 ZL	DI	03	Veterans Park PS & TK Check Valve Closed	N/A
VPK VLVC 001 F	DI	01	Veterans Park PS & TK Check Valve Fault	N/A
VPK VLVC 002 F	DI	02	Veterans Park PS & TK Check Valve Fault	N/A
VPK VLVC 003 F	DI	03	Veterans Park PS & TK Check Valve Fault	N/A
VPK VLVC 001 ZH	DI	01	Veterans Park PS & TK Check Valve Open	N/A
VPK VLVC 002 ZH	DI	02	Veterans Park PS & TK Check Valve Open	N/A
VPK VLVC 003 ZH	DI	03	Veterans Park PS & TK Check Valve Open	N/A

Veterans Park PS & TK Site ID VPK Site # 78

Tag Name	I/O Type	Unit	Description	Eng. Unit
VPK FIT 001 FZ	AI	01	Veterans Park PS & TK Flow Meter Discharge Flow	MGD
VPK PIT 001 FZ	AI	01	Veterans Park PS & TK Pressure Meter Discharge Pressure	PSI
VPK PIT 001 PZ	AI	01	Veterans Park PS & TK Pressure Meter Suction Pressure	PSI
VPK VFD 001 HSB	DI	01	Veterans Park PS & TK Pump Bypass Selected	N/A
VPK VFD 002 HSB	DI	02	Veterans Park PS & TK Pump Bypass Selected	N/A
VPK VFD 003 HSB	DI	03	Veterans Park PS & TK Pump Bypass Selected	N/A
VPK MCP 001 KX	AI	01	Veterans Park PS & TK Pump Inhibit Start Time Remaining	Seconds
VPK MCP 002 KX	AI	02	Veterans Park PS & TK Pump Inhibit Start Time Remaining	Seconds
VPK MCP 003 KX	AI	03	Veterans Park PS & TK Pump Inhibit Start Time Remaining	Seconds
VPK VFD 001 IZ	AI	01	Veterans Park PS & TK Pump Motor Current	Amps
VPK VFD 002 IZ	AI	02	Veterans Park PS & TK Pump Motor Current	Amps
VPK VFD 003 IZ	AI	03	Veterans Park PS & TK Pump Motor Current	Amps
VPK VFD 001 MTZ	AI	01	Veterans Park PS & TK Pump Motor Thermal State	Percent
VPK VFD 002 MTZ	AI	02	Veterans Park PS & TK Pump Motor Thermal State	Percent
VPK VFD 003 MTZ	AI	03	Veterans Park PS & TK Pump Motor Thermal State	Percent
VPK MCP 001 MN	DI	01	Veterans Park PS & TK Pump Running	N/A
VPK MCP 002 MN	DI	02	Veterans Park PS & TK Pump Running	N/A
VPK MCP 003 MN	DI	03	Veterans Park PS & TK Pump Running	N/A
VPK MCP 001 KZQ	AI	01	Veterans Park PS & TK Pump Runtime	Hours
VPK MCP 002 KZQ	AI	02	Veterans Park PS & TK Pump Runtime	Hours
VPK MCP 003 KZQ	AI	03	Veterans Park PS & TK Pump Runtime	Hours
VPK MCP 001 HSS	DI	01	Veterans Park PS & TK Pump SCADA Mode	N/A
VPK MCP 002 HSS	DI	02	Veterans Park PS & TK Pump SCADA Mode	N/A
VPK MCP 003 HSS	DI	03	Veterans Park PS & TK Pump SCADA Mode	N/A
VPK VFD 001 SZD	AO	01	Veterans Park PS & TK Pump Speed Control	Percent
VPK VFD 002 SZD	AO	02	Veterans Park PS & TK Pump Speed Control	Percent
VPK VFD 003 SZD	AO	03	Veterans Park PS & TK Pump Speed Control	Percent
VPK VFD 001 SZ	AI	01	Veterans Park PS & TK Pump Speed Feedback	Percent
VPK VFD 002 SZ	AI	02	Veterans Park PS & TK Pump Speed Feedback	Percent

Veterans Park PS & TK Site ID VPK Site # 78

Tag Name	I/O Type	Unit	Description	Eng. Unit
VPK VFD 003 SZ	AI	03	Veterans Park PS & TK Pump Speed Feedback	Percent
VPK MCP 001 MD	DO	01	Veterans Park PS & TK Pump Start	N/A
VPK MCP 002 MD	DO	02	Veterans Park PS & TK Pump Start	N/A
VPK MCP 003 MD	DO	03	Veterans Park PS & TK Pump Start	N/A
VPK MCP 001 MN_N	DO	01	Veterans Park PS & TK Pump Stop	N/A
VPK MCP 002 MN_N	DO	02	Veterans Park PS & TK Pump Stop	N/A
VPK MCP 003 MN_N	DO	03	Veterans Park PS & TK Pump Stop	N/A
VPK VFD 001 TZ	AI	01	Veterans Park PS & TK Pump Thermal State	Percent
VPK VFD 002 TZ	AI	02	Veterans Park PS & TK Pump Thermal State	Percent
VPK VFD 003 TZ	AI	03	Veterans Park PS & TK Pump Thermal State	Percent
VPK VFD 001 EZ	AI	01	Veterans Park PS & TK Pump Voltage to Motor	Volts
VPK VFD 002 EZ	AI	02	Veterans Park PS & TK Pump Voltage to Motor	Volts
VPK VFD 003 EZ	AI	03	Veterans Park PS & TK Pump Voltage to Motor	Volts
VPK RCP 001 EZ_BA	AI	01	Veterans Park PS & TK Batteries Voltage	Volts
VPK RCP 001 EY	DI	01	Veterans Park PS & TK PMCR 120 VAC Present	N/A
VPK RCP 001 JN_BA	DI	01	Veterans Park PS & TK UPS Battery Mode	N/A
VPK RCP 001 Z_UPS	DI	01	Veterans Park PS & TK UPS Charging Mode	N/A
VPK RCP 001 F_UPS	DI	01	Veterans Park PS & TK UPS Fault	N/A
VPK VLVS 001 D	DO	01	Veterans Park PS & TK Altitude Valve Open	N/A
VPK BEA 001 N	DI	01	Veterans Park PS & TK Beacon On	N/A
VPK HT 001 N	DI	01	Veterans Park PS & TK Heat Tape On	N/A
VPK HT 001 PY	DI	01	Veterans Park PS & TK Heat Tape Power Available	N/A
Total				
DI	DO	AI	AO	
35	8	41	3	87

Violet Street PS & TK Site ID VIO Site # 22

Tag Name	I/O Type	Unit	Description	Eng. Unit
VIO LS 001 H	DI	01	Violet Street PS & TK Building Flood	N/A

