



Zarzamora Pump Station Improvements Project  
SAWS Job No. 15-6101  
Solicitation No. CO-00144-DW

**ADDENDUM No. 2**

October 31, 2017

This addendum, applicable to work designated above, is an amendment to the proposal and specification documents and as such shall be a part of and included in the Contract. Acknowledge receipt of this addendum by entering the addendum number and issue date on the space provided in submitted copies of the proposal.

**1. Questions/Comments**

- 1.1.** After Reviewing the Spec we would like to ask that Henry Pratt be added as an approved manufacturer for Check Valves, Air Valves, Air Vacuum Valves, and Combination Air Valves. Please let me know what documentation I will need to send to make this happen.

**Response:** Henry Pratt is not currently listed in the SPECIFICATIONS FOR AIR RELEASE, VACUUM & COMBINATION AIR VALVES FOR WATER SERVICE REVISED DECEMBER 2011. To be listed you must submit your product data to the SAWS Product Standards Committee. An application and other information is available at [http://www.saws.org/business\\_center/specs/product\\_submittal/](http://www.saws.org/business_center/specs/product_submittal/).

- 1.2.** Cortrol Process Systems, Inc., respectfully requests a review in regards to specification section 13122, Pre-Engineered Fiberglass Shelters and a review of the attached information on Jacobs Manufacturing fiberglass buildings. Jacobs Manufacturing will meet or exceed the specification. We would ask that we be listed as an “approved equal” in an upcoming addendum. I appreciate your time to review my email, questions and attachments. I look forward to hearing from you soon?

**Response:** Section 13122 allows for review of these items to be approved equal during the bid process. The materials provided by Cortrol Process Systems, Inc. indicate that the products will be equal to those specified. Thus, Jacobs Manufacturing will be an approved equal for Pre-Engineered Fiberglass Shelters supplied under Section 13122.

- 1.3.** Good morning. The Special Provisions to the Technical specifications is missing per the Table of Contents for the Zarzamora Pump Station Improvements. Thank you.

**Response:** There are no Special Provisions to the Technical specifications. Please see No. 2.3 Modifications to the Specifications.

- 1.4.** Signature Automation is listed as one of the pre-approved application services providers (ASPs) for the above referenced project.

Can you please add Signature Automation's contact information to specification Section 17300 (1.06, D) for the pre-approved ASPs? Our contact information is as follows:

Signature Automation  
900 NE Loop 410, Suite D317  
San Antonio, TX 78209  
Attn: Rick Hidalgo  
Phone: 210-807-7434

**Response:** Noted and added to the specification, see No. 2.12 Modifications to the Specifications.

- 1.5.** Would you please let me know what the cost estimate is?

**Response:** \$13,500,000.

- 1.6.** When will work begin?

**Response:** A notice to proceed is anticipated to be issued in January 2018.

- 1.7.** Finally, are there any union requirements?

**Response:** There are no union requirements included in the Contract Documents.

- 1.8.** Cotrol Process Systems Inc. is also requesting a review of attached information on Kentec Composites in regards to specification section 06600, Fiberglass Reinforced Plastics Fabrication, Molded Grating. Kentec will meet or exceed the current specification and would like to be included in a future addendum as an "approved equal".

**Response:** Refer to specification section 01660.

- 1.9.** In the plans for the Zarzamora Pump Station I've noticed a problem that requires addressing. On sheet C-107 Pipe A (lower left corner) is clearly labeled in many places as 24". On sheet D-203 all of the piping for Well #5 is indicated as 20". We didn't see any indication of a reducer anywhere. Is the piping for Well #5 20"? If it is 20" where the reducer should be placed?

**Response:** Revised sheets are included in No. 3.5 and No. 3.8 attached in this Addendum.

- 1.10.** I would like to see if Assmann can be approved as a safer and more cost effective alternative to the FRP tanks specified. Please advise.

**Response:** Polyethylene tanks will not be considered as a substitution for the FRP tanks specified prior to opening bids.

- 1.11.** Is there any information regarding the Cathodic Protection portion of this project? On dwg E-507 A it shows a Rectifier panel with a reference to the spec sec 13110. There is no 13110 in the specs. Can you point me in the right direction please?

**Response:** Specification Section 13110 was added, see No. 2.11 attached in this Addendum.

**1.12.** Regarding named “or equal” status on a fiberglass shelter and have run into a bit of a catch-22.

- 13122 2.01.B calls for substitutions in advance of the bid date per 01660
- However, 01660 1.10.A only allows for substitutions to be considered after the contract with the Contractor has been executed?

**Response:** See response to question 1.2.

**1.13.** In spec section 17515 page 7 of 8. E. 1. You talk about the contractor furnish and installing a 150’ Monopole Mast per spec section 17600. I don’t see that spec section. Will that spec section be provided?

**Response:** The monopole will be provided under a separate contract.

**1.14.** 1. What material are the 4” valves in the chemical building?  
2. Please confirm the end connections for 200-BFV-2, 200-BFV-4 and 200-BFV-6.

**Response:** See Sheet D-314 for the valve schedule and Section 15110 for the valve specifications. The end connections for 200-BFV-2, 200-BFV-4, and 200-BFV-6 are flanged.

**1.15.** Is there a spec available for the operators for the site entrance gates?

**Response:** Refer to specification 17550 – Security System

## **2. Modifications to the Specifications**

**2.1.** Cover Sheet – Remove and replace the cover sheets in their entirety with the cover sheets attached in this Addendum.

**2.2.** Seal Sheets:

The Professional Engineering Firm’s name and registration number will be added to the seal sheets per the Texas Board of Professional Engineers Rule 137.33 and 137.77.

Architectural Certification Sheet add “GNA Architecture – TBAE Reg. No. BR 113”

Electrical Certification Page add “Grubb Engineering, Inc – TBPE Reg. No. F-3904”

HVAC and Plumbing Certification Page add “RGM Engineering – TBPE Reg No. F-10487”

Instrumentation Certification page add “Grubb Engineering, Inc – TBPE Reg. No. F-3904”

Landscaping Certification page add “CFZ Group, Inc – TBPE Reg. No. 1784”

Structural Certification page add “Tetra Tech, Inc – TBPE Reg. No. F-3924”

Tetra Tech Certification page add “Tetra Tech, Inc – TBPE Reg. No. F-3924”

**2.3.** Table of Contents:

Remove and replace the Table of Contents in its entirety with the Table of Contents attached in this Addendum.

**2.4.** Invitation to Bidders:

Add the following paragraphs between the ninth and tenth paragraphs of the Invitation to Bidders:

*“The Davis-Bacon prevailing wage requirements apply to Contractors and Subcontractors performing on federally funded or assisted contracts in excess of \$2,000 for the construction, alteration or repair (including painting) of a treatment works project under the CWSRF or a construction project under the DWSRF.*

*For prime contracts in excess of \$100,000, Contractors and Subcontractors must also, under the provisions of the Contract Work Hours and Safety Standards Act, as amended, pay laborers and mechanics, including guards and watchmen, at least one and one-half times their regular rate of pay for all hours worked over 40 in a workweek. The Fair Labor Standards Act may also apply to Davis-Bacon covered contracts.*

*Any contracts or subcontracts in excess of \$2,000 must include the provisions of the Davis-Bacon Wage Rate Requirements found in TWDB Guidance No. DB-0156.”*

**2.5. Instructions to Bidders**

Add the following paragraphs immediately after Paragraph No. 24:

**25. Contingent Award of Contract**

This contract is contingent upon release of funds from the Texas Water Development Board. Any contract(s) awarded under this Invitation for Bids is/are expected to be funded in part by a loan or loan with principal forgiveness from the Texas Water Development Board and a grant from the United States Environmental Protection Agency, U.S. EPA. Neither the State of Texas, the U.S. EPA, nor any of its departments, agencies, or employees, are or will be a party to this Invitation for Bids or any resulting contract.

**26. Disadvantaged Business Enterprise Goals**

The Texas Water Development Board's (TWDB) Clean Water and Drinking Water State Revolving Fund programs receive federal funds from the U. S. Environmental Protection Agency (EPA). As a condition of federal grant awards, EPA regulations require that loan recipients make a "good faith effort" to award a fair share of work to Disadvantaged Business Enterprises (DBE) who are Minority Business Enterprises(MBE's), and Women-owned Business Enterprises (WBE's) whenever procuring construction, supplies, services and equipment. More information on DBE requirements is available in the Supplemental Contract Conditions section of this guidance No. 14. Disadvantaged Business Enterprises.

The current fair share goals for the State of Texas are as follows:

<b>CATEGORY</b>	<b>MBE</b>	<b>WBE</b>
CONSTRUCTION	12.94%	8.72%
EQUIPMENT	7.12%	5.39%
SUPPLIES	9.68%	9.34%
SERVICES	10.84%	5.72%

**27. Davis-Bacon Wage Rate Requirements**



(a) Davis-Bacon prevailing wage requirements apply to the construction, alteration or repair of treatment works carried out, in whole or in part, with assistance made available by the Clean Water State Revolving Fund (CWSRF) or a construction project financed, in whole or in part, from the Drinking Water State Revolving Fund (DWSRF).

(b) The Davis-Bacon prevailing wage requirements apply to Contractors and Subcontractors performing on federally funded or assisted contracts in excess of \$2,000 for the construction, alteration or repair (including painting) of a treatment works project under the CWSRF or a construction project under the DWSRF.

(c) For prime contracts in excess of \$100,000, Contractors and Subcontractors must also, under the provisions of the Contract Work Hours and Safety Standards Act, as amended, pay laborers and mechanics, including guards and watchmen, at least one and one-half times their regular rate of pay for all hours worked over 40 in a workweek.

The Fair Labor Standards Act may also apply to Davis-Bacon covered contracts.

(d) Any contracts in excess of \$2,000 must include the provisions of the Davis-Bacon Wage Rate Requirements. If the Owner (sub-recipient) is a governmental entity such as a city or district, it must insert in full the contract clauses found in TWDB Guidance DB-0156, Appendix 1: Section 3, Section 4 if the contract exceeds \$100,000, and Section 5. If the Owner (sub-recipient) is a non-governmental entity such as a water supply corporation or a private company, it must insert in full the contract clauses found in TWDB Guidance DB-0156, Appendix 2: Section 3, Section 4 if the contract exceeds \$100,000, and Section 5. The Owner (sub-recipient) must ensure all prime contracts require the same full text in any subcontracts. See TWDB Guidance DB-0156 for the text of the contract language that must be included.

Additional information on Davis-Bacon Wage Rate Requirements and its applicability to this contract can be found in TWDB Guidance DB-0156.

28. American Iron and Steel

Any contract(s) awarded under this Invitation for Bids is/are subject to the American Iron and Steel (AIS) requirements of 33 U.S.C §1388 for Clean Water State Revolving Fund projects or Public Law 114-113, Consolidated Appropriations Act, 2016, or subsequent appropriations acts, for Drinking Water State Revolving Fund projects. The Contractor must complete the statement of understanding regarding this requirement, found in the Special Contract Conditions, Item No. 9.

29. Equal Employment Opportunity and Affirmative Action

All qualified applicants will receive consideration for employment without regard to race, color, religion, sex (including pregnancy), sexual orientation, gender identity, national origin, age (40 or older), disability, or genetic information. Bidders on this work will be required to comply with the Department of Labor regulations at 41 CFR Part 60-4, relating to Construction Contractors--Affirmative Action Requirements, which include the President's Executive Order No. 11246, as amended by Executive Order No. 11375 and Executive Order No. 13672, in the award and administration of contracts awarded under TWDB financial assistance agreements. Failure by the Contractor to carry out these requirements is a material breach, which may result in the termination of the awarded financial assistance.

30. Debarment and Suspension Certification

This contract is subject to the federal requirements of Subpart C of 2 CFR Part 180 and Part 1532 regarding Debarment and Suspension. The Contractor will comply with the assurances provided with the bid that leads to a contract.

31. Bid Guarantee

Each bidder shall furnish a bid guarantee equivalent to five percent of the bid price (Water Code 17.183). If a bid bond is provided, the Contractor shall utilize a surety company which is authorized

to do business in Texas in accordance with Surety Bonds and Related Instruments, Chapter 3503 of the Insurance Code.

32. Forms to be submitted with Bid:

- WRD-255, Bidder's Certifications regarding Equal Employment Opportunity and Non-Segregated Facilities.
- SRF-404, Certification Regarding Debarment, Suspension and Other Responsibility Matters,(to be completed and submitted by the sub-recipient).
- Disadvantaged Business Enterprise (DBE) Construction Contract Phase Forms

2.6. Add the attached “ED-103 – Contractor’s Act of Assurance” to the Contract Documents after page 46 of the TWDB-0550.

2.7. Add the attached “ED-104 – Contractor’s Resolution on Authorized Representative” to the Contract Documents after the ED-103 inserted within this Addendum.

2.8. Section 01010 – Summary of Work

Section 1.01.D – add the following paragraph in its entirety following D, “E. Per the Categorical Exclusion issued on August 21, 2017, conditions pertaining to this project apply. These include:

1. Standard emergency condition for the discover of cultural resources; and
2. Standard emergency conditions for the discovery of threatened and endangered species.”

2.9. Section 11366

Delete paragraph 2.02.C.2 in its entirety. “The electrolyzer shall include a secondary dilution inlet to allow for concentration and temperature control inside the electrolyzer. About 50% of the water consumed by the electrolyzer is fed through this inlet.”

Section 2.04.C.3.j - Replace “36 top manway” with “30-inch top manway”

Section 2.04.D.1 – Replace “OSHG master panel” with “two (2) OSHG generator PLC panels”

Add the following language immediately following paragraph 2.11.A.4. “5. 480 VAC, 3 phase and 120VAC, 1 phase power shall be split into two separate panels.”

2.10. Section 13122 Replace Paragraph 2.2.A.3 with the following:

3. Foam Core:

- i. Rigid, unfaced, closed cell, polyisocyanurate foam with a density of 3.0 pounds per cubic foot. Foam shall be P300 Elfoam.

1. 1 inch thick with an initial insulating value of R-6.

ii. Foam properties:

1. Thermal conductivity (ASTM C 518): 0.165 BTU•inch/hr./SF/°F

2. Density / specific gravity (ASTM D 1622): 3.0 PCF.

3. Shear Strength (ASTM C 273)
  - a. Parallel to rise: 35 lb/in<sup>2</sup>
  - b. Perpendicular to rise: 30 lb/in<sup>2</sup>
4. Tensile Strength (ASTM D 1623)
  - a. Parallel to rise: 60 lb/in<sup>2</sup>
  - b. Perpendicular to rise: 50 lb/in<sup>2</sup>
5. Compressive Strength (ASTM D 1621):
  - a. Parallel to rise: 65 lb/in<sup>2</sup>
  - b. Perpendicular to rise: 40 lb/in<sup>2</sup>

**2.11.** Section 13110  
Add the Attached Section 13110 to the technical specifications.

**2.12.** Section 17300  
Add the following language to paragraph 1.06.D.6:  
“900 NE Loop 410, Suite D317  
San Antonio, TX 78209  
Attn: Rick Hidalgo  
Phone: 210-807-7434”

**2.13.** Section 17450A  
Replace in its entirety.

**2.14.** Section 17515  
Replace in its entirety.

### **3. Modifications to the Drawings**

**3.1.** Sheet G-002.

The following General Notes will be added:

“20. This project is subject to the American Iron and Steel (AIS) requirements of P.L. 113-235, Consolidated and Further Continuing Appropriations Act 2015. All iron and steel products for construction, alteration, maintenance, or repairs incorporated in these plans must be produced in the United States.”

“21. Per the Categorical Exclusion issued on August 21, 2017, conditions pertaining to this project apply. These include:

- Standard emergency condition for the discovery of cultural resources; and
- Standard emergency conditions for the discovery of threatened endangered species.”

**3.2.** Sheet G-005

Replace sheet in its entirety.

- 3.3.** Sheet A-306  
Replace sheet in its entirety.
- 3.4.** Sheet S-102  
Replace sheet in its entirety.
- 3.5.** Sheet C-107  
Replace sheet in its entirety.
- 3.6.** Sheet D-201  
Replace sheet in its entirety.
- 3.7.** Sheet D-202  
Replace sheet in its entirety.
- 3.8.** Sheet D-203  
Replace sheet in its entirety.
- 3.9.** Sheet D-313  
Replace sheet in its entirety.
- 3.10.** Sheet D-314  
Replace sheet in its entirety.
- 3.11.** Sheet E-301  
Replace sheet in its entirety.
- 3.12.** Sheet E-302  
Replace sheet in its entirety.
- 3.13.** Sheet E-350  
Replace sheet in its entirety.
- 3.14.** Sheet I-302  
Replace sheet in its entirety.
- 3.15.** Sheet I-303  
Replace sheet in its entirety.
- 3.16.** Sheet I-506  
Replace sheet in its entirety.
- 3.17.** Sheet I-514  
Replace sheet in its entirety.
- 3.18.** Sheet I-602

Replace sheet in its entirety.

**3.19.** Sheet I-700

Replace sheet in its entirety.

**3.20.** Sheet I-703

Replace sheet in its entirety.

Tetra Tech, Inc.

Texas Registered Engineering Firm F-3924

700 N. Saint Mary's Street, Ste. 300

San Antonio, TX 78205



**END OF ADDENDUM**

**SAN ANTONIO WATER SYSTEM**



# **CONTRACT DOCUMENTS**

VOLUME 1 OF 2

## **ZARAMORA PUMP STATION IMPROVEMENTS PROJECT**

**SAWS Job No. 15-6103**

**SAWS Solicitation No. CO-00144**

**September 2017**



**TETRA TECH**

**Texas Registration No. F-3924**

This page intentionally left blank.

**SAN ANTONIO WATER SYSTEM**



# **CONTRACT DOCUMENTS**

VOLUME 2 OF 2

## **ZARAMORA PUMP STATION IMPROVEMENTS PROJECT**

**SAWS Job No. 15-6103**

**SAWS Solicitation No. CO-00144**

**September 2017**



**TETRA TECH**

**Texas Registration No. F-3924**



This page intentionally left blank.

**Contract Documents  
Table of Contents**

BIDDING AND CONTRACT REQUIREMENTS	PAGE
Invitation to Bidders ( <i>Rev. 7/13/2017</i> ) . . . . .	. IV-1
Instructions to Bidders ( <i>Rev. 1/25/2017</i> ). . . . .	. IB-1
Workers' Compensation Insurance Coverage Requirements ( <i>Rev. 9/08/2015</i> ) . . . . .	. WC-1
Contractor's Bid Packet Checklist ( <i>Rev. 3/15/2017</i> ) . . . . .	. BC
Bid Proposal. . . . .	. BP-1
Proposal Certification ( <i>Rev. 4/2014</i> ) . . . . .	. PC-1
Good Faith Effort Plan ( <i>Rev. 5/18/2017</i> ). . . . .	. GFEP-1
Conflict of Interest ( <i>Rev. 11/30/2015</i> ). . . . .	. Form CIQ
Wage Decisions . . . . .	. WR-1
General Conditions of the Contract ( <i>Rev. 6/15</i> ) . . . . .	. GC-1
Contract Agreement ( <i>Rev. 3/13/2017</i> ) . . . . .	. CA-1
Performance and Payment Bond ( <i>Rev. 3/13/2017</i> ) . . . . .	. PB-1
Contractor Suspension Policy Exhibit "B" ( <i>Rev. 3/14</i> ). . . . .	. SP-1
Contractor Security Procedures Exhibit "C" ( <i>Rev. 3/14</i> ) . . . . .	. SP-10
Request for Taxpayer Identification Number and Certification Form ( <i>Rev. 12/2014</i> ). . . . .	. W-9
Instructions for Completing the ACORD Certificate of Liability Insurance ( <i>Rev. 1/23/2017</i> ) . . . . .	. ICS
TWDB FAQ's . . . . .	. FQ-1
TWDB-0210 – U.S. E.P.A. Guidance ( <i>Rev. 02/05/15</i> ). . . . .	. DBE Guidance - 1
TWDB-0550 – Supplemental Contract Conditions ( <i>Rev. 09/2016</i> ) . . . . .	. TWDB 0550 – 1
ED-103 – Contractor's Act of Assurance. . . . .	. ED-103
ED-104 – Contractor's Resolution on Authorized Representative. . . . .	. ED-103
TWDB-1106 – American Iron and Steel (AIS) Guidance ( <i>Rev. 08/2016</i> ) . . . . .	. TWDB 1106 – 1
TWDB Form-0216 – Affirmative Steps Solicitation Report ( <i>Rev. 02/16/12</i> ) . . . . .	. TWDB-0216-1
TWDB Form-0217 – Affirmative Steps Certification and Goals ( <i>Rev. 02/16/12</i> ) . . . . .	. TWDB-0217-1
TWDB Form-0373 – Loan/Principal Forgiveness Participation Summary ( <i>Rev 02/16/12</i> ) . . . . .	. TWDB-0373-1
SRF Form 404 – Certification Regarding Debarment, Suspension, and Other Responsibility Matters ( <i>Rev. 04/16/15</i> ) . . . . .	. SRF-404-1
Guidance Regarding Use of Expiring Forms ( <i>dated 08/27/2015</i> ). . . . .	. US EPA Memo

Supplemental Conditions . . . . . SS-1

Special Conditions. . . . . SC-1

(Separate Documents)

CoSA STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (Latest Edition)

<https://www.sanantonio.gov/TCI/Current-Vendor-Resources/Standard-Specifications-and-Details>

SAWS SPECIFICATIONS FOR WATER & SANITARY SEWER CONSTRUCTION (February 2017)

[http://www.saws.org/business\\_center/specs/constspecs/](http://www.saws.org/business_center/specs/constspecs/)

**TABLE OF CONTENTS****DIVISION 1 – GENERAL REQUIREMENTS**

<u>Section</u>	<u>Title</u>
01010	Summary of Work
01015	Use of Premises
01040	Coordination
01050	Field Engineering
01065	Contractor Safety Plan
01092	Abbreviations
01200	Project Meetings
01270	Measurement and Payment
01300	Submittals
01310	Construction Schedule
01321	Progress Schedule
01322	Construction Photographs and Video
01370	Schedule of Values
01400	Quality Control
01500	Construction Facilities and Temporary Controls
01566	Waste and Salvageable Material
01600	Material and Equipment
01640	Manufacturer's Field Services
01652	System Operation
01700	Contract Closeout
01720	Project Record Documents
01730	Operation and Maintenance Data
01752	Facility Startup Commissioning Requirements

**DIVISION 2 – SITE CONSTRUCTION**

02060	Demolition
02100	Site Preparation
02140	Dewatering During Construction
02200	Earthwork
02205	Excavation
02210	Subgrade Preparation
02212	Removing Existing Pavements and Structures
02215	Fill and Backfill
02220	Excavating, Backfilling, and Compaction
02240	Lime Treated Subgrade
02318	Trench Safety System

02480	Landscape Plantings
02481	Treatment of Existing Trees
02503	Lead Paint Abatement
02509	Concrete Sidewalks
02510	Pavement Repair and Resurfacing
02525	Concrete Curbs and Gutters
02630	Storm Drainage
02700	Well No. 3 Abandonment
02821	Chain Link Fences and Gates
02921	Seeding

### **DIVISION 3 - CONCRETE**

03300	Cast-in-Place Concrete
03313	Tightness Testing of Concrete Structures
03410	Pre Cast Concrete Structure
03521	Lightweight Insulating Concrete

### **DIVISION 4 – MASONRY**

04200	Unit Masonry
-------	--------------

### **DIVISION 5 – METALS**

05120	Structural Steel Framing
05140	Structural Aluminum
05400	Cold Formed Metal Framing
05500	Metal Fabrication
05520	Metal Grating Stairs
05521	Pipe and Tube Railings

### **DIVISION 6 – WOOD AND PLASTICS**

06100	Rough Carpentry
06600	Fiberglass Reinforced Plastics (FRP) Fabrications Molded Grating
06610	Fiberglass Reinforced Plastics (FRP) Fabrications Pultruded Fiberglass Structural Shapes

**DIVISION 7 – THERMAL AND MOISTURE PROTECTION**

07015	Preparation for Re-Roofing
07210	Thermal Insulation
07250	Weather Barriers
07555	Styrene-Butadiene-Styrene Modified Bituminous Roofing (SBS)
07620	Sheet Metal Flashing and Trim
07631	Manufactured Gutters and Downspouts
07710	Roof Specialties
07720	Roof Accessories
07840	Firestopping
07920	Joint Sealants

**DIVISION 8 – DOORS AND WINDOWS**

08110	Hollow Metal Doors and Frames
08710	Finish Hardware
08910	Louvers

**DIVISION 9 – FINISHES**

09260	Gypsum Board Assemblies
09850	Protective Coatings – Chemical Resistant Coatings
09900	Painting and Coating
09911	Polyurethane Coating

**DIVISION 10 – SPECIALTIES**

10103	Signs
10140	Signage

**DIVISION 11 – EQUIPMENT**

11165	Dock Bumpers
11224	In-Line Static Mixer
11242	Peristaltic Chemical Metering Pumps and Auxiliaries
11310	Corrosion Resistant Sump Pumps
11366	On-Site Hypochlorite Generation System

**DIVISION 13 – SPECIAL CONSTRUCTION**

13110	Cathodic Protection System
13122	Pre-Engineered Fiberglass Shelters
13216	Fiberglass Reinforced Plastic Tanks and Accessories

**DIVISION 14 – MATERIAL PROCESSING AND HANDLING EQUIPMENT**

14630	Crane Bridge Hoists
-------	---------------------

**DIVISION 15 – MECHANICAL**

15000	Mechanical - General Requirements
15044	Pressure Testing of Piping
15060	Miscellaneous Process Piping
15062	Chlorinated Polyvinyl Chloride (CPVC) Pipe and Fittings
15063	Polyvinyl Chloride (PVC) Pipe, Schedule Type
15064	Polyvinyl Chloride (PVC) Pressure Pipe and Fittings, C900
15065	Steel Process Piping
15066	Double Wall Containment Piping
15073	Disinfection of Waterlines
15074	Water Pipeline Testing
15077	Identification for Chemical System Piping
15082	Chemical System Insulation
15099	Pipe Corrosion Control
15110	Valves and Actuators
15111	Ball Valve and Electrical Actuator
15126	Pipe Hangers and Support
15129	Coupling and Connectors
15130	Flexible Joints and Couplings
15410	Common Work Results for Plumbing
15411	Plumbing Fixtures
15440	Facility Water Distribution
15450	Facility Sanitary Sewerage
15475	Identification for Plumbing, Piping and Equipment
15478	Heat Tracing for Plumbing Piping
15482	Plumbing Insulation
15815	HVAC Ducts and Casings
15820	Air Duct Accessories
15821	Refrigerant Piping
15830	HVAC Fans
15836	Packaged Air Conditioning Units
15838	Split-System Air-Conditioning Units
15850	Air Outlets and Inlets
15861	Hangers and Supports for HVAC Piping and Equipment

15872	Vibration Controls for HVAC Equipment
15876	Identification for HVAC Piping and Equipment
15887	HVAC Insulation
15950	Testing, Adjusting and Balancing for HVAC

### **DIVISION 16 – ELECTRICAL**

16010	Basic Electrical Requirements
16050	Basic Electrical Materials and Methods
16073	Hangers and Supports for Electrical Systems
16110	Raceways
16115	Cable Tray
16120	Conductors
16411	Power System Study
16412	Safety Switches - Heavy Duty
16421	Soft Start Motor Controller
16428	Low Voltage Switchboard
16431	Low Voltage Motor Control Center
16451	Grounding
16461	Transformers - General Purpose 3-Phase
16482	Medium Voltage Motor Control Center
16501	Automatic Transfer Switch
16600	Standby Generator
16670	Lightning Protection Systems
16940	Instrumentation Heat Trace System
16950	Electrical Testing

### **DIVISION 17 – INSTRUMENTATION**

17300	Instrumentation and Controls – General Provisions
17302	Process Instrumentation and Controls System Testing
17305	Application Services
17310	Field Instruments
17325	Control Panels
17327	Panel Mounted Equipment
17328	Instrumentation and Controls - Single Phase Uninterruptible Power Supply
17400	Control Loop Descriptions
17405	Input/Output List
17405A	Appendix A – Common Control Panel
17410	Field Instrument List
17500	Programmable Logic Controller
17515	Communications Interface Equipment
17550	Security System



This page intentionally left blank.