Violet Street PS & TK Site ID VIO Site # 22

Tag Name	I/O Type	Unit	Description	Eng. Unit
VIO TS 001 H/L	DI	01	Violet Street PS & TK Building High/Low Temp	N/A
VIO TT 001 TZ	AI	01	Violet Street PS & TK Building or Room Temperature	°F
VIO ZS 001 H	DI	01	Violet Street PS & TK Doors & Hatches Intrusion	N/A
VIO DR 001 D	DO	01	Violet Street PS & TK Doors & Hatches Open Door	N/A
VIO LS 001 H	DI	01	Violet Street PS & TK Pit Flood	N/A
VIO PM 001 IZ_A	AI	01	Violet Street PS & TK Power Monitoring Phase A Current	Amps
VIO PM 001 IZ_B	AI	01	Violet Street PS & TK Power Monitoring Phase B Current	Amps
VIO PM 001 IZ_C	AI	01	Violet Street PS & TK Power Monitoring Phase C Current	Amps
VIO PM 001 JZ_R	AI	01	Violet Street PS & TK Power Monitoring Reactive Power	KVAR
VIO PM 001 JZ	AI	01	Violet Street PS & TK Power Monitoring Real Power	KW
VIO PM 001 EZ_AB	AI	01	Violet Street PS & TK Power Monitoring Voltage A-B	Volts
VIO PM 001 EZ_BC	AI	01	Violet Street PS & TK Power Monitoring Voltage B-C	Volts
VIO PM 001 EZ_CA	AI	01	Violet Street PS & TK Power Monitoring Voltage C-A	Volts
VIO VLVC 001 ZL	DI	01	Violet Street PS & TK Check Valve Closed	N/A
VIO VLVC 002 ZL	DI	02	Violet Street PS & TK Check Valve Closed	N/A
VIO VLVC 001 F	DI	01	Violet Street PS & TK Check Valve Fault	N/A
VIO VLVC 002 F	DI	02	Violet Street PS & TK Check Valve Fault	N/A
VIO VLVC 001 ZH	DI	01	Violet Street PS & TK Check Valve Open	N/A
VIO VLVC 002 ZH	DI	02	Violet Street PS & TK Check Valve Open	N/A
VIO FIT 001 FZ	AI	01	Violet Street PS & TK Flow Meter Discharge Flow	MGD
VIO PIT 001 FZ	AI	01	Violet Street PS & TK Pressure Meter Discharge Pressure	PSI
VIO PIT 001 PZ	AI	01	Violet Street PS & TK Pressure Meter Suction Pressure	PSI
VIO MCP 001 KX	AI	01	Violet Street PS & TK Pump Inhibit Start Time Remaining	Seconds
VIO MCP 002 KX	AI	02	Violet Street PS & TK Pump Inhibit Start Time Remaining	Seconds
VIO MCP 001 MN	DI	01	Violet Street PS & TK Pump Running	N/A
VIO MCP 002 MN	DI	02	Violet Street PS & TK Pump Running	N/A
VIO MCP 001 KZQ	AI	01	Violet Street PS & TK Pump Runtime	Hours
VIO MCP 002 KZQ	AI	02	Violet Street PS & TK Pump Runtime	Hours
VIO MCP 001 HSS	DI	01	Violet Street PS & TK Pump SCADA Mode	N/A

**Violet Street PS & TK Site ID VIO Site # 22**

Tag Name	I/O Type	Unit	Description	Eng. Unit
VIO MCP 002 HSS	DI	02	Violet Street PS & TK Pump SCADA Mode	N/A
VIO MCP 001 MD	DO	01	Violet Street PS & TK Pump Start	N/A
VIO MCP 002 MD	DO	02	Violet Street PS & TK Pump Start	N/A
VIO MCP 001 MN_N	DO	01	Violet Street PS & TK Pump Stop	N/A
VIO MCP 002 MN_N	DO	02	Violet Street PS & TK Pump Stop	N/A
VIO RCP 001 EZ_BA	AI	01	Violet Street PS & TK Batteries Voltage	Volts
VIO RCP 001 H	DI	01	Violet Street PS & TK Door Open	N/A
VIO RCP 001 EY	DI	01	Violet Street PS & TK PMCR 120 VAC Present	N/A
VIO RCP 001 F_TVS	DI	01	Violet Street PS & TK TVSS Fault	N/A
VIO RCP 001 JN_BA	DI	01	Violet Street PS & TK UPS Battery Mode	N/A
VIO RCP 001 Z_UPS	DI	01	Violet Street PS & TK UPS Charging Mode	N/A
VIO RCP 001 F_UPS	DI	01	Violet Street PS & TK UPS Fault	N/A
VIO VLVS 001 B	DO	01	Violet Street PS & TK Altitude Valve Close	N/A
VIO VLVA 001 ZL	DI	01	Violet Street PS & TK Altitude Valve Closed	N/A
VIO VLVS 001 D	DO	01	Violet Street PS & TK Altitude Valve Open	N/A
VIO VLVA 001 ZH	DI	01	Violet Street PS & TK Altitude Valve Opened	N/A
VIO VLVA 001 Z	AI	01	Violet Street PS & TK Altitude Valve Position	Percent
VIO BEA 001 N	DI	01	Violet Street PS & TK Beacon On	N/A
VIO HT 001 N	DI	01	Violet Street PS & TK Heat Tape On	N/A
VIO HT 001 PY	DI	01	Violet Street PS & TK Heat Tape Power Available	N/A
VIO LIT 001 Z	AI	01	Violet Street PS & TK Tank/Standpipe Level	Feet

DI	DO	AI	AO	Total
25	7	19	0	51

**Vukelic Station Site ID VUK Site # 04**

Tag Name	I/O Type	Unit	Description	Eng. Unit
VUK LS 001 H	DI	01	Vukelic Station Building Flood	N/A
VUK TT 001 TZ	AI	01	Vukelic Station Building or Room Temperature	°F