## CONTRACTOR'S RESOLUTION ON AUTHORIZED REPRESENTATIVE

\_\_\_\_\_  
Name or Names

I hereby certify that it was RESOLVED by a quorum of the directors of the

\_\_\_\_\_, meeting on the  
Name of Corporation

\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_, that \_\_\_\_\_,

\_\_\_\_\_, \_\_\_\_\_, and

\_\_\_\_\_, be, and hereby is/are authorized to act on behalf of

\_\_\_\_\_, as its representative in all business  
name of corporation

transactions conducted in the State of Texas, and;

That all above resolution was unanimously ratified by the Board of Directors at said meeting and that the resolution has not been rescinded or amended and is now in full forces and effect; and;

In authentication of the adoption of this resolution, I subscribe my name and affix the seal of the corporation this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Secretary

(seal)

**SECTION 13110****CATHODIC PROTECTION SYSTEM****PART 1 GENERAL****1.01 SCOPE**

- A. The cathodic protection design/install constructor shall provide all engineering services, materials, equipment, labor, and supervision for the installation of an automatically controlled impressed current cathodic protection system. All work furnished shall be in accordance with A.W.W.A. Standard D104, ANSI/NSF 61 and features included in this specification. The cathodic protection constructor shall be Corpro Waterworks, or Engineer approved equal.

**1.02 DESIGN**

- A. All engineering services shall be provided by a Corrosion Specialist who is accredited by the National Association of Corrosion Engineers International as a Senior Corrosion Technologist, Corrosion Specialist or Cathodic Protection Specialist. The system shall be designed by a Corrosion Specialist with experience in cathodic protection for water storage tanks and steel pipes. The Corrosion Specialist shall design the system to provide effective corrosion control in accordance with criteria for protection. The criteria for protection shall be based on a tank-to-water potential, pipe-to-water potential, pipe/soil potentials, IR drop free, within a range of -0.850 volts to -1.050 volts relative to a stationary copper-copper sulfate reference electrode. This potential shall be measured free of the effect of voltage gradients (IR drop).
- B. The Corrosion Specialist shall also base system capacity and performance on:
1. Total submerged surface area of the tank. (includes area up to high water line within tank bowl and wet risers in elevated tanks which are 30" in diameter or larger)
  2. Type of coating and condition of coating.
  3. Steel pipe material and coating.
  4. Total bare surface area to be protected will be a minimum of 25% of total surface area.
  5. Minimum current density of 0.5 MA/ft.<sup>2</sup> bare surface area.
  6. Chemical analysis of water including resistivity expressed in ohm-cm.
  7. Susceptibility of tank and steel pipe to icing conditions.
  8. Minimum anode design life of twenty (20) years.
  9. Selection, dimensions, and layout of system components specified in Section C. of this specification.

**1.03 SUBMITTALS**

- A. The cathodic protection constructor shall submit the following information to the purchaser for approval by the OWNER or his representative.

1. Rectifier product data.
4. Operations and Maintenance manuals.

## **PART 2 PRODUCTS**

### **2.01 RECTIFIER**

- A. The rectifier unit shall perform in accordance with ANSI/AWWA Standard D104 and shall include:
1. Transformer
  2. Silicon rectifying elements
  3. Circuit breaker(s)
  4. Lightning, surge, and overload protection
  5. Provision for air-cooling operation
  6. Digital voltmeter(s), ammeter(s) and potential meter(s)
  7. Weatherproof cabinet in accordance with NEMA 4 requirements
  8. Provision to vary current output from 0% to 100% of rated capacity
  9. Provisions for mounting, grounding, and locking
  10. Provision for 110-120 volt, 60 Hz, single phase A.C. power.
  11. D.C. output capacity in volts and amperes in accordance with Design (Section B)
  12. Number of circuits in accordance with Design (Section B)
  13. Automatic controller shall adjust current output to compensate for changes in water level, temperature of water, water chemistry, and cathodic polarization, and shall include the following provisions:
    - a. Utilize long-life reference electrode(s) installed within the tank
    - b. Monitor the tank-to-water potential, free of IR drop
    - c. Automatically adjust the tank-to-water potential, free of IR drop, to a preset value
    - d. Operate within 25MV of preset value
    - e. Limit current to a preset value
    - f. Utilize digital potential meter(s) to display tank-to-water potential, free of IR drop

The rectifier unit shall be a Corppower TASC VIII automatic rectifier Model #TASCA-CJ.

## **PART 3 EXECUTION**

### **3.01 WORKMANSHIP AND INSTALLATION QUALIFICATIONS**

- A. The cathodic protection constructor shall have a minimum of five (5) years experience

installing and servicing the types of system described in this specification. The system shall be installed by personnel specifically trained by the constructor to provide all workmanship required for corrosion control performance. All personnel shall be subject to Federal Substance Abuse and Testing Regulations.

### **3.02 PERFORMANCE**

- A. All work shall be in accordance with the following requirements:
1. The rectifier shall be installed in the manner and at the locations as shown. The rectifier shall be connected to the existing cathodic protection system by the cathodic protection constructor.
  2. Pressure entrance fitting shall be installed in accordance with AWWA D100.
  6. Materials and equipment shall be inspected prior to installation. Any defective component shall be repaired or replaced.
  7. Electrical work shall be in accordance with the National Electrical Code.
  8. Lead wires shall be installed to prevent damage from abrasion.
  9. Electrical connections within the tank shall be sealed to prevent water migration.
  10. The rectifier shall be mounted at a convenient height (eye level) above grade for monitoring and service purposes.
  11. A.C. power to the rectifier shall be furnished by the purchaser.
  12. Disinfection of the tank shall be the responsibility of the purchaser.
  13. Work provided by the constructor shall be completed in a clean and safe manner.

### **3.03 ENERGIZING THE SYSTEM**

- A. After the new rectifier is installed and the tank is filled, the cathodic protection constructor shall provide start-up service which includes energizing, testing, and adjusting the system for optimum performance of the cathodic protection system. This start-up service shall be in performed in accordance with ANSI/AWWA D104 Section 5.2 Testing. This start-up service shall be coordinated with the OWNER or his representative. All test data shall be reviewed and evaluated by the Corrosion Specialist.

### **3.04 GUARANTEE**

- A. All workmanship, equipment, and materials furnished by the cathodic protection constructor shall be guaranteed for two (2) years.

**END OF SECTION**

This page intentionally left blank.

SAWS  
Zarzamora Pump Station Improvements Project (Common Control Panel)

I/O LIST								
Item No.	P&ID	Parameter	Digital Input	Digital Output	Analog Input	Analog Output	Modbus	Ethernet
<b>Chemical Analytical Equipment</b>								
		Chlorine Residual #1 (PPM) at GST Inlet Piping						X
		Chlorine Residual #2 (PPM) at GST Discharge Piping						X
		Fluoride Residual (PPM) at HSP Suction Header						X
<b>Chemical - Sodium Hypochlorite</b>								
		SH Valve (300-BV-81) to SH Storage Tank #1 Position Closed	X					
		SH Valve (300-BV-81) to SH Storage Tank #2 Position Closed	X					
		SH Metering Pump #1 Diaphragm Fail (Leak Detection) Alarm	X					
		SH Metering Pump #1 VFD Fail Alarm	X					
		SH Metering Pump #1 Remote Status	X					
		SH Metering Pump #1 Running Status	X					
		SH Metering Pump #1 High Pressure Alarm	X					
		SH Metering Pump #1 Alarm Reset		X				
		Fluoride Metering Pump #1 Start Command		X				
		Fluoride Metering Pump #1 Stop Command		X				
		SH Metering Pump #1 Overload Alarm	X					
		SH Metering Pump #1 Speed Indication			X			
		SH Metering Pump #1 Speed Command				X		
		SH Metering Pump #2 Diaphragm Fail (Leak Detection) Alarm	X					
		SH Metering Pump #2 VFD Fail Alarm	X					
		SH Metering Pump #2 Remote Status	X					
		SH Metering Pump #2 Running Status	X					
		SH Metering Pump #2 High Pressure Alarm	X					
		SH Metering Pump #2 Alarm Reset		X				
		Fluoride Metering Pump #2 Start Command		X				
		Fluoride Metering Pump #2 Stop Command		X				
		SH Metering Pump #2 Overload Alarm	X					
		SH Metering Pump #2 Speed Indication			X			
		SH Metering Pump #2 Speed Command				X		
		SH Metering Pump #3 Diaphragm Fail (Leak Detection) Alarm	X					
		SH Metering Pump #3 VFD Fail Alarm	X					
		SH Metering Pump #3 Remote Status	X					
		SH Metering Pump #3 Running Status	X					
		SH Metering Pump #3 High Pressure Alarm	X					
		Fluoride Metering Pump #3 Start Command		X				
		Fluoride Metering Pump #3 Stop Command		X				
		SH Metering Pump #3 Alarm Reset		X				
		SH Metering Pump #3 Overload Alarm	X					
		SH Metering Pump #3 Speed Indication			X			
		SH Metering Pump #3 Speed Command				X		
		SH Metering Pump Discharge Flow to Primary Injection #1			X			
		SH Leak Detection Alarm	X					
		SH Storage Area High Level Alarm	X					
		Hydrogen Level			X			
<b>Fluoride System</b>								
		Fluoride Metering Pump #1 in Automatic	X					
		Fluoride Metering Pump #1 Run Status	X					
		Fluoride Metering Pump #1 VFD Fail Alarm	X					
		Fluoride Metering Pump #1 Speed Indication			X			
		Fluoride Metering Pump #1 Common Alarm	X					
		Fluoride Metering Pump #1 Speed Command				X		
		Fluoride Metering Pump #1 Alarm Reset		X				
		Fluoride Metering Pump #1 Start Command		X				
		Fluoride Metering Pump #1 Stop Command		X				
		Fluoride Metering Pump #1 High Discharge Pressure Alarm	X					
		Fluoride Metering Pump #1 Leak Detection Alarm	X					



SAWS  
Zarzamora Pump Station Improvements Project (Common Control Panel)

I/O LIST								
Item No.	P&ID	Parameter	Digital Input	Digital Output	Analog Input	Analog Output	Modbus	Ethernet
		Fluoride Metering Pump #2 in Automatic	X					
		Fluoride Metering Pump #2 Run Status	X					
		Fluoride Metering Pump #2 VFD Fail Alarm	X					
		Fluoride Metering Pump #2 Speed Indication			X			
		Fluoride Metering Pump #2 Common Alarm	X					
		Fluoride Metering Pump #2 Speed Command				X		
		Fluoride Metering Pump #2 Alarm Reset		X				
		Fluoride Metering Pump #2 Start Command		X				
		Fluoride Metering Pump #2 Stop Command		X				
		Fluoride Metering Pump #2 High Discharge Pressure Alarm	X					
		Fluoride Metering Pump #2 Leak Detection Alarm	X					
		Fluoride Metering Pump #3 in Automatic	X					
		Fluoride Metering Pump #3 Run Status	X					
		Fluoride Metering Pump #3 VFD Fail Alarm	X					
		Fluoride Metering Pump #3 Speed Indication			X			
		Fluoride Metering Pump #3 Common Alarm	X					
		Fluoride Metering Pump #3 Speed Command				X		
		Fluoride Metering Pump #3 Alarm Reset		X				
		Fluoride Metering Pump #3 Start Command		X				
		Fluoride Metering Pump #3 Stop Command		X				
		Fluoride Metering Pump #3 High Discharge Pressure Alarm	X					
		Fluoride Metering Pump #3 Leak Detection Alarm	X					
		Fluoride Flow Rate to Injection Point #1			X			
		Fluoride Storage Area High Level Alarm	X					
<b>SCADA Panel</b>								
		SCADA Panel Internal Temperature			X			
		Communications Failure Normal/Fail (Internal to PLC)		X				
		Loss of 120V PLC Control System Power (K7 Relay)	X					
		UPS System Health						X
		UPS Battery Voltage						X
		UPS Status						X
<b>Brine Tank/Brine System</b>								
		Brine Tank Liquid Level			X			
		Brine Tank Salt Level			X			
		Hardness Alarm	X					
		Potable Water Flow to Water Softeners			X			
		Softened Water Flow			X			
<b>Brine Tank Solenoid Valve</b>								
		Brine Tank Solenoid Valve in Automatic	X					
		Brine Tank Solenoid Valve Opened	X					
		Brine Tank Solenoid Valve Closed	X					
		Brine Tank Solenoid Valve Open Command		X				
		Brine Tank Solenoid Valve Close Command		X				
<b>Softened Water Solenoid Valves</b>								
		Softened Water Solenoid Valve SV-1 in Automatic	X					
		Softened Water Solenoid Valve SV-1 Opened	X					
		Softened Water Solenoid Valve SV-1 Closed	X					
		Softened Water Solenoid Valve SV-1 Open Command		X				
		Softened Water Solenoid Valve SV-1 Close Command		X				
		Softened Water Solenoid Valve SV-2 in Automatic	X					
		Softened Water Solenoid Valve SV-2 Opened	X					
		Softened Water Solenoid Valve SV-2 Closed	X					
		Softened Water Solenoid Valve SV-2 Open Command		X				
		Softened Water Solenoid Valve SV-2 Close Command		X				

SAWS  
Zarzamora Pump Station Improvements Project (Common Control Panel)

I/O LIST								
Item No.	P&ID	Parameter	Digital Input	Digital Output	Analog Input	Analog Output	Modbus	Ethernet
		Softened Water Solenoid Valve SV-3 in Automatic	X					
		Softened Water Solenoid Valve SV-3 Opened	X					
		Softened Water Solenoid Valve SV-3 Closed	X					
		Softened Water Solenoid Valve SV-3 Open Command		X				
		Softened Water Solenoid Valve SV-3 Close Command		X				
<b>Fluoride Discharge Valve</b>								
		Fluoride Discharge High High Flow	X					
		Fluoride Discharge Valve Opened	X					
		Fluoride Discharge Valve Closed	X					
		Fluoride Discharge Valve Panel LOR Switch in Local	X					
		Fluoride Discharge Valve Panel LOR Switch in Remote	X					
		Fluoride Discharge Valve Open Command		X				
		Fluoride Discharge Valve Close Command		X				
<b>Chemical - Sodium Hypochlorite Storage Tanks</b>								
		SH Storage Tank #1 Vent High Differential Pressure	X					
		SH Storage Tank #2 Vent High Differential Pressure	X					
		<b>Point Count (Does not include internal PLC I/O)</b>	<b>62</b>	<b>28</b>	<b>14</b>	<b>6</b>		
		<b>Card Capacity</b>	<b>32</b>	<b>32</b>	<b>16</b>	<b>8</b>		
		<b>Cards Required (includes Spare Capacity)</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>1</b>		

**SECTION 17515****COMMUNICATIONS INTERFACE EQUIPMENT****PART 1 - GENERAL**

## 1.01 SCOPE:

- A. This Section of the Specifications describes the requirements for Communications Interface Equipment and Systems to be furnished under other Sections of the Specifications as listed in the Related Sections paragraph of this Section.
- B. All equipment described herein shall be submitted and furnished as an integral part of equipment specified elsewhere in these Specifications.

## 1.02 RELATED SECTIONS:

- A. Section 17300 Instrumentation General Provisions
- B. Section 17302 Process Instrumentation and Control System Testing
- C. Section 17305 Application Services
- D. Section 17310 Field Instruments
- E. Section 17327 Panel Mounted Equipment
- F. Section 17400 Control Loop Descriptions
- G. Section 17405 Input/Output List
- H. Section 17410 Field Instrument List
- I. Section 17500 Programmable Logic Controller (PLC)

## 1.03 SUBMITTALS:

- A. Submit catalog data for all items supplied from this specification Section as applicable. Submittal shall include catalog data, functions, ratings, inputs, outputs, displays, etc. sufficient to confirm that the equipment provides every specified requirement. Any options or exceptions shall be clearly indicated.
- B. Submittals for equipment specified herein shall be made as a part of equipment submittals furnished under other Sections. Individual submittals for equipment specified herein will not be accepted and will be returned un-reviewed.
- C. Installation experience documentation shall be submitted for approval with the Section Equipment Submittal.
- D. Operations and Maintenance Manuals:
  - 1. Operations and Maintenance manuals shall be constructed in accordance with Division 1 and shall include the following information:
    - a. Manufacturer's contact address and telephone number for parts and service.
    - b. Instruction books and/or leaflets

- c. Recommended renewal parts list
- d. Record documents for the information required by the Submittals section above.

#### 1.04 REFERENCE CODES AND STANDARDS:

- A. The equipment in this specification shall be designed and manufactured according to latest revision of the following standards (unless otherwise noted):
  - 1. National Electric Code (NEC)
  - 2. National Electrical Safety Code (NESC)
  - 3. International Society of Automation (ISA)
  - 4. Occupational Safety and Health Administration (OSHA)
  - 5. Underwriters Laboratories (UL)
  - 6. UL 508, the Standard of Safety for Industrial Control Equipment
  - 7. Factory Mutual (FM)
  - 8. City of San Antonio, Texas Electrical Code
  - 9. All equipment and installations shall conform to Federal, State and local codes.
- B. All equipment and installations shall conform to the standards and codes listed in the individual device paragraphs.

#### 1.05 QUALITY ASSURANCE:

- A. The manufacturer of this equipment shall have produced similar equipment for a minimum period of five (5) years. When requested by the OWNER/ENGINEER, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.
- B. The equipment as submitted shall be located as shown on the project plans and shall fit within this location. Equipment which does not fit in the space as shown on the project plans is not acceptable.
- C. For the equipment specified herein, the manufacturer shall be ISO 9001 2000 certified.

#### 1.06 WARRANTY:

- A. The Manufacturer shall warrant the equipment to be free from defects in material and workmanship for two (2) years from the date of acceptance of the equipment containing the items specified in this Section. Within such period of warranty the Manufacturer shall promptly furnish all material and labor necessary to return the equipment to new operating condition. Any warranty work requiring shipping or transporting of the equipment shall be performed by the CONTRACTOR at no expense to the OWNER.

**PART 2 - PRODUCTS**

## 2.01 INDUSTRIAL ETHERNET SWITCH (SCADA CABINET):

- A. Subject to compliance with the Contract Documents, the following Manufacturers are acceptable:
  - 1. CISCO model IE-3000-8TC-E
- B. The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety.
- C. Environmental:
  - 1. Operating temperature: -40°F to 167°F
  - 2. Operating humidity: 10-95% Non-condensing
  - 3. Storage temperature: -13°F to 185°F
- D. Physical:
  - 1. Enclosure: NEMA TS-2. Fully Modular construction.
  - 2. Power supply: 120VAC from proposed UPS source.
  - 3. Microprocessor based managed type.
  - 4. Din rail mountable capability.
  - 5. 19 inch rack mountable where shown in plans.
- E. Functional Performance:
  - 1. Per Port status LED indication.
  - 2. Port based Ethernet MAC security individually port configurable.
  - 3. Wire speed switching, 16 Gigabit Switching Fabric.
  - 4. HSRP Protocol Support.
  - 5. Cisco Express Forwarding Hardware Routing Architecture.
  - 6. SNMP v1, SNMP v2c, and SNMP v3 Support.
  - 7. 802.1d Spanning Tree Protocol Support.
  - 8. HTTPS accessible.
  - 9. Common Industrial Protocol (CIP) Management Objects Support.
  - 10. Smart Templates for Ethernet/IP.

11. PROFINET v2 certification.
12. Alarm contacts for external fault notification.
13. 10/100 Base T ports with RJ-45 connectors for Category 6 cabling.
14. Switch Configuration on removable/configurable via Flash Memory module.
15. Fully managed switch capability.

F. Options and Accessories Required:

1. Provide twenty (20) percent spare port capacity for each port type.
2. Provide expansion modules Cisco model IEM-3000-8TM for additional connections.

2.02 MODBUS GATEWAY:

- A. Manufacturer: Lantronix IntelliBox-I/O 2100 or approved equal

2.03 INDUSTRIAL ETHERNET SWITCH (SECURITY CABINET):

- A. Subject to compliance with the Contract Documents, the following Manufacturers are acceptable:

1. Cisco WS 3560-24PS-24 POE Ports with Redundant PWR-C2-640 WAC Power Module

- B. The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety.

C. Environmental:

1. Operating temperature: 23°F to 113°F
2. Operating humidity: 5-95% Non-condensing
3. Storage temperature: -40°F to 158°F

D. Physical:

1. Stackable, rack mount enclosure
2. Power supply: 120VAC from proposed UPS source.
3. 640 Watt Power Supply
4. Microprocessor based managed type.

E. Functional Performance:

1. Per Port status LED indication.
2. Port based Ethernet MAC security individually port configurable.

3. HSRP Protocol Support.
4. Cisco Express Forwarding Hardware Routing Architecture
5. SNMP v1, SNMP v2c, and SNMP v3 Support.
6. 802.1d Spanning Tree Protocol Support.
7. Alarm contacts for external fault notification.
8. 10/100 Base T ports with RJ-45 connectors for Category 6 cabling.
9. Switch Configuration on removable/configurable via Flash Memory module.
10. Fully managed switch capability.
11. 12 GE SFP Ethernet Ports

F. Options and Accessories Required:

1. Provide twenty (20) percent spare port capacity for each port type.

2.04 INDUSTRIAL GRADE ROUTER (COMMUNICATIONS CABINET)

A. Subject to compliance with the Contract Documents, the following Manufacturers are acceptable:

1. Cisco CGR-2010

B. The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety.

C. Environmental:

1. Operating temperature: -40°F to 140°F
2. Operating humidity: 5-95% Non-condensing
3. Storage temperature: -40°F to 185°F

D. Physical:

1. Enclosure: Fully Modular construction to allow for field upgrades for existing and/or future technologies without requiring a platform replacement.
2. Power supply: 120VAC from proposed UPS source.
3. Microprocessor based managed type.
4. 19 inch rack mountable where shown in plans.

E. Functional Performance:

1. Dual Gigabit Ethernet WAN interfaces, supporting two GE Fiber
2. Two external Compact Flash slots
3. Two high-speed USB 2.0 ports
4. SNMP Support.
5. Fully managed switch capability.

F. Options and Accessories Required:

1. Provide twenty (20) percent spare port capacity for each port type.
2. Provide expansion module Cisco model GRWIC-D-ES-2S-8PC for additional connections.

2.05 RADIO TRANSCIEVER SYSTEM:

- A. Broadband radio to be provided as part of a separate project.
- B. Approved Products NO SUBSTITUTIONS:

Narrowband Radio System to consist of the following:

DESCRIPTION	MANUFACTURER	PART NUMBER
13.8 volts DC power supply	Power One	HN24-3.6-A
900 MHz directional Yagi antenna, 10dBd gain, 50 ohm	Kathrein Inc., Scala Division	TY-900
Omni-Directional Antenna	Kathryn Scala	OGB9-915N
Trio JR Ethernet Radio	Schneider Electric	TBURJ-R900-00-002-E-H-0
Surge Protection	Poly Phaser	IS-50NX-C2
Grounding Kit	Andrew	Per specified feedline used

C. Surge Protection:

1. Radio antenna cable connection shall have 50kA surge protector, Poly Phaser Part No. IS-50NX-C2.

D. Antennas:

1. See above list for antennas to be provided.
2. Feedline:
  - a. 50 feet or less: LMR-400 Coaxial Cable.
  - b. Over 50 but less than 100 feet: LMR-600 Coaxial Cable.
  - c. 100 feet or more: LMR-900 Coaxial Cable.
  - d. Andrew Grounding Kit (per specified feedline size used)

E. Antenna Mast:

1. To be provided as part of a separate project.



**PART 3 - EXECUTION**

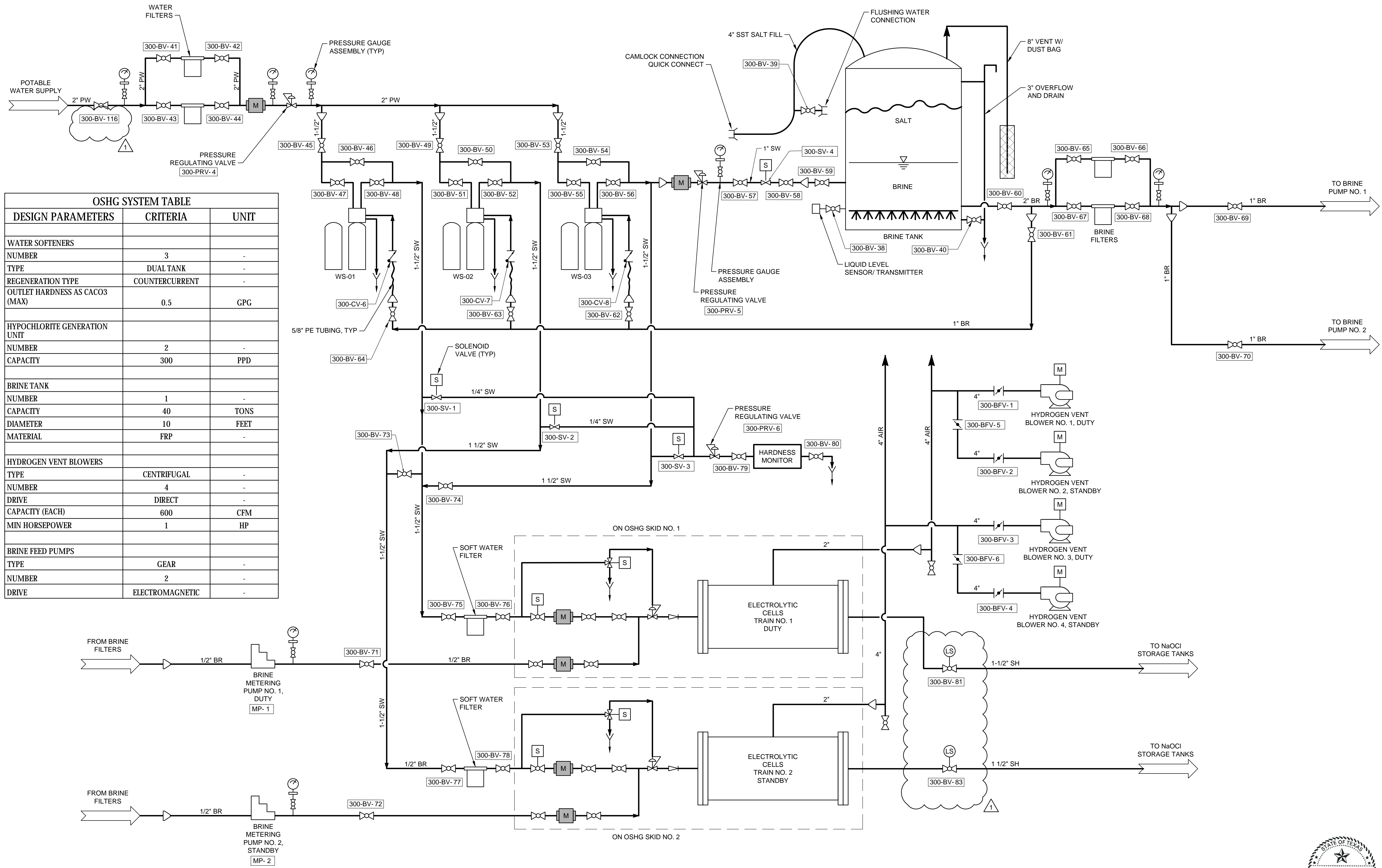
3.01 INSTALLATION:

- A. All equipment specified herein shall be factory installed in an overall assembly, field adjusted, tested and cleaned as an integral part of the equipment specified elsewhere in these Specifications.

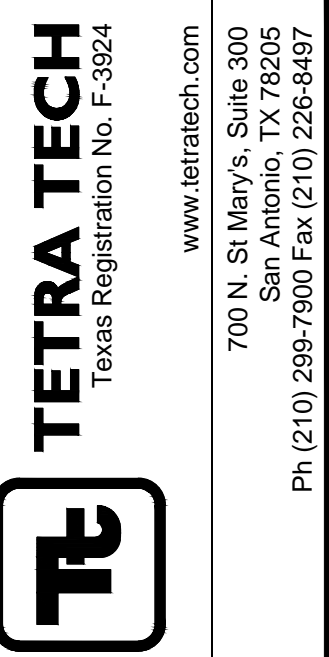
END OF SECTION

This page intentionally left blank.