Vukelic Station Site ID VUK Site # 04

Tag Name	I/O Type	Unit	Description	Eng. Unit
VUK ZS 001 H	DI	01	Vukelic Station Doors & Hatches Intrusion	N/A
VUK DR 001 D	DO	01	Vukelic Station Doors & Hatches Open Door	N/A
VUK LS 001 H	DI	01	Vukelic Station Pit Flood	N/A
VUK LIT 001 LZ	AI	01	Vukelic Station Diesel Tank Level	Gallons
VUK GEN 001 IZ_A	AI	01	Vukelic Station Generator Current Phase A	Amps
VUK GEN 001 IZ_B	AI	01	Vukelic Station Generator Current Phase B	Amps
VUK GEN 001 IZ_C	AI	01	Vukelic Station Generator Current Phase C	Amps
VUK GEN 001 F	DI	01	Vukelic Station Generator Fault	N/A
VUK GEN 001 HSA_	DI	01	Vukelic Station Generator Not In Auto	N/A
VUK GEN 001 JZ	AI	01	Vukelic Station Generator Real Power	KW
VUK XFER 001 F_G	DI	01	Vukelic Station Transfer Switch Generator Running	N/A
VUK XFER 001 N_G	DI	01	Vukelic Station Transfer Switch On Generator Power	N/A
VUK XFER 001 N_U	DI	01	Vukelic Station Transfer Switch On Utility Power	N/A
VUK XFER 001 Y_U	DI	01	Vukelic Station Transfer Switch Utility Power Available	N/A
VUK XFER 001 EZ_	AI	01	Vukelic Station Transfer Switch Voltage A-B	Volts
VUK XFER 001 EZ_B	AI	01	Vukelic Station Transfer Switch Voltage B-C	Volts
VUK XFER 001 EZ_C	AI	01	Vukelic Station Transfer Switch Voltage C-A	Volts
VUK PM 001 IZ_A	AI	01	Vukelic Station Power Monitoring Phase A Current	Amps
VUK PM 001 IZ_B	AI	01	Vukelic Station Power Monitoring Phase B Current	Amps
VUK PM 001 IZ_C	AI	01	Vukelic Station Power Monitoring Phase C Current	Amps
VUK PM 001 JZ_R	AI	01	Vukelic Station Power Monitoring Reactive Power	KVAR
VUK PM 001 JZ	AI	01	Vukelic Station Power Monitoring Real Power	KW
VUK PM 001 EZ_AB	AI	01	Vukelic Station Power Monitoring Voltage A-B	Volts
VUK PM 001 EZ_BC	AI	01	Vukelic Station Power Monitoring Voltage B-C	Volts
VUK PM 001 EZ_CA	AI	01	Vukelic Station Power Monitoring Voltage C-A	Volts
VUK RCP 001 EY_D	DI	01	Vukelic Station 24 Volt PS DC OK	N/A
VUK RCP 001 EZ_BA	AI	01	Vukelic Station Batteries Voltage	Volts
VUK RCP 001 H	DI	01	Vukelic Station Door Open	N/A
VUK RCP 001 EY	DI	01	Vukelic Station PMCR 120 VAC Present	N/A

Vukelic Station Site ID VUK Site # 04

Tag Name	I/O Type	Unit	Description	Eng. Unit
VUK RCP 001 F_TVSS	DI	01	Vukelic Station TVSS Fault	N/A
VUK RCP 001 JN_BA	DI	01	Vukelic Station UPS Battery Mode	N/A
VUK RCP 001 Z_UPS	DI	01	Vukelic Station UPS Charging Mode	N/A
VUK RCP 001 F_UPS	DI	01	Vukelic Station UPS Fault	N/A

DI DO AI AO Total  
 16 1 18 0 35

Vukelic Station APC UPS Site ID APC Site # 04A

Tag Name	I/O Type	Unit	Description	Eng. Unit
APC UPS 001 TZ	AI	01	Vukelic Station APC UPS Battery Temp.	°F
APC UPS 001 F	DI	01	Vukelic Station APC UPS UPS Fault	N/A
APC UPS 001	AI	01	Vukelic Station APC UPS UPS Input Frequency	Hz
APC UPS 001 EH	AI	01	Vukelic Station APC UPS UPS Input Max Voltage	Volts
APC UPS 001 EL	AI	01	Vukelic Station APC UPS UPS Input Minimum Voltage	Volts
APC UPS 001 E	AI	01	Vukelic Station APC UPS UPS Input Volts	Volts
APC UPS 001 N_UPS	DI	01	Vukelic Station APC UPS UPS On UPS	N/A
APC UPS 001	AI	01	Vukelic Station APC UPS UPS Output Current	Amps
APC UPS 001	AI	01	Vukelic Station APC UPS UPS Output Frequency	Hz
APC UPS 001 E	AI	01	Vukelic Station APC UPS UPS Output Voltage	Volts
APC UPS 001	AI	01	Vukelic Station APC UPS UPS Percent of full load	%
APC UPS 001 TZ	AI	01	Vukelic Station APC UPS UPS Remaining Charge	%
APC UPS 001 KZ	AI	01	Vukelic Station APC UPS UPS Remaining Time	Seconds
APC UPS 001 KZQ	AI	01	Vukelic Station APC UPS UPS Time On Battery	millisec

DI DO AI AO Total  
 2 0 12 0 14

Ward Road TK Site ID WAR Site # 36

Tag Name	I/O Type	Unit	Description	Eng. Unit
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Ward Road TK Site ID WAR Site # 36

Tag Name	I/O Type	Unit	Description	Eng. Unit
WAR LS 001 H	DI	01	Ward Road TK Building Flood	N/A
WAR TS 001 H/L	DI	01	Ward Road TK Building High/Low Temp	N/A
WAR TT 001 TZ	AI	01	Ward Road TK Building or Room Temperature	°F
WAR ZS 001 H	DI	01	Ward Road TK Doors & Hatches Intrusion	N/A
WAR DR 001 D	DO	01	Ward Road TK Doors & Hatches Open Door	N/A
WAR LS 001 H	DI	01	Ward Road TK Pit Flood	N/A
WAR RCP 001 EZ_B	AI	01	Ward Road TK Batteries Voltage	Volts
WAR RCP 001 H	DI	01	Ward Road TK Door Open	N/A
WAR RCP 001 EY	DI	01	Ward Road TK PMCR 120 VAC Present	N/A
WAR RCP 001 F_TV	DI	01	Ward Road TK TVSS Fault	N/A
WAR RCP 001 JN_B	DI	01	Ward Road TK UPS Battery Mode	N/A
WAR RCP 001 Z_UPS	DI	01	Ward Road TK UPS Charging Mode	N/A
WAR RCP 001 F_UPS	DI	01	Ward Road TK UPS Fault	N/A
WAR VLVS 001 B	DO	01	Ward Road TK Altitude Valve Close	N/A
WAR VLVA 001 ZL	DI	01	Ward Road TK Altitude Valve Closed	N/A
WAR VLVS 001 D	DO	01	Ward Road TK Altitude Valve Open	N/A
WAR VLVA 001 ZH	DI	01	Ward Road TK Altitude Valve Opened	N/A
WAR VLVA 001 Z	AI	01	Ward Road TK Altitude Valve Position	Percent
WAR BEA 001 N	DI	01	Ward Road TK Beacon On	N/A
WAR HT 001 N	DI	01	Ward Road TK Heat Tape On	N/A
WAR HT 001 PY	DI	01	Ward Road TK Heat Tape Power Available	N/A
WAR LIT 001 Z	AI	01	Ward Road TK Tank/Standpipe Level	Feet
Total				
DI	DO	AI	AO	
15	3	4	0	22

Wehrle TK Site ID WER Site # 01

Tag Name	I/O Type	Unit	Description	Eng. Unit
WER LS 001 H	DI	01	Wehrle TK Building Flood	N/A

Wehrle TK Site ID WER Site # 01

Tag Name	I/O Type	Unit	Description	Eng. Unit
WER TS 001 H/L	DI	01	Wehrle TK Building High/Low Temp	N/A
WER TT 001 TZ	AI	01	Wehrle TK Building or Room Temperature	°F
WER ZS 001 H	DI	01	Wehrle TK Doors & Hatches Intrusion	N/A
WER DR 001 D	DO	01	Wehrle TK Doors & Hatches Open Door	N/A
WER LS 001 H	DI	01	Wehrle TK Pit Flood	N/A
WER RCP 001 EZ_B	AI	01	Wehrle TK Batteries Voltage	Volts
WER RCP 001 H	DI	01	Wehrle TK Door Open	N/A
WER RCP 001 EY	DI	01	Wehrle TK PMCR 120 VAC Present	N/A
WER RCP 001 F_TVSS	DI	01	Wehrle TK TVSS Fault	N/A
WER RCP 001 JN_BA	DI	01	Wehrle TK UPS Battery Mode	N/A
WER RCP 001 Z_UPS	DI	01	Wehrle TK UPS Charging Mode	N/A
WER RCP 001 F_UPS	DI	01	Wehrle TK UPS Fault	N/A
WER VLVS 001 B	DO	01	Wehrle TK Altitude Valve Close	N/A
WER VLVA 001 ZL	DI	01	Wehrle TK Altitude Valve Closed	N/A
WER VLVS 001 D	DO	01	Wehrle TK Altitude Valve Open	N/A
WER VLVA 001 ZH	DI	01	Wehrle TK Altitude Valve Opened	N/A
WER VLVA 001 Z	AI	01	Wehrle TK Altitude Valve Position	Percent
WER BEA 001 N	DI	01	Wehrle TK Beacon On	N/A
WER HT 001 N	DI	01	Wehrle TK Heat Tape On	N/A
WER HT 001 PY	DI	01	Wehrle TK Heat Tape Power Available	N/A
WER LIT 001 Z	AI	01	Wehrle TK Tank/Standpipe Level	Feet

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 15 3 4 0 22

William Street PS Site ID WLM Site # 86

Tag Name	I/O Type	Unit	Description	Eng. Unit
WLM LS 001 H	DI	01	William Street PS Building Flood	N/A
WLM TS 001 H/L	DI	01	William Street PS Building High/Low Temp	N/A

William Street PS Site ID WLM Site # 86

Tag Name	I/O Type	Unit	Description	Eng. Unit
WLM TT 001 TZ	AI	01	William Street PS Building or Room Temperature	°F
WLM ZS 001 H	DI	01	William Street PS Doors & Hatches Intrusion	N/A
WLM DR 001 D	DO	01	William Street PS Doors & Hatches Open Door	N/A
WLM LS 001 H	DI	01	William Street PS Pit Flood	N/A
WLM LIT 001 LZ	AI	01	William Street PS Diesel Tank Level	Gallons
WLM GEN 001 IZ_A	AI	01	William Street PS Generator Current Phase A	Amps
WLM GEN 001 IZ_B	AI	01	William Street PS Generator Current Phase B	Amps
WLM GEN 001 IZ_C	AI	01	William Street PS Generator Current Phase C	Amps
WLM GEN 001 F	DI	01	William Street PS Generator Fault	N/A
WLM GEN 001 HSA	DI	01	William Street PS Generator Not In Auto	N/A
WLM GEN 001 JZ	AI	01	William Street PS Generator Real Power	KW
WLM XFER 001 F_G	DI	01	William Street PS Transfer Switch Generator Running	N/A
WLM XFER 001 N_G	DI	01	William Street PS Transfer Switch On Generator Power	N/A
WLM XFER 001 N_U	DI	01	William Street PS Transfer Switch On Utility Power	N/A
WLM XFER 001 Y_U	DI	01	William Street PS Transfer Switch Utility Power Available	N/A
WLM XFER 001 EZ	AI	01	William Street PS Transfer Switch Voltage A-B	Volts
WLM XFER 001 EZ	AI	01	William Street PS Transfer Switch Voltage B-C	Volts
WLM XFER 001 EZ	AI	01	William Street PS Transfer Switch Voltage C-A	Volts
WLM PM 001 IZ_A	AI	01	William Street PS Power Monitoring Phase A Current	Amps
WLM PM 001 IZ_B	AI	01	William Street PS Power Monitoring Phase B Current	Amps
WLM PM 001 IZ_C	AI	01	William Street PS Power Monitoring Phase C Current	Amps
WLM PM 001 JZ_R	AI	01	William Street PS Power Monitoring Reactive Power	KVAR
WLM PM 001 JZ	AI	01	William Street PS Power Monitoring Real Power	KW
WLM PM 001 EZ_AB	AI	01	William Street PS Power Monitoring Voltage A-B	Volts
WLM PM 001 EZ_BC	AI	01	William Street PS Power Monitoring Voltage B-C	Volts
WLM PM 001 EZ_CA	AI	01	William Street PS Power Monitoring Voltage C-A	Volts
WLM VLVC 001 ZL	DI	01	William Street PS Check Valve Closed	N/A
WLM VLVC 002 ZL	DI	02	William Street PS Check Valve Closed	N/A
WLM VLVC 003 ZL	DI	03	William Street PS Check Valve Closed	N/A