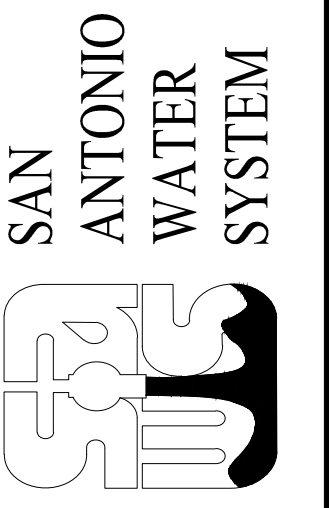
10/31/2017 8:46:38 AM - O:\PROJECTS\SAN ANTONIO\09308\200-09308-16002\CAD\SHEETFILES\ZARZAMORA\G - PROCESS FLOW DIAGRAM OSHG-HYPO.DWG - THOMAS, BRYAN



OSHG SYSTEM TABLE		
DESIGN PARAMETERS	CRITERIA	UNIT
<b>WATER SOFTENERS</b>		
NUMBER	3	-
TYPE	DUAL TANK	-
REGENERATION TYPE	COUNTERCURRENT	-
OUTLET HARDNESS AS CaCO3 (MAX)	0.5	GPG
<b>HYPOCHLORITE GENERATION UNIT</b>		
NUMBER	2	-
CAPACITY	300	PPD
<b>BRINE TANK</b>		
NUMBER	1	-
CAPACITY	40	TONS
DIAMETER	10	FEET
MATERIAL	FRP	-
<b>HYDROGEN VENT BLOWERS</b>		
TYPE	CENTRIFUGAL	-
NUMBER	4	-
DRIVE	DIRECT	-
CAPACITY (EACH)	600	CFM
MIN HORSEPOWER	1	HP
<b>BRINE FEED PUMPS</b>		
TYPE	GEAR	-
NUMBER	2	-
DRIVE	ELECTROMAGNETIC	-



BID SET



MARK	DATE	DESCRIPTION	BY	DJB
1	10/31/17	ADDENDUM #1		

SAN ANTONIO WATER SYSTEM  
ZARZAMORA PUMP STATION  
IMPROVEMENTS PROJECT  
**OSHG SYSTEM  
PROCESS FLOW DIAGRAM**

Project No.: 200-09308-16002  
Designed By: MMS  
Drawn By: BLE  
Checked By: DJB

**G-005**

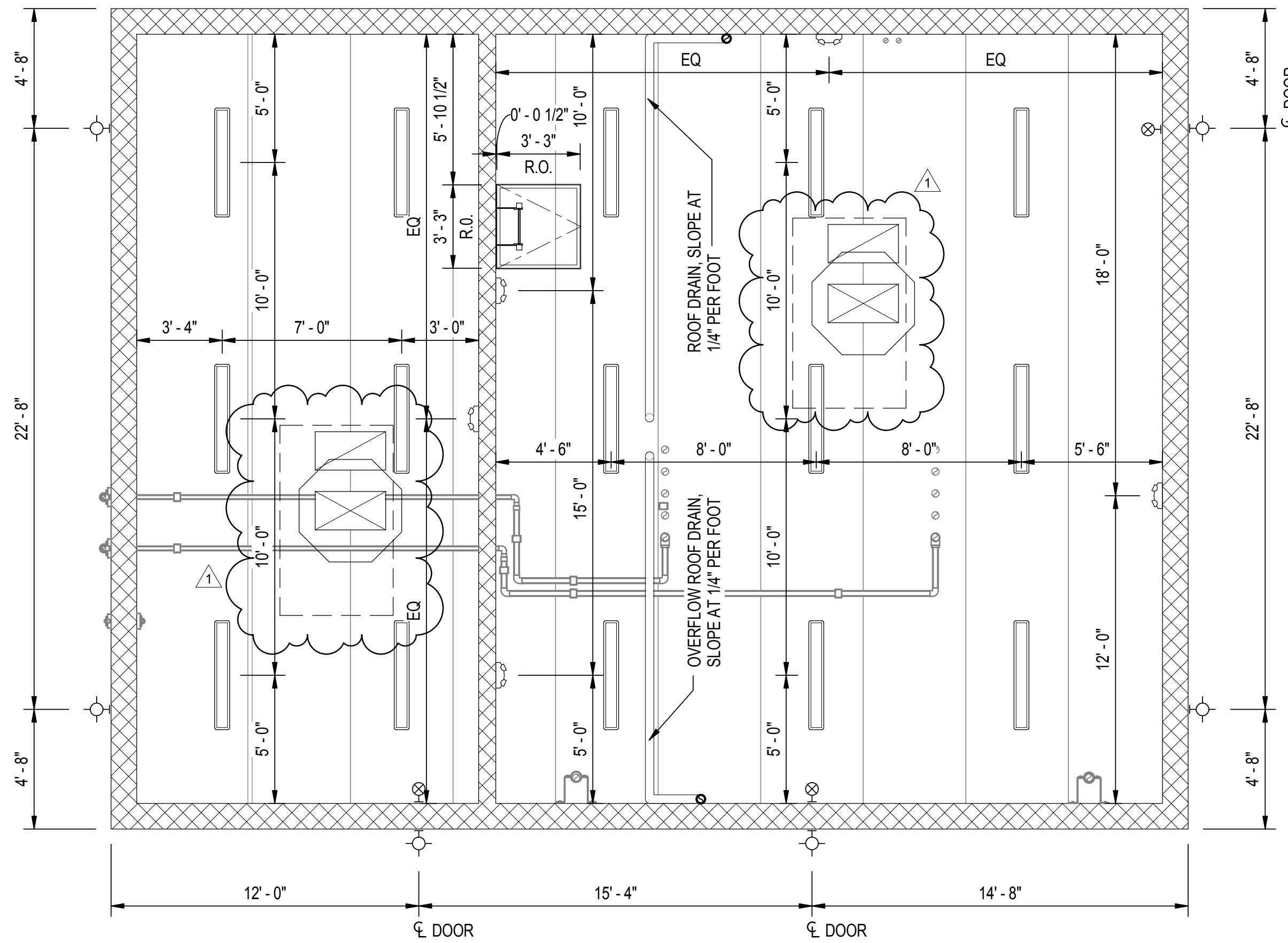


Bar Measures 1 inch

10/31/2017 10:50:25 AM C:\Users\rafael.domi\Documents\AL\_1-A-CHEM\_BLDG-2015 - Zarzamora\_Rafael.Domit.rvt

# 01 CHEMICAL BUILDING RCP




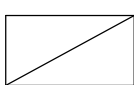
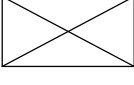
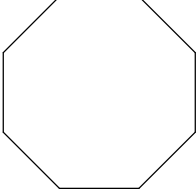



1/4" = 1'-0"

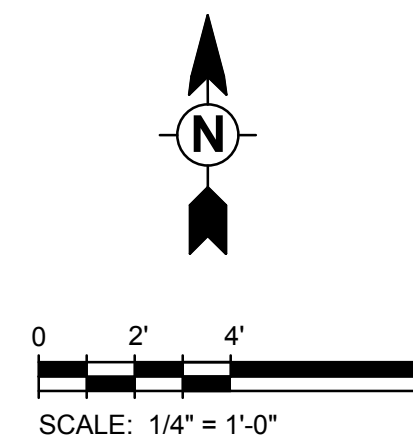


## GENERAL NOTES

1. REFER TO STRUCTURAL DRAWINGS INFORMATION ON WALLS, FOUNDATIONS, PADS, AND DESIGN OF ALL OTHER STRUCTURAL ELEMENTS.
2. REFER TO CIVIL DRAWINGS FOR BUILDING LOCATIONS, FINISH FLOOR ELEVATIONS, UTILITIES AND SEWER, SITE GRADING, PAVING, FENCING, AND YARD PIPING.
3. REFER TO PROCESSING DRAWINGS FOR ALL ELEMENTS PERTAINING TO CHEMICAL TREATMENT, WELLS, PUMPS, TANKS, AND ALL OTHER ASSOCIATED PROCESSING EQUIPMENT.
4. REFER TO MECHANICAL DRAWINGS FOR INFORMATION REGARDING HVAC, VENTILATION, AND ASSOCIATED EQUIPMENT.
5. REFER TO PLUMBING DRAWINGS FOR INFORMATION REGARDING WATER SUPPLY, DRAINS, SANITARY SEWER, EYE WASH STATIONS, HOSE STATIONS, AND ALL OTHER ASSOCIATED PLUMBING COMPONENTS.
6. LOCATIONS OF LIGHTING FIXTURES WITHIN THE BUILDINGS ARE DEPICTED IN THE ARCHITECTURAL DRAWINGS. REFER TO ELECTRICAL DRAWINGS FOR INFORMATION REGARDING LIGHTING FIXTURES, ELECTRICAL RECEPTACLES, POWER REQUIREMENTS FOR THE FACILITIES AND THEIR EQUIPMENT, AND ALL OTHER ELECTRICAL REQUIREMENTS AND COMPONENTS.
7. REFER TO LANDSCAPE DRAWINGS FOR TREE PRESERVATION, AND NEW TREES AND VEGETATION.

## RCP LEGEND

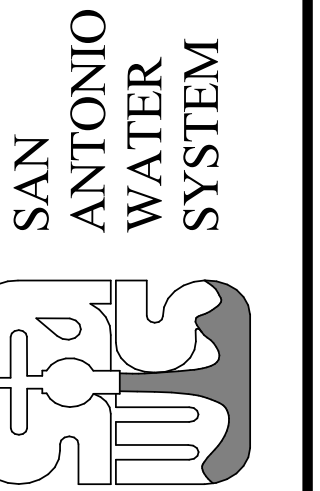
-  EXTERIOR WALL MOUNTED LUMINAIRE  
REFERENCE ELECTRICAL DRAWINGS
-  EXIT LIGHT  
REFERENCE ELECTRICAL DRAWINGS
-  EMERGENCY WALL PACK  
REFERENCE ELECTRICAL DRAWINGS
-  RETURN AIR DUCT  
REFERENCE MECHANICAL DRAWINGS,  
REFERENCE STRUCTURAL FOR ROOF  
PENETRATION LOCATION
-  SUPPLY AIR DUCT  
REFERENCE MECHANICAL DRAWINGS,  
REFERENCE STRUCTURAL FOR ROOF  
PENETRATION LOCATION
-  COCENTRIC DIFFUSER  
REFERENCE MECHANICAL DRAWINGS
-  SUSPENDED LIGHT FIXTURE  
REFERENCE ELECTRICAL DRAWINGS
-  SUSPENDED LIGHT FIXTURE  
REFERENCE ELECTRICAL DRAWINGS
-  ROOF TOP UNIT ABOVE  
COORDINATE LOCATION WITH SUPPLY AND  
RETURN DUCT PENETRATION LOCATIONS IN  
STRUCTURAL DRAWINGS



October 31, 2017  
*Gerardo G. Noriega*



BID SET  
**GNA**  
GNA Architecture  
300 Convent Street # 1330  
San Antonio, Texas 78205  
P. 210.298.7800



MARK	DATE	DESCRIPTION
1	10/31/17	ADDENDUM NO. 2

SAN ANTONIO WATER SYSTEM  
ZARZAMORA PUMP STATION  
IMPROVEMENTS PROJECT  
**NEW CHEMICAL BUILDING  
REFLECTED CEILING PLAN**