William Street PS Site ID WLM Site # 86

Tag Name	I/O Type	Unit	Description	Eng. Unit
WLM VLVC 001 F	DI	01	William Street PS Check Valve Fault	N/A
WLM VLVC 002 F	DI	02	William Street PS Check Valve Fault	N/A
WLM VLVC 003 F	DI	03	William Street PS Check Valve Fault	N/A
WLM VLVC 001 ZH	DI	01	William Street PS Check Valve Open	N/A
WLM VLVC 002 ZH	DI	02	William Street PS Check Valve Open	N/A
WLM VLVC 003 ZH	DI	03	William Street PS Check Valve Open	N/A
WLM FIT 001 FZ	AI	01	William Street PS Flow Meter Discharge Flow	MGD
WLM PIT 001 FZ	AI	01	William Street PS Pressure Meter Discharge Pressure	PSI
WLM PIT 001 PZ	AI	01	William Street PS Pressure Meter Suction Pressure	PSI
WLM VFD 001 HSB	DI	01	William Street PS Pump Bypass Selected	N/A
WLM VFD 002 HSB	DI	02	William Street PS Pump Bypass Selected	N/A
WLM VFD 003 HSB	DI	03	William Street PS Pump Bypass Selected	N/A
WLM MCP 001 KX	AI	01	William Street PS Pump Inhibit Start Time Remaining	Seconds
WLM MCP 002 KX	AI	02	William Street PS Pump Inhibit Start Time Remaining	Seconds
WLM MCP 003 KX	AI	03	William Street PS Pump Inhibit Start Time Remaining	Seconds
WLM VFD 001 IZ	AI	01	William Street PS Pump Motor Current	Amps
WLM VFD 002 IZ	AI	02	William Street PS Pump Motor Current	Amps
WLM VFD 003 IZ	AI	03	William Street PS Pump Motor Current	Amps
WLM VFD 001 MTZ	AI	01	William Street PS Pump Motor Thermal State	Percent
WLM VFD 002 MTZ	AI	02	William Street PS Pump Motor Thermal State	Percent
WLM VFD 003 MTZ	AI	03	William Street PS Pump Motor Thermal State	Percent
WLM MCP 001 MN	DI	01	William Street PS Pump Running	N/A
WLM MCP 002 MN	DI	02	William Street PS Pump Running	N/A
WLM MCP 003 MN	DI	03	William Street PS Pump Running	N/A
WLM MCP 001 KZQ	AI	01	William Street PS Pump Runtime	Hours
WLM MCP 002 KZQ	AI	02	William Street PS Pump Runtime	Hours
WLM MCP 003 KZQ	AI	03	William Street PS Pump Runtime	Hours
WLM MCP 001 HSS	DI	01	William Street PS Pump SCADA Mode	N/A
WLM MCP 002 HSS	DI	02	William Street PS Pump SCADA Mode	N/A

William Street PS Site ID WLM Site # 86

Tag Name	I/O Type	Unit	Description	Eng. Unit
WLM MCP 003 HSS	DI	03	William Street PS Pump SCADA Mode	N/A
WLM VFD 001 SZD	AO	01	William Street PS Pump Speed Control	Percent
WLM VFD 002 SZD	AO	02	William Street PS Pump Speed Control	Percent
WLM VFD 003 SZD	AO	03	William Street PS Pump Speed Control	Percent
WLM VFD 001 SZ	AI	01	William Street PS Pump Speed Feedback	Percent
WLM VFD 002 SZ	AI	02	William Street PS Pump Speed Feedback	Percent
WLM VFD 003 SZ	AI	03	William Street PS Pump Speed Feedback	Percent
WLM MCP 001 MD	DO	01	William Street PS Pump Start	N/A
WLM MCP 002 MD	DO	02	William Street PS Pump Start	N/A
WLM MCP 003 MD	DO	03	William Street PS Pump Start	N/A
WLM MCP 001 MN	DO	01	William Street PS Pump Stop	N/A
WLM MCP 002 MN	DO	02	William Street PS Pump Stop	N/A
WLM MCP 003 MN	DO	03	William Street PS Pump Stop	N/A
WLM VFD 001 TZ	AI	01	William Street PS Pump Thermal State	Percent
WLM VFD 002 TZ	AI	02	William Street PS Pump Thermal State	Percent
WLM VFD 003 TZ	AI	03	William Street PS Pump Thermal State	Percent
WLM VFD 001 EZ	AI	01	William Street PS Pump Voltage to Motor	Volts
WLM VFD 002 EZ	AI	02	William Street PS Pump Voltage to Motor	Volts
WLM VFD 003 EZ	AI	03	William Street PS Pump Voltage to Motor	Volts
WLM RCP 001 EZ_B	AI	01	William Street PS Batteries Voltage	Volts
WLM RCP 001 H	DI	01	William Street PS Door Open	N/A
WLM RCP 001 EY	DI	01	William Street PS PMCR 120 VAC Present	N/A
WLM RCP 001 F_TV	DI	01	William Street PS TVSS Fault	N/A
WLM RCP 001 JN_B	DI	01	William Street PS UPS Battery Mode	N/A
WLM RCP 001 Z_UP	DI	01	William Street PS UPS Charging Mode	N/A
WLM RCP 001 F_UP	DI	01	William Street PS UPS Fault	N/A

Total			
DI	DO	AI	AO
34	7	42	3
			86

Windom APC UPS Site ID APS Site # 86A

Tag Name	I/O Type	Unit	Description	Eng. Unit
APS UPS 001 TZ	AI	01	Windom APC UPS Battery Temp.	°F
APS UPS 001 F	DI	01	Windom APC UPS UPS Fault	N/A
APS UPS 001	AI	01	Windom APC UPS Input Frequency	Hz
APS UPS 001 EH	AI	01	Windom APC UPS Input Max Voltage	Volts
APS UPS 001 EL	AI	01	Windom APC UPS Input Minimum Voltage	Volts
APS UPS 001 E	AI	01	Windom APC UPS Input Volts	Volts
APS UPS 001 N_UPS	DI	01	Windom APC UPS On UPS	N/A
APS UPS 001	AI	01	Windom APC UPS Output Current	Amps
APS UPS 001	AI	01	Windom APC UPS Output Frequency	Hz
APS UPS 001 E	AI	01	Windom APC UPS Output Voltage	Volts
APS UPS 001	AI	01	Windom APC UPS Percent of full load	%
APS UPS 001 TZ	AI	01	Windom APC UPS Remaining Charge	%
APS UPS 001 KZ	AI	01	Windom APC UPS Remaining Time	Seconds
APS UPS 001 KZQ	AI	01	Windom APC UPS Time On Battery	millisec

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 2 0 12 0 14

Windom PS & TK Site ID WIN Site # 08

Tag Name	I/O Type	Unit	Description	Eng. Unit
WIN LS 0WIN H	DI	WIN	Windom PS & TK Building Flood	N/A
WIN TS 0WIN H/L	DI	WIN	Windom PS & TK Building High/Low Temp	N/A
WIN TT 0WGN TZ	AI	WGN	Windom PS & TK Building or Room Temperature	°F
WIN TT 0WIN TZ	AI	WIN	Windom PS & TK Building or Room Temperature	°F
WIN TT 0WNS TZ	AI	WNS	Windom PS & TK Building or Room Temperature	°F
WIN TT 0WPB TZ	AI	WPB	Windom PS & TK Building or Room Temperature	°F
WIN ZS 0WGN H	DI	WGN	Windom PS & TK Doors & Hatches Intrusion	N/A
WIN ZS 0WIN H	DI	WIN	Windom PS & TK Doors & Hatches Intrusion	N/A
WIN ZS 0WNS H	DI	WNS	Windom PS & TK Doors & Hatches Intrusion	N/A