SAWS Job No. 200-09308-16002  
Designed By:  
Drawn By: RD  
Checked By: GN

**A-306**

Bar Measures 1 inch

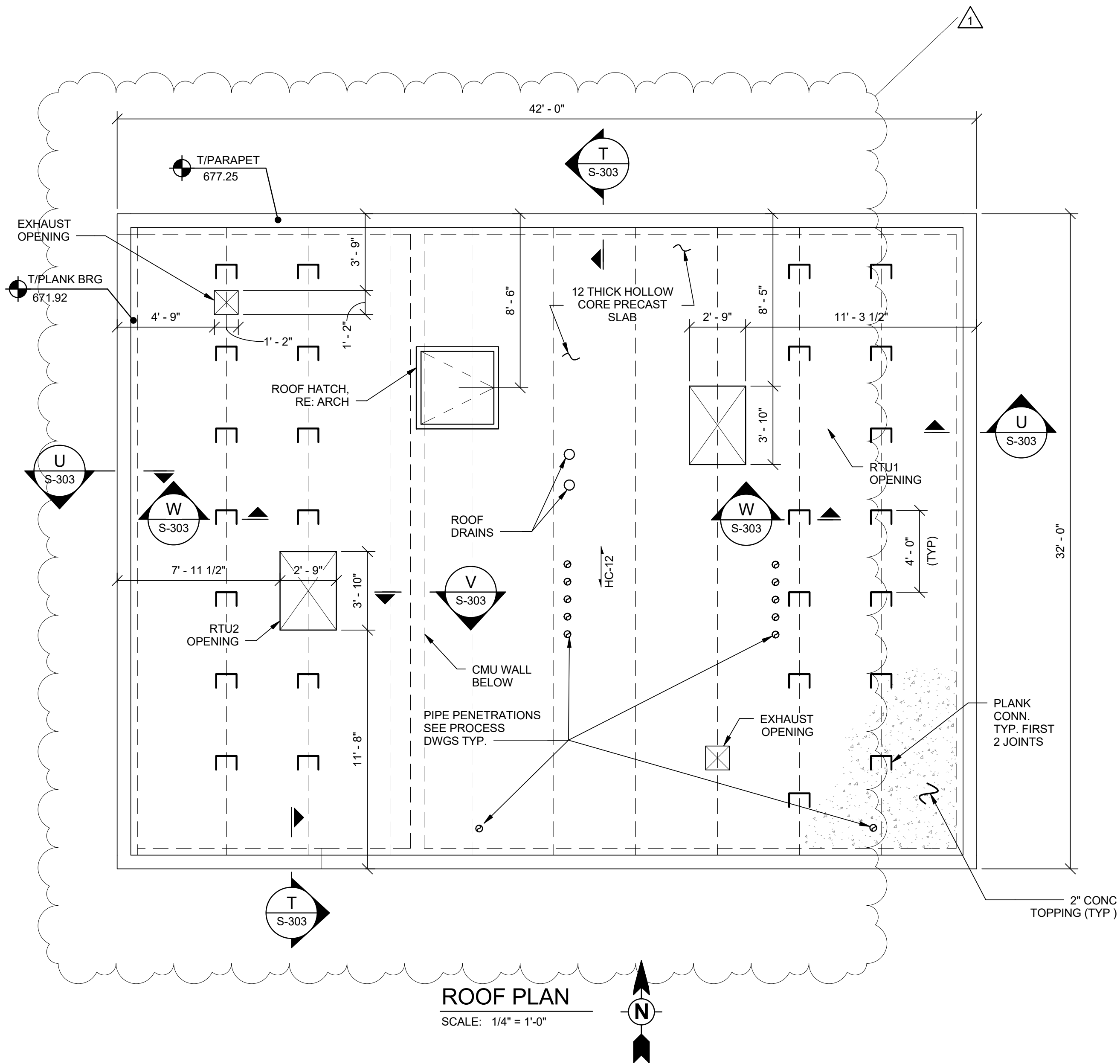
Copyright Tetra Tech

1 2 3 4 5 6 7

EQUIPMENT WEIGHTS	
DESIGNATION	WEIGHT(LBS)
RTU1	1,208
RTU2	1,315

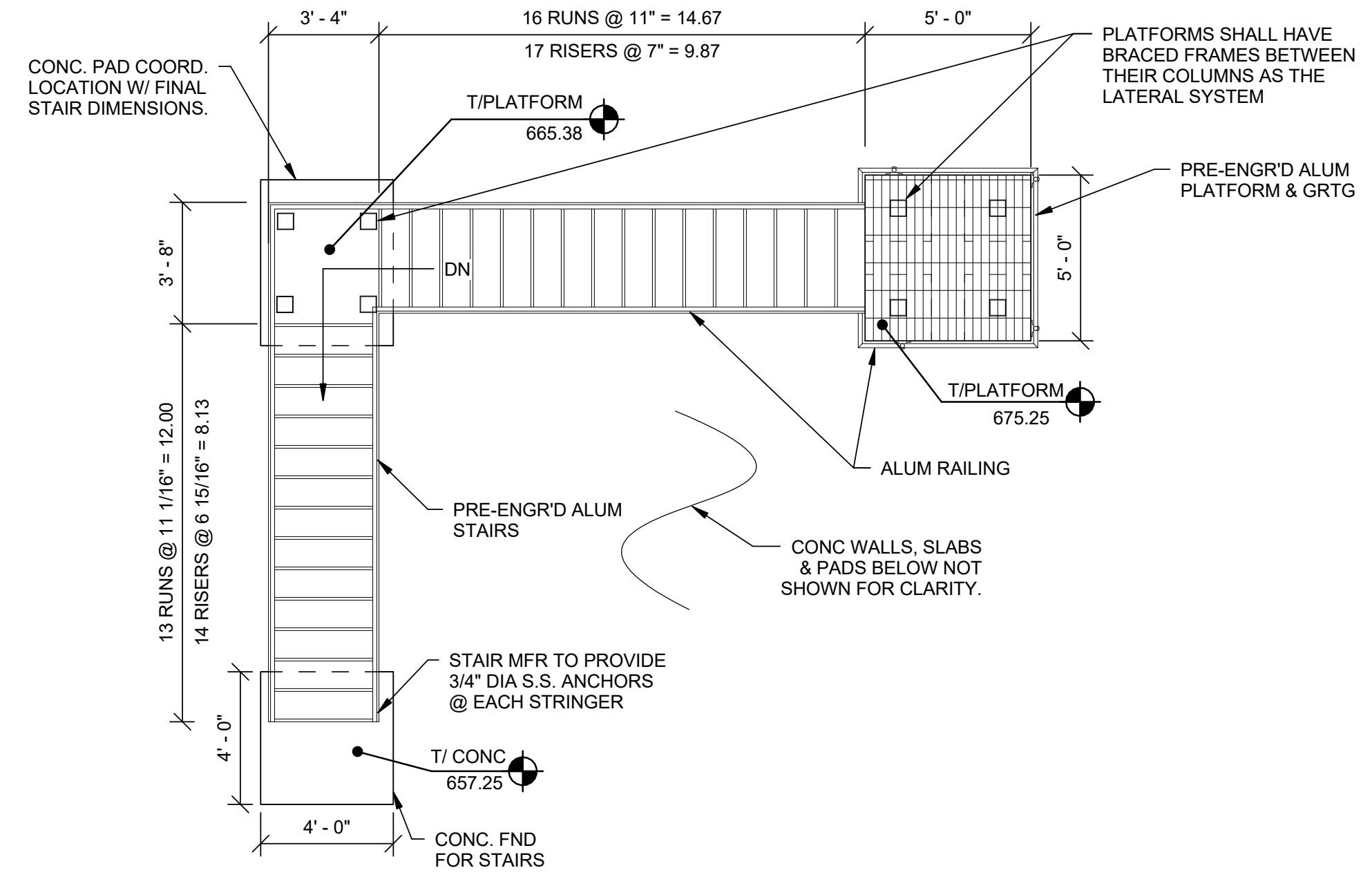
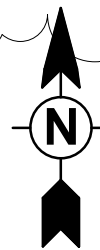
**PLAN NOTES:**

- HC-12 SPAN DIRECTION OF 12" PRECAST HOLLOW CORE PLANK W/2" CONC. TOPPING, REINF. W/ 6X6 W1.4X1.4X WWF (MID DEPTH).
- SEE S-303 FOR KEYWAY JOINT DETAIL.
- ALL EQUIPMENT WEIGHTS, ROOF PENETRATION SIZES AND LOCATIONS ARE PROVIDED FOR BIDDING PURPOSES AND MUST BE CONFIRMED WITH MECHANICAL AND ELECTRICAL TRADES.
- REFER TO SHEET S-502 FOR CMU LINTEL SCHEDULE.



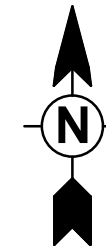
**ROOF PLAN**

SCALE: 1/4" = 1'-0"



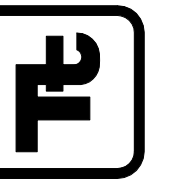
**2 ALUMINUM STAIR PLAN**

S-101 SCALE: 1/4" = 1'-0"



C:\Users\phl.fleming\Documents\09308-S-CHEM\_BLDG-2015\_PhilFleming.rvt

**TETRA TECH**  
Texas Registration No. F-3924  
www.tetratech.com  
700 N. St. Mary's, Suite 300  
San Antonio, TX 78205  
Tel: (210) 226-7900 Fax: (210) 226-9497



100% SET

**SAN ANTONIO WATER SYSTEM**

BY

PAF

DESCRIPTION

MARK DATE 10/31/17 ADDENDUM #2

SAN ANTONIO WATER SYSTEM  
ZARZAMORA PUMP STATION

**NEW CHEMICAL BUILDING  
STRUCTURAL ROOF AND  
STAIR PLANS**

Project No.: 200-09308-16002

Designed By: PAF

Drawn By: SPS

Checked By: JLB

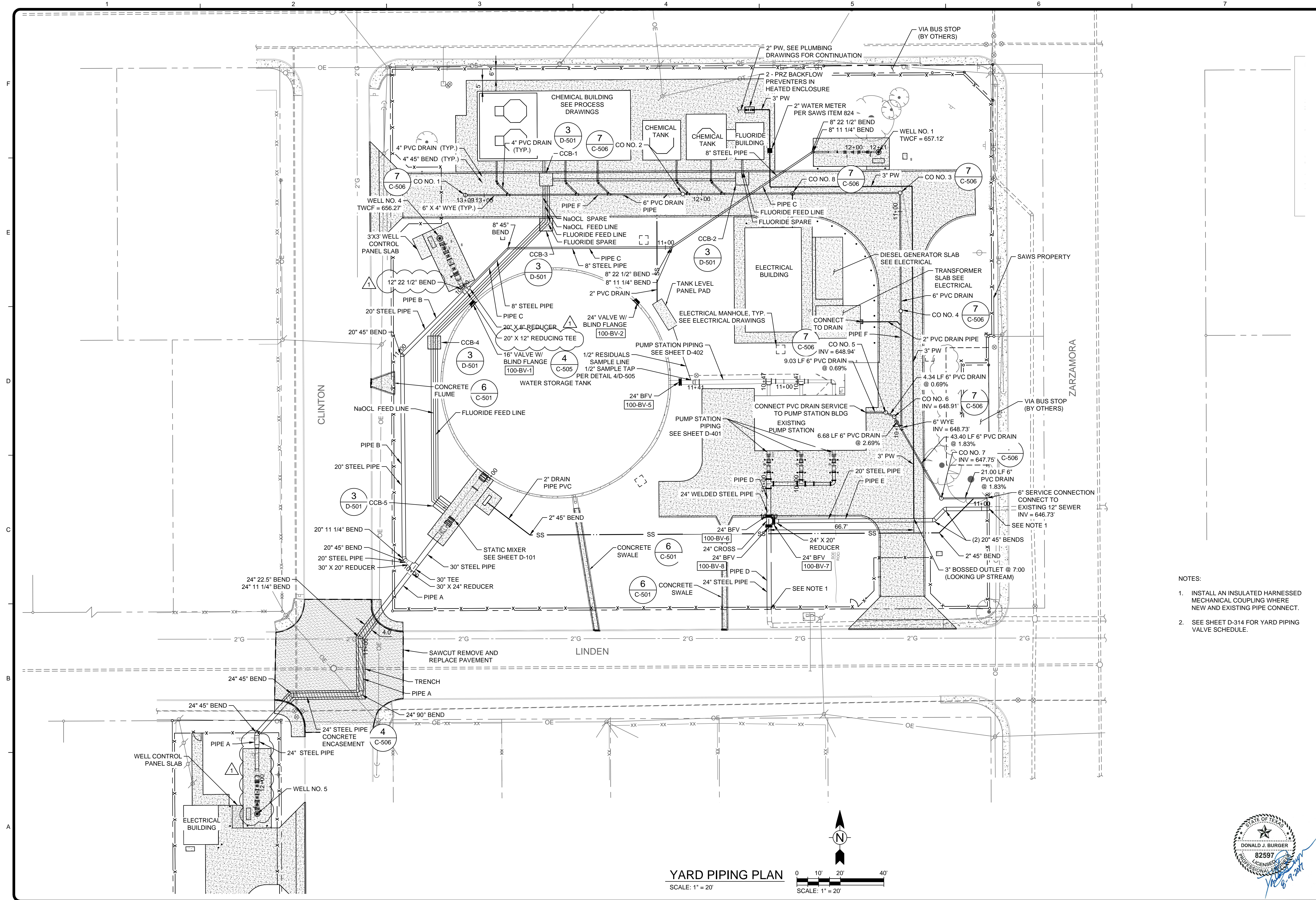


**S-102**

Copyright: Tetra Tech  
Bar Measures 1 inch

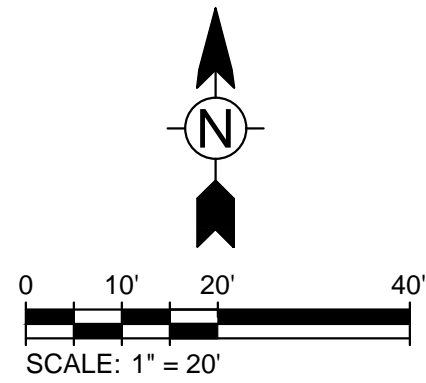


10/31/2017 8:45:55 AM - O:\PROJECTS\SAN ANTONIO\09308\200-09308-16002\CAD\SHEETFILES\ZARZAMORA\CA - YARD PIPING PLAN.DWG - THOMAS, BRYAN



- NOTES:
- INSTALL AN INSULATED HARNESSSED MECHANICAL COUPLING WHERE NEW AND EXISTING PIPE CONNECT.
  - SEE SHEET D-314 FOR YARD PIPING VALVE SCHEDULE.

**YARD PIPING PLAN**  
SCALE: 1" = 20'



MARK	DATE	DESCRIPTION	BY	DUB
1	10/31/17	ADDENDUM #1		

**SAN ANTONIO WATER SYSTEM**  
ZARCAMORA PUMP STATION  
IMPROVEMENTS PROJECT  
**YARD PIPING PLAN**

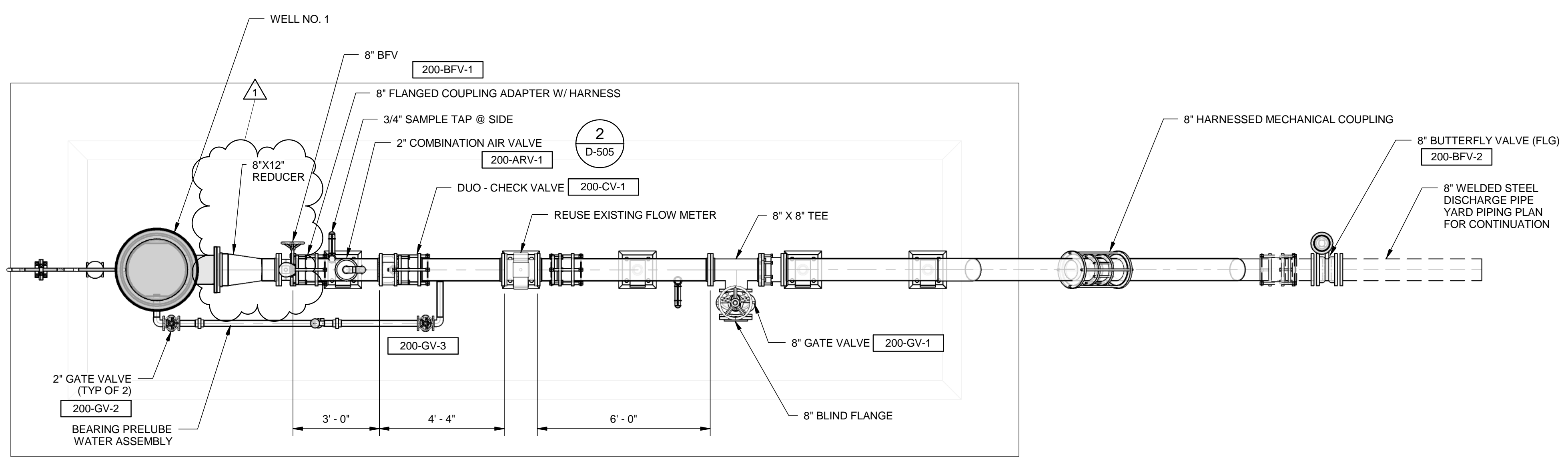
Project No.: 200-09308-16002  
Designed By: BLE  
Drawn By: DAC  
Checked By: DJB