Windom PS & TK Site ID WIN Site # 08

Tag Name	I/O Type	Unit	Description	Eng. Unit
WIN ZS 0WPB H	DI	WPB	Windom PS & TK Doors & Hatches Intrusion	N/A
WIN DR 0WGN D	DO	WGN	Windom PS & TK Doors & Hatches Open Door	N/A
WIN DR 0WIN D	DO	WIN	Windom PS & TK Doors & Hatches Open Door	N/A
WIN DR 0WNS D	DO	WNS	Windom PS & TK Doors & Hatches Open Door	N/A
WIN DR 0WPB D	DO	WPB	Windom PS & TK Doors & Hatches Open Door	N/A
WIN LS 0WIN H	DI	WIN	Windom PS & TK Pit Flood	N/A
WIN LIT 0WGN LZ	AI	WGN	Windom PS & TK Diesel Tank Level	Gallons
WIN GEN 0WGN IZ_	AI	WGN	Windom PS & TK Generator Current Phase A	Amps
WIN GEN 0WGN IZ_	AI	WGN	Windom PS & TK Generator Current Phase B	Amps
WIN GEN 0WGN IZ_	AI	WGN	Windom PS & TK Generator Current Phase C	Amps
WIN GEN 0WGN F	DI	WGN	Windom PS & TK Generator Fault	N/A
WIN GEN 0WGN HS	DI	WGN	Windom PS & TK Generator Not In Auto	N/A
WIN GEN 0WGN JZ	AI	WGN	Windom PS & TK Generator Real Power	KW
WIN XFER 0WGN F_	DI	WGN	Windom PS & TK Transfer Switch Generator Running	N/A
WIN XFER 0WGN N_	DI	WGN	Windom PS & TK Transfer Switch On Generator Power	N/A
WIN XFER 0WGN N_	DI	WGN	Windom PS & TK Transfer Switch On Utility Power	N/A
WIN XFER 0WGN Y_	DI	WGN	Windom PS & TK Transfer Switch Utility Power Available	N/A
WIN XFER 0WGN EZ	AI	WGN	Windom PS & TK Transfer Switch Voltage A-B	Volts
WIN XFER 0WGN EZ	AI	WGN	Windom PS & TK Transfer Switch Voltage B-C	Volts
WIN XFER 0WGN EZ	AI	WGN	Windom PS & TK Transfer Switch Voltage C-A	Volts
WIN PM 001 IZ_A	AI	01	Windom PS & TK Power Monitoring Phase A Current	Amps
WIN PM 002 IZ_A	AI	02	Windom PS & TK Power Monitoring Phase A Current	Amps
WIN PM 001 IZ_B	AI	01	Windom PS & TK Power Monitoring Phase B Current	Amps
WIN PM 002 IZ_B	AI	02	Windom PS & TK Power Monitoring Phase B Current	Amps
WIN PM 001 IZ_C	AI	01	Windom PS & TK Power Monitoring Phase C Current	Amps
WIN PM 002 IZ_C	AI	02	Windom PS & TK Power Monitoring Phase C Current	Amps
WIN PM 001 JZ_R	AI	01	Windom PS & TK Power Monitoring Reactive Power	KVAR
WIN PM 002 JZ_R	AI	02	Windom PS & TK Power Monitoring Reactive Power	KVAR
WIN PM 001 JZ	AI	01	Windom PS & TK Power Monitoring Real Power	KW

Windom PS & TK Site ID WIN Site # 08

Tag Name	I/O Type	Unit	Description	Eng. Unit
WIN PM 002 JZ	AI	02	Windom PS & TK Power Monitoring Real Power	KW
WIN PM 001 EZ_AB	AI	01	Windom PS & TK Power Monitoring Voltage A-B	Volts
WIN PM 002 EZ_AB	AI	02	Windom PS & TK Power Monitoring Voltage A-B	Volts
WIN PM 001 EZ_BC	AI	01	Windom PS & TK Power Monitoring Voltage B-C	Volts
WIN PM 002 EZ_BC	AI	02	Windom PS & TK Power Monitoring Voltage B-C	Volts
WIN PM 001 EZ_CA	AI	01	Windom PS & TK Power Monitoring Voltage C-A	Volts
WIN PM 002 EZ_CA	AI	02	Windom PS & TK Power Monitoring Voltage C-A	Volts
WIN VLVC 001 ZL	DI	01	Windom PS & TK Check Valve Closed	N/A
WIN VLVC 002 ZL	DI	02	Windom PS & TK Check Valve Closed	N/A
WIN VLVC 003 ZL	DI	03	Windom PS & TK Check Valve Closed	N/A
WIN VLVC 004 ZL	DI	04	Windom PS & TK Check Valve Closed	N/A
WIN VLVC 001 F	DI	01	Windom PS & TK Check Valve Fault	N/A
WIN VLVC 002 F	DI	02	Windom PS & TK Check Valve Fault	N/A
WIN VLVC 003 F	DI	03	Windom PS & TK Check Valve Fault	N/A
WIN VLVC 004 F	DI	04	Windom PS & TK Check Valve Fault	N/A
WIN VLVC 001 ZH	DI	01	Windom PS & TK Check Valve Open	N/A
WIN VLVC 002 ZH	DI	02	Windom PS & TK Check Valve Open	N/A
WIN VLVC 003 ZH	DI	03	Windom PS & TK Check Valve Open	N/A
WIN VLVC 004 ZH	DI	04	Windom PS & TK Check Valve Open	N/A
WIN FIT 001 FZ	AI	01	Windom PS & TK Flow Meter Discharge Flow	MGD
WIN PIT 001 FZ	AI	01	Windom PS & TK Pressure Meter Discharge Pressure	PSI
WIN PIT 001 PZ	AI	01	Windom PS & TK Pressure Meter Suction Pressure	PSI
WIN VFD 001 HSB	DI	01	Windom PS & TK Pump Bypass Selected	N/A
WIN VFD 002 HSB	DI	02	Windom PS & TK Pump Bypass Selected	N/A
WIN VFD 003 HSB	DI	03	Windom PS & TK Pump Bypass Selected	N/A
WIN VFD 004 HSB	DI	04	Windom PS & TK Pump Bypass Selected	N/A
WIN MCP 001 KX	AI	01	Windom PS & TK Pump Inhibit Start Time Remaining	Seconds
WIN MCP 002 KX	AI	02	Windom PS & TK Pump Inhibit Start Time Remaining	Seconds
WIN MCP 003 KX	AI	03	Windom PS & TK Pump Inhibit Start Time Remaining	Seconds