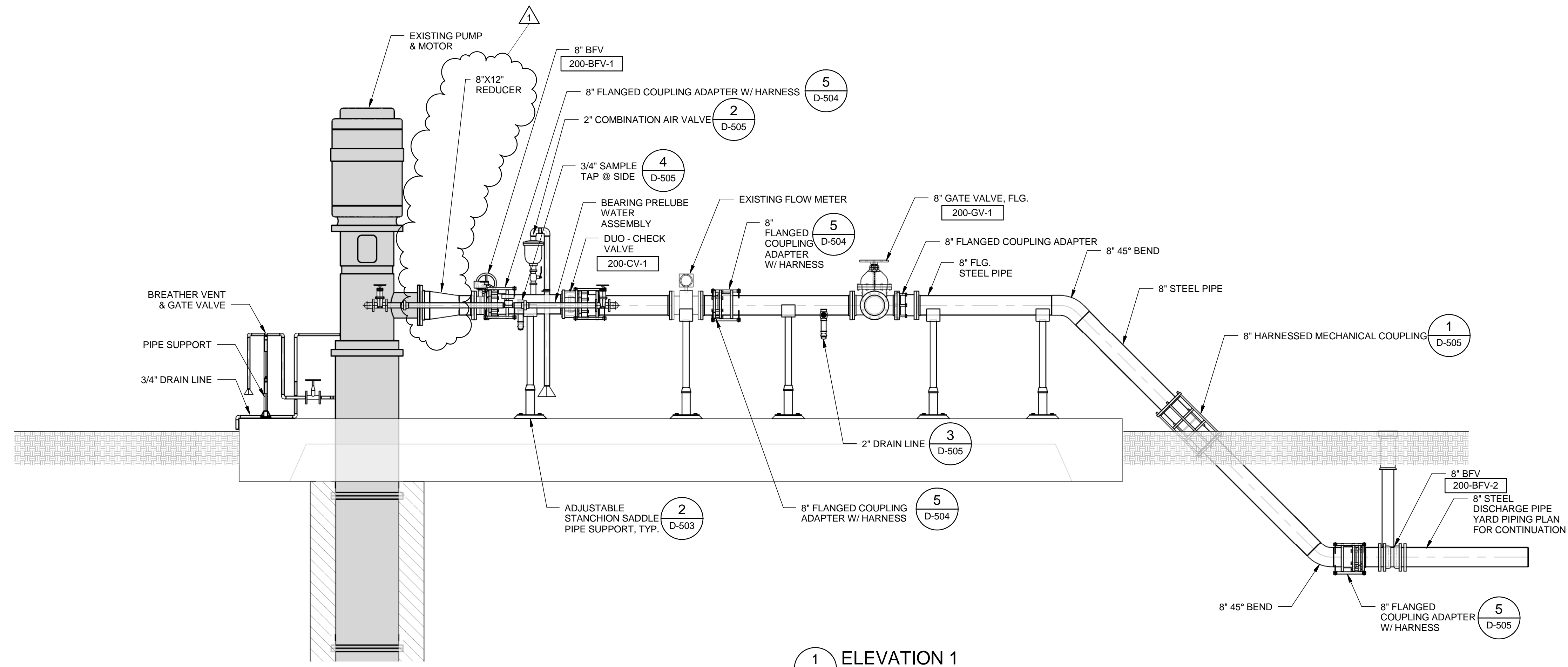
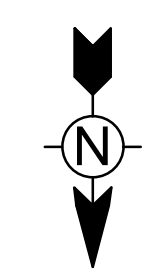
1 2 3 4 5 6 7

F  
E  
D  
C  
B  
A



1  
D-201

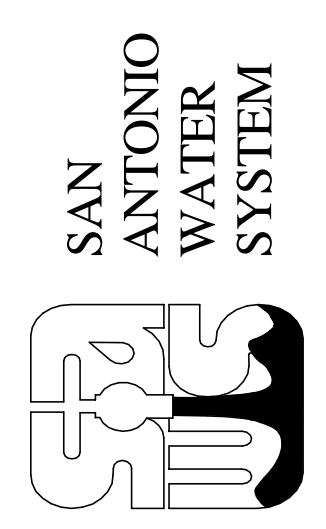
WELL NO. 1  
SCALE: 3/8" = 1'-0"



1 ELEVATION 1  
D-201 SCALE: 3/8" = 1'-0"



BID SET



MARK	DATE	DESCRIPTION
1	10/31/17	ADDENDUM # 1

SAN ANTONIO WATER SYSTEM  
ZARZAMORA PUMP STATION  
IMPROVEMENTS PROJECT  
WELL NO. 1  
(LINDEN WELL)

SAWS Job No. 200-09308-16002  
Designed By: MMS  
Drawn By: DAC  
Checked By: DJB

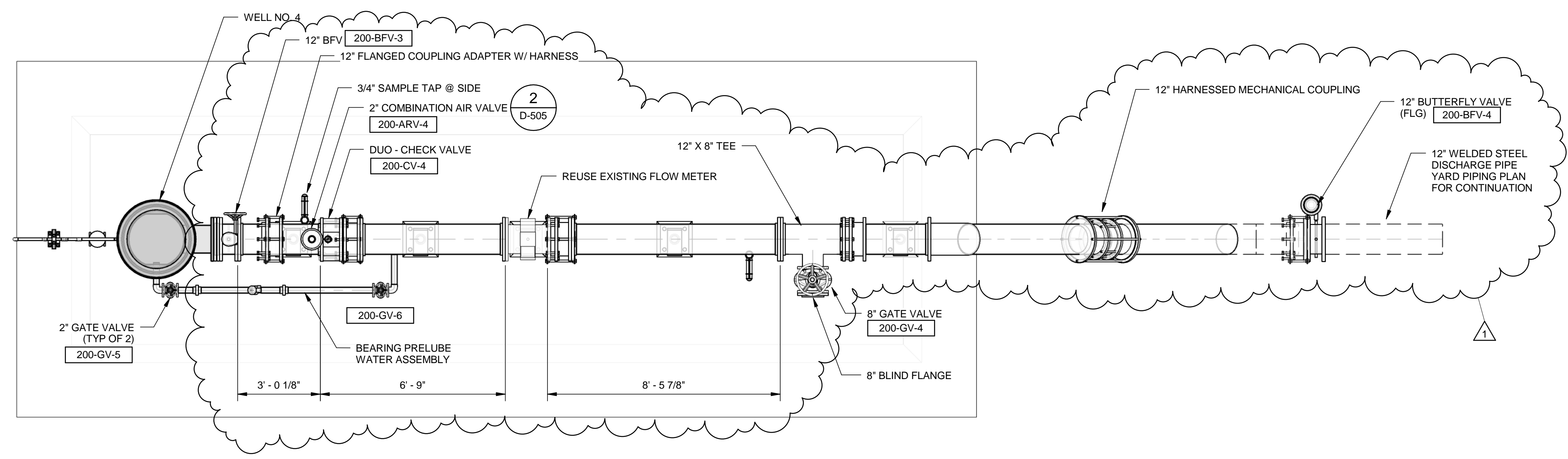
D-201



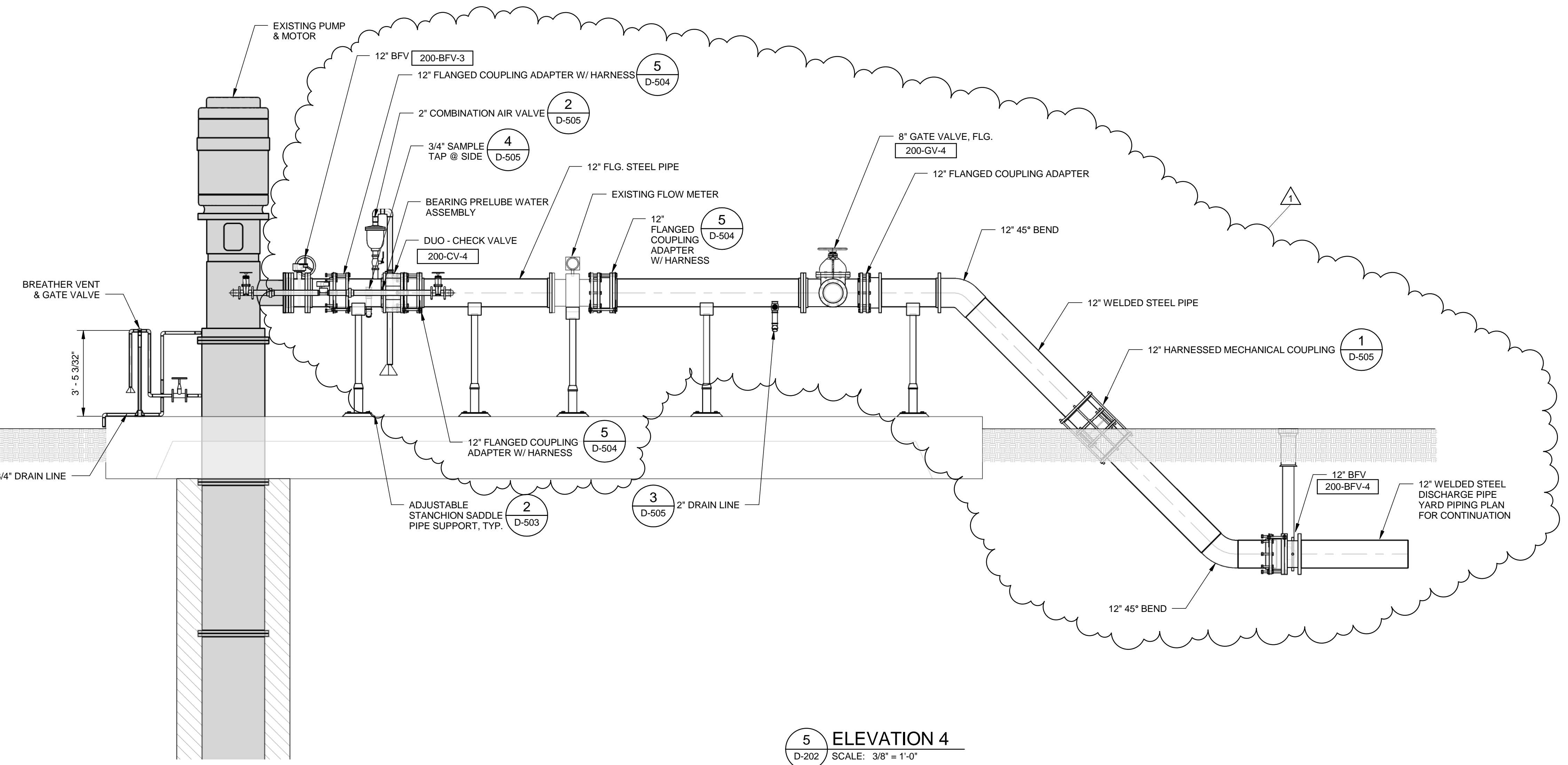
1 2 3 4 5 6 7

F  
E  
D  
C  
B  
A

5  
D-202



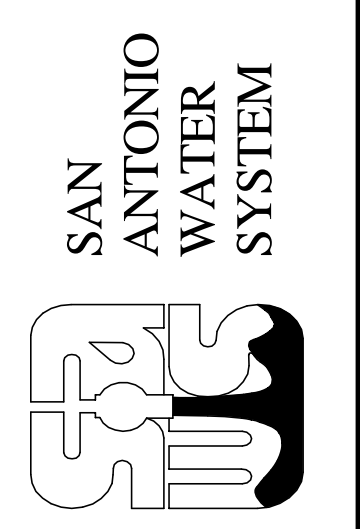
WELL NO. 4  
SCALE: 3/8" = 1'-0"



5 ELEVATION 4  
D-202 SCALE: 3/8" = 1'-0"



BID SET



MARK	DATE	DESCRIPTION
1	10/31/17	ADDENDUM #1

SAN ANTONIO WATER SYSTEM  
ZARZAMORA PUMP STATION  
IMPROVEMENTS PROJECT  
WELL NO. 4

SAWS Job No.: 200-09308-16002  
Designed By: MMS  
Drawn By: DAC  
Checked By: DJB

D-202



10/30/2017 3:17:31 PM C:\Users\bryan.thomas\Documents\09308-PS-D-2015-ZARZAMORA\_bryan.thomas@tetratech.com.rvt

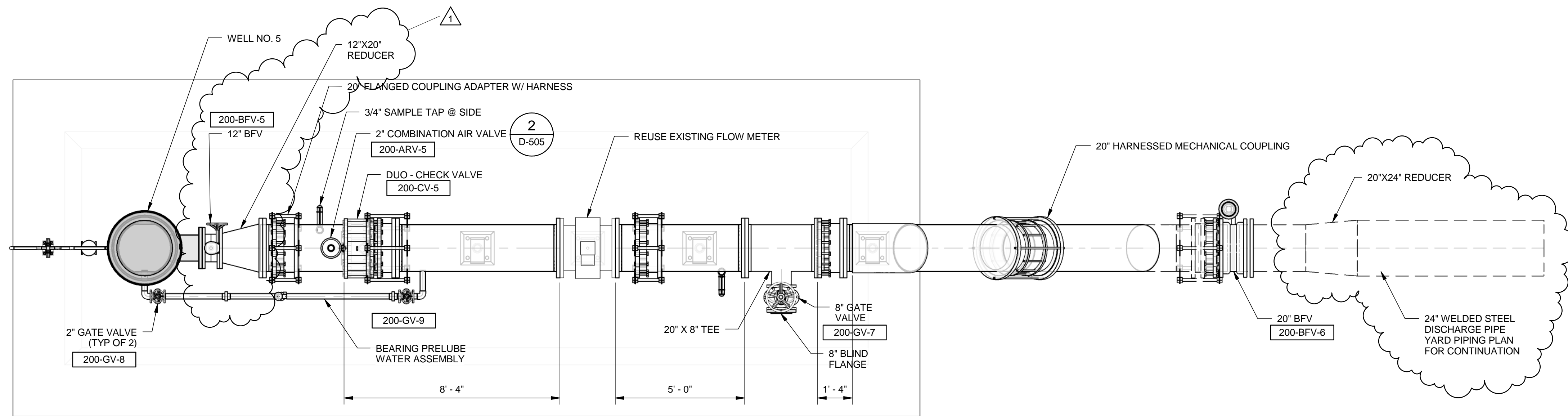
Copyright: Tetra Tech

Bar Measures 1 inch



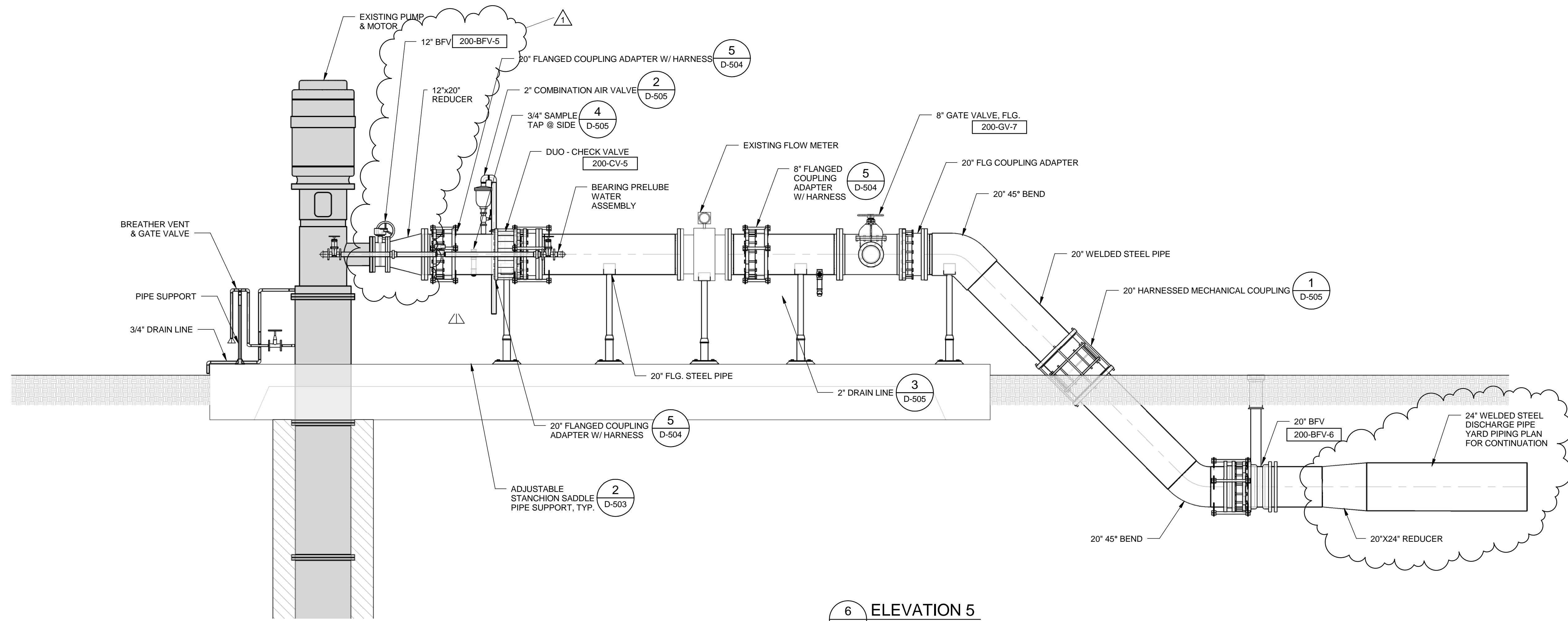
1 2 3 4 5 6 7

F  
E  
D  
C  
B  
A



6  
D-203

WELL NO. 5  
SCALE: 3/8" = 1'-0"



6  
D-203 ELEVATION 5  
SCALE: 3/8" = 1'-0"



**TETRA TECH**  
TFBE REG NO. F-3924  
www.tetratech.com

BID SET

SAN ANTONIO WATER SYSTEM

MARK	DATE	DESCRIPTION
1	10/31/17	ADDENDUM #1

SAN ANTONIO WATER SYSTEM  
ZARZAMORA PUMP STATION  
IMPROVEMENTS PROJECT  
WELL NO. 5

SAWS Job No.: 200-09308-16002  
Designed By: MMS  
Drawn By: DAC  
Checked By: DJB

**D-203**



10/31/2017 8:45:11 AM - O:\PROJECTS\SAN ANTONIO\09308\200-09308-16002\CAD\SHEETFILES\ZARZAMORA\ID - VALVE IDENTIFICATION TABLES.DWG - THOMAS, BRYAN

F  
E  
D  
C  
B  
A

1

2

3

4

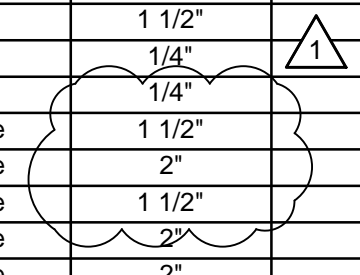
5

6

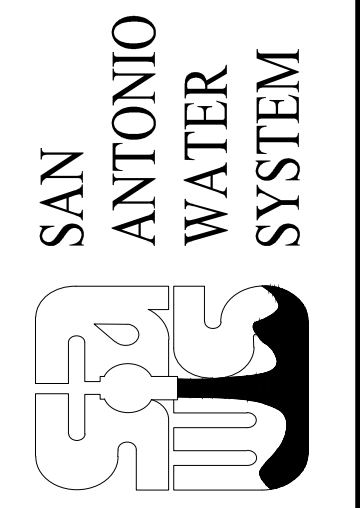
7

### CHEMICAL FACILITIES VALVES

	VALVE NUMBER	GENERAL LOCATION & ENVIRONMENT	SERVICE	VALVE SIZE	VALVE TYPE	INDOORS/ OUTDOORS	END CONNECTIONS	ACTUATOR	SPECIFICATION SECTION	SUPPLIED BY:	REMARKS
1	300-BV-1	Fluoride Tank Fill	Hydrofluosilicic Acid	2"	CPVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
2	300-BV-2	Fluoride Tank Overflow	Hydrofluosilicic Acid	1"	CPVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
3	300-BV-3	Fluoride Tank Overflow	Hydrofluosilicic Acid	1"	CPVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
4	300-BV-4	Fluoride Tank Sight Glass	Hydrofluosilicic Acid	2"	CPVC Ball Valve	Outdoors	Threaded	Lever	13216	Tank Manufacturer	
5	300-BV-5	Fluoride Tank Sight Glass	Hydrofluosilicic Acid	2"	CPVC Ball Valve	Outdoors	Threaded	Lever	13216	Tank Manufacturer	
6	300-BV-6	Fluoride Tank Outlet	Hydrofluosilicic Acid	2"	CPVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
7	300-BV-7	Fluoride Tank Outlet Drain	Hydrofluosilicic Acid	2"	CPVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
8	300-BV-8	Fluoride Tank Outlet Flow Control	Hydrofluosilicic Acid	2"	CPVC Ball Valve	Outdoors	Solvent Welded Socket	Electric	15110	Contractor	Open/Close
9	300-BV-9	Pump Suction Basket Strainer Isolation	Hydrofluosilicic Acid	1"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
10	300-BV-10	Pump Suction Basket Strainer Isolation	Hydrofluosilicic Acid	1"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
11	300-BV-11	Pump Suction Basket Strainer Bypass	Hydrofluosilicic Acid	1"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
12	300-BV-12	Suction side skid connection, on skid	Hydrofluosilicic Acid	3/4"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
13	300-BV-13	Calibration Column isolation	Hydrofluosilicic Acid	3/4"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
14	300-BV-14	Fluoride Metering Pump 1 Suction, On skid	Hydrofluosilicic Acid	3/4"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
15	300-BV-15	Fluoride Metering Pump 2 Suction, On skid	Hydrofluosilicic Acid	3/4"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
16	300-BV-16	Fluoride Metering Pump 3 Suction, On skid	Hydrofluosilicic Acid	3/4"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
17	300-BV-17	Fluoride Metering Pump 1 Discharge, On skid	Hydrofluosilicic Acid	1/2"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
18	300-BV-18	Fluoride Metering Pump 1 Discharge Drain, On skid	Hydrofluosilicic Acid	1/2"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
19	300-BV-19	Fluoride Metering Pump 1 Discharge, On skid	Hydrofluosilicic Acid	1/2"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
20	300-BV-20	Fluoride Metering Pump 2 Discharge, On skid	Hydrofluosilicic Acid	1/2"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
21	300-BV-21	Fluoride Metering Pump 2 Discharge Drain, On skid	Hydrofluosilicic Acid	1/2"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
22	300-BV-22	Fluoride Metering Pump 2 Discharge, On skid	Hydrofluosilicic Acid	1/2"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
23	300-BV-23	Fluoride Metering Pump 3 Discharge, On skid	Hydrofluosilicic Acid	1/2"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
24	300-BV-24	Fluoride Metering Pump 3 Discharge Drain, On skid	Hydrofluosilicic Acid	1/2"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
25	300-BV-25	Fluoride Metering Pump 3 Discharge, On skid	Hydrofluosilicic Acid	1/2"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
26	300-BV-26	Combined Metering Skid Discharge	Hydrofluosilicic Acid	1/2"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
27	300-BV-27	Flushing water isolation	Hydrofluosilicic Acid	1/2"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
28	300-BV-28	Flow Meter Isolation	Hydrofluosilicic Acid	1/2"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
29	300-BV-29	Flow Meter Isolation	Hydrofluosilicic Acid	1/2"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
30	300-BV-30	Flow Meter Bypass	Hydrofluosilicic Acid	1/2"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
31	300-BV-32	Discharge - Isolation of Feed Lines	Hydrofluosilicic Acid	1/2"	CPVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
33	300-BV-33	Discharge Pipe Flushing Water	Flushing Water	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
34	300-BV-34	Discharge Pipe Flushing Water	Flushing Water	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
35	300-BV-35	Fluoride Pump Containment Drain	Hydrofluosilicic Acid	2"	CPVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
36	300-BV-36	Fluoride Containment sump to sewer	Hydrofluosilicic Acid	3"	CPVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
37	300-BV-37	Fluoride Containment sump to off-site	Hydrofluosilicic Acid	3"	CPVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
38	300-BV-38	Brine Tank Level Indicator	Salt	1"	PVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	OSHG System Manufacturer	
39	300-BV-39	Salt Fill Line Flushing Water Connection	Flushing Water	3/4"	SST Ball Valve	Outdoors	Flanged	Lever	15110	OSHG System Manufacturer	
40	300-BV-40	Brine Tank Drain	Brine	3"	PVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	OSHG System Manufacturer	
41	300-BV-41	Water Filter Isolation	Potable Water	2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
42	300-BV-42	Water Filter Isolation	Potable Water	2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
43	300-BV-43	Water Filter Isolation	Potable Water	2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
44	300-BV-44	Water Filter Isolation	Potable Water	2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
45	300-BV-45	Water Supply to Water Softeners	Potable Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
46	300-BV-46	Water Supply to Water Softeners-Bypass	Potable Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
47	300-BV-47	Water Supply to Water Softeners	Potable Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
48	300-BV-48	Water Softener 1 Discharge	Softened Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
49	300-BV-49	Water Supply to Water Softeners	Potable Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
50	300-BV-50	Water Supply to Water Softeners-Bypass	Potable Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
51	300-BV-51	Water Supply to Water Softeners	Potable Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
52	300-BV-52	Water Softener 2 Discharge	Softened Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
53	300-BV-53	Water Supply to Water Softeners	Potable Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
54	300-BV-54	Water Supply to Water Softeners-Bypass	Potable Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
55	300-BV-55	Water Supply to Water Softeners	Potable Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
56	300-BV-56	Water Softener 3 Discharge	Softened Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
57	300-BV-57	Brine Tank Softened Water Supply	Softened Water	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
58	300-BV-58	Brine Tank Softened Water Supply	Softened Water	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
59	300-BV-59	Brine Tank Water Inlet	Softened Water	1"	PVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
60	300-BV-60	Brine Tank Outlet	Brine	2"	PVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
61	300-BV-61	Brine to Softeners	Brine	1"	PVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
62	300-BV-62	Brine to Water Softener 3	Brine	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
63	300-BV-63	Brine to Water Softener 2	Brine	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
64	300-BV-64	Brine to Water Softener 1	Brine	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
65	300-BV-65	Brine Filter Isolation	Brine	2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
66	300-BV-66	Brine Filter Isolation	Brine	2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
67	300-BV-67	Brine Filter Isolation	Brine	2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
68	300-BV-68	Brine Filter Isolation	Brine	2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
69	300-BV-69	Brine Pump No.1 Suction	Brine	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
70	300-BV-70	Brine Pump No.2 Suction	Brine	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
71	300-BV-71	Brine to OSHG Skid 1	Brine	1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	OSHG System Manufacturer	
72	300-BV-72	Brine to OSHG Skid 2	Brine	1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	OSHG System Manufacturer	
73	300-BV-73	Water Softeners 1 and 2 Interconnection	Softened Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
74	300-BV-74	Water Softener 3 tie-in to OSHG Feed line	Softened Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
75	300-BV-75	Soft Water Filter Isolation for OSHG 1	Softened Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
76	300-BV-76	Soft Water Filter Isolation for OSHG 1	Softened Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
77	300-BV-77	Soft Water Filter Isolation for OSHG 2	Softened Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
78	300-BV-78	Soft Water Filter Isolation for OSHG 2	Softened Water	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
79	300-BV-79	Hardness Monitor Inlet	Softened Water	1/4"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
80	300-BV-80	Hardness Monitor Drain	Softened Water	1/4"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
81	300-BV-81	Storage Tank 1 Secondary Port	Sodium Hypochlorite	1 1/2"	PVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	Locking Valve
82	300-BV-82	Isolation of Tanks 1 and 2 Feed	Sodium Hypochlorite	2"	PVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
83	300-BV-83	Storage Tank 2 Secondary Port	Sodium Hypochlorite	1 1/2"	PVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	Locking Valve
84	300-BV-84	Storage Tank 1 Drain	Sodium Hypochlorite	2"	PVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
85	300-BV-85	Storage Tank 2 Drain	Sodium Hypochlorite	2"	PVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
86	300-BV-86	Storage Tank 1 Outlet	Sodium Hypochlorite	2"	PVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
87	300-BV-87	Storage Tank 2 Outlet	Sodium Hypochlorite	2"	PVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor	
88	300-BV-88	Pump Suction Basket Strainer Isolation	Sodium Hypochlorite	2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
89	300-BV-89	Pump Suction Basket Strainer Isolation	Sodium Hypochlorite	2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
90	300-BV-90	Pump Suction Basket Strainer Bypass	Sodium Hypochlorite	2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor	
91	300-BV-91	Sodium Hypochlorite Metering Pump 1 Suction	Sodium Hypochlorite	3/4"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
92	300-BV-92	Sodium Hypochlorite Metering Pump 2 Suction	Sodium Hypochlorite	3/4"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
93	300-BV-93	Sodium Hypochlorite Metering Pump 3 Suction	Sodium Hypochlorite	3/4"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
94	300-BV-94	Sodium Hypochlorite Metering Pump 1 Calibration Column	Sodium Hypochlorite	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
95	300-BV-95	Sodium Hypochlorite Metering Pump 2 Calibration Column	Sodium Hypochlorite	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
96	300-BV-96	Sodium Hypochlorite Metering Pump 3 Calibration Column	Sodium Hypochlorite	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
97	300-BV-97	Sodium Hypochlorite Metering Pump 1 Discharge	Sodium Hypochlorite	3/4"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
98	300-BV-98	Sodium Hypochlorite Metering Pump 2 Discharge	Sodium Hypochlorite	3/4"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
99	300-BV-99	Sodium Hypochlorite Metering Pump 3 Discharge	Sodium Hypochlorite	3/4"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
100	300-BV-100	Metering Pump Piping Drain	Sodium Hypochlorite	1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
101	300-BV-101	Metering Pump Piping Drain	Sodium Hypochlorite	1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	
102	300-BV-102	Metering Pump Piping Drain	Sodium Hypochlorite	1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer	



BID SET



MARK	DATE	DESCRIPTION	BY
1	10/31/17	ADDENDUM #1	DUB

SAN ANTONIO WATER SYSTEM  
 ZARZAMORA PUMP STATION