Windom PS & TK Site ID WIN Site # 08

Tag Name	I/O Type	Unit	Description	Eng. Unit
WIN MCP 004 KX	AI	04	Windom PS & TK Pump Inhibit Start Time Remaining	Seconds
WIN VFD 001 IZ	AI	01	Windom PS & TK Pump Motor Current	Amps
WIN VFD 002 IZ	AI	02	Windom PS & TK Pump Motor Current	Amps
WIN VFD 003 IZ	AI	03	Windom PS & TK Pump Motor Current	Amps
WIN VFD 004 IZ	AI	04	Windom PS & TK Pump Motor Current	Amps
WIN VFD 001 MTZ	AI	01	Windom PS & TK Pump Motor Thermal State	Percent
WIN VFD 002 MTZ	AI	02	Windom PS & TK Pump Motor Thermal State	Percent
WIN VFD 003 MTZ	AI	03	Windom PS & TK Pump Motor Thermal State	Percent
WIN VFD 004 MTZ	AI	04	Windom PS & TK Pump Motor Thermal State	Percent
WIN MCP 001 MN	DI	01	Windom PS & TK Pump Running	N/A
WIN MCP 002 MN	DI	02	Windom PS & TK Pump Running	N/A
WIN MCP 003 MN	DI	03	Windom PS & TK Pump Running	N/A
WIN MCP 004 MN	DI	04	Windom PS & TK Pump Running	N/A
WIN MCP 001 KZQ	AI	01	Windom PS & TK Pump Runtime	Hours
WIN MCP 002 KZQ	AI	02	Windom PS & TK Pump Runtime	Hours
WIN MCP 003 KZQ	AI	03	Windom PS & TK Pump Runtime	Hours
WIN MCP 004 KZQ	AI	04	Windom PS & TK Pump Runtime	Hours
WIN MCP 001 HSS	DI	01	Windom PS & TK Pump SCADA Mode	N/A
WIN MCP 002 HSS	DI	02	Windom PS & TK Pump SCADA Mode	N/A
WIN MCP 003 HSS	DI	03	Windom PS & TK Pump SCADA Mode	N/A
WIN MCP 004 HSS	DI	04	Windom PS & TK Pump SCADA Mode	N/A
WIN VFD 001 SZD	AO	01	Windom PS & TK Pump Speed Control	Percent
WIN VFD 002 SZD	AO	02	Windom PS & TK Pump Speed Control	Percent
WIN VFD 003 SZD	AO	03	Windom PS & TK Pump Speed Control	Percent
WIN VFD 004 SZD	AO	04	Windom PS & TK Pump Speed Control	Percent
WIN VFD 001 SZ	AI	01	Windom PS & TK Pump Speed Feedback	Percent
WIN VFD 002 SZ	AI	02	Windom PS & TK Pump Speed Feedback	Percent
WIN VFD 003 SZ	AI	03	Windom PS & TK Pump Speed Feedback	Percent
WIN VFD 004 SZ	AI	04	Windom PS & TK Pump Speed Feedback	Percent

Windom PS & TK Site ID WIN Site # 08

Tag Name	I/O Type	Unit	Description	Eng. Unit
WIN MCP 001 MD	DO	01	Windom PS & TK Pump Start	N/A
WIN MCP 002 MD	DO	02	Windom PS & TK Pump Start	N/A
WIN MCP 003 MD	DO	03	Windom PS & TK Pump Start	N/A
WIN MCP 004 MD	DO	04	Windom PS & TK Pump Start	N/A
WIN MCP 001 MN_N	DO	01	Windom PS & TK Pump Stop	N/A
WIN MCP 002 MN_N	DO	02	Windom PS & TK Pump Stop	N/A
WIN MCP 003 MN_N	DO	03	Windom PS & TK Pump Stop	N/A
WIN MCP 004 MN_N	DO	04	Windom PS & TK Pump Stop	N/A
WIN VFD 001 TZ	AI	01	Windom PS & TK Pump Thermal State	Percent
WIN VFD 002 TZ	AI	02	Windom PS & TK Pump Thermal State	Percent
WIN VFD 003 TZ	AI	03	Windom PS & TK Pump Thermal State	Percent
WIN VFD 004 TZ	AI	04	Windom PS & TK Pump Thermal State	Percent
WIN VFD 001 EZ	AI	01	Windom PS & TK Pump Voltage to Motor	Volts
WIN VFD 002 EZ	AI	02	Windom PS & TK Pump Voltage to Motor	Volts
WIN VFD 003 EZ	AI	03	Windom PS & TK Pump Voltage to Motor	Volts
WIN VFD 004 EZ	AI	04	Windom PS & TK Pump Voltage to Motor	Volts
WIN RCP 001 EY_DC	DI	01	Windom PS & TK 24 Volt PS DC OK	N/A
WIN RCP 0WGN EY_	DI	WGN	Windom PS & TK 24 Volt PS DC OK	N/A
WIN RCP 001 EZ_BA	AI	01	Windom PS & TK Batteries Voltage	Volts
WIN RCP 0WGN EZ_	AI	WGN	Windom PS & TK Batteries Voltage	Volts
WIN RCP 001 H	DI	01	Windom PS & TK Door Open	N/A
WIN RCP 0WGN H	DI	WGN	Windom PS & TK Door Open	N/A
WIN RCP 0WNS H	DI	WNS	Windom PS & TK Door Open	N/A
WIN RCP 0WPB H	DI	WPB	Windom PS & TK Door Open	N/A
WIN RCP 001 EY	DI	01	Windom PS & TK PMCR 120 VAC Present	N/A
WIN RCP 0WGN EY	DI	WGN	Windom PS & TK PMCR 120 VAC Present	N/A
WIN RCP 001 F_TVSS	DI	01	Windom PS & TK TVSS Fault	N/A
WIN RCP 0WGN F_T	DI	WGN	Windom PS & TK TVSS Fault	N/A
WIN RCP 001 JN_BA	DI	01	Windom PS & TK UPS Battery Mode	N/A

Windom PS & TK Site ID WIN Site # 08

Tag Name	I/O Type	Unit	Description	Eng. Unit
WIN RCP 0WGN JN	DI	WGN	Windom PS & TK UPS Battery Mode	N/A
WIN RCP 001 Z_UPS	DI	01	Windom PS & TK UPS Charging Mode	N/A
WIN RCP 0WGN Z_U	DI	WGN	Windom PS & TK UPS Charging Mode	N/A
WIN RCP 001 F_UPS	DI	01	Windom PS & TK UPS Fault	N/A
WIN RCP 0WGN F_U	DI	WGN	Windom PS & TK UPS Fault	N/A
WIN VLVS 001 B	DO	01	Windom PS & TK Altitude Valve Close	N/A
WIN VLVA 001 ZL	DI	01	Windom PS & TK Altitude Valve Closed	N/A
WIN VLVS 001 D	DO	01	Windom PS & TK Altitude Valve Open	N/A
WIN VLVA 001 ZH	DI	01	Windom PS & TK Altitude Valve Opened	N/A
WIN VLVA 001 Z	AI	01	Windom PS & TK Altitude Valve Position	Percent
WIN BEA 001 N	DI	01	Windom PS & TK Beacon On	N/A
WIN VLVS 001 B	DO	01	Windom PS & TK Control Valve Close	N/A
WIN VLVA 001 ZL	DI	01	Windom PS & TK Control Valve Closed	N/A
WIN VLVS 001 D	DO	01	Windom PS & TK Control Valve Open	N/A
WIN VLVA 001 ZH	DI	01	Windom PS & TK Control Valve Opened	N/A
WIN VLVA 001 Z	AI	01	Windom PS & TK Control Valve Position	Percent
WIN HT 001 N	DI	01	Windom PS & TK Heat Tape On	N/A
WIN HT 001 PY	DI	01	Windom PS & TK Heat Tape Power Available	N/A
WIN LIT 001 Z	AI	01	Windom PS & TK Tank/Standpipe Level	Feet

DI DO AI AO Total  
60 16 64 4 144

Wohlhueter TK Site ID WOL Site # 82

Tag Name	I/O Type	Unit	Description	Eng. Unit
WOL AS 001 H	DI	01	Wohlhueter TK Chlorine Containment Sump Leak	N/A
WOL CFCP 001 MNZ	DI	01	Wohlhueter TK Chlorine System Fault	N/A
WOL CFCP 001 SZD	AI	01	Wohlhueter TK Chlorine System Feed Rate	PPM
WOL CFCP 001 OO	DO	01	Wohlhueter TK Chlorine System Pause	N/A

Wohlhueter TK Site ID WOL Site # 82

Tag Name	I/O Type	Unit	Description	Eng. Unit
WOL LT 001 LZ	AI	01	Wohlhueter TK Day Tank Level	Lbs.
WOL AIT 001 AZ	AI	01	Wohlhueter TK Effluent Chlorine Analyzer Chlorine Residual	PPM
WOL AIT 001 AZ	AI	01	Wohlhueter TK Influent Chlorine Analyzer Chlorine Residual	PPM
WOL FS 001 H	DI	01	Wohlhueter TK Eyewash stations and showers In Use	N/A
WOL LS 001 H	DI	01	Wohlhueter TK Building Flood	N/A
WOL TS 001 H/L	DI	01	Wohlhueter TK Building High/Low Temp	N/A
WOL TT 001 TZ	AI	01	Wohlhueter TK Building or Room Temperature	°F
WOL ZS 001 H	DI	01	Wohlhueter TK Doors & Hatches Intrusion	N/A
WOL DR 001 D	DO	01	Wohlhueter TK Doors & Hatches Open Door	N/A
WOL LS 001 H	DI	01	Wohlhueter TK Pit Flood	N/A
WOL LIT 001 LZ	AI	01	Wohlhueter TK Diesel Tank Level	Gallons
WOL GEN 001 IZ_A	AI	01	Wohlhueter TK Generator Current Phase A	Amps
WOL GEN 001 IZ_B	AI	01	Wohlhueter TK Generator Current Phase B	Amps
WOL GEN 001 IZ_C	AI	01	Wohlhueter TK Generator Current Phase C	Amps
WOL GEN 001 F	DI	01	Wohlhueter TK Generator Fault	N/A
WOL GEN 001 HSA_	DI	01	Wohlhueter TK Generator Not In Auto	N/A
WOL GEN 001 JZ	AI	01	Wohlhueter TK Generator Real Power	KW
WOL XFER 001 F_G	DI	01	Wohlhueter TK Transfer Switch Generator Running	N/A
WOL XFER 001 N_G	DI	01	Wohlhueter TK Transfer Switch On Generator Power	N/A
WOL XFER 001 N_U	DI	01	Wohlhueter TK Transfer Switch On Utility Power	N/A
WOL XFER 001 Y_U	DI	01	Wohlhueter TK Transfer Switch Utility Power Available	N/A
WOL XFER 001 EZ_	AI	01	Wohlhueter TK Transfer Switch Voltage A-B	Volts
WOL XFER 001 EZ_	AI	01	Wohlhueter TK Transfer Switch Voltage B-C	Volts
WOL XFER 001 EZ_	AI	01	Wohlhueter TK Transfer Switch Voltage C-A	Volts
WOL RCP 001 EZ_B	AI	01	Wohlhueter TK Batteries Voltage	Volts
WOL RCP 001 H	DI	01	Wohlhueter TK Door Open	N/A
WOL RCP 001 EY	DI	01	Wohlhueter TK PMCR 120 VAC Present	N/A
WOL RCP 001 F_TVSS	DI	01	Wohlhueter TK TVSS Fault	N/A
WOL RCP 001 JN_BA	DI	01	Wohlhueter TK UPS Battery Mode	N/A

Wohlhueter TK Site ID WOL Site # 82

Tag Name	I/O Type	Unit	Description	Eng. Unit
WOL RCP 001 Z UPS	DI	01	Wohlhueter TK UPS Charging Mode	N/A
WOL RCP 001 F UPS	DI	01	Wohlhueter TK UPS Fault	N/A
WOL VLVS 001 B	DO	01	Wohlhueter TK Altitude Valve Close	N/A
WOL VLVA 001 ZL	DI	01	Wohlhueter TK Altitude Valve Closed	N/A
WOL VLVS 001 D	DO	01	Wohlhueter TK Altitude Valve Open	N/A
WOL VLVA 001 ZH	DI	01	Wohlhueter TK Altitude Valve Opened	N/A
WOL VLVA 001 Z	AI	01	Wohlhueter TK Altitude Valve Position	Percent
WOL BEA 001 N	DI	01	Wohlhueter TK Beacon On	N/A
WOL HT 001 N	DI	01	Wohlhueter TK Heat Tape On	N/A
WOL HT 001 PY	DI	01	Wohlhueter TK Heat Tape Power Available	N/A
WOL LIT 001 Z	AI	01	Wohlhueter TK Tank/Standpipe Level	Feet

DI	DO	AI	AO	Total
24	4	16	0	44

TOTAL SYSTEM I/O

DI	DO	AI	AO	Total
1424	315	1266	45	3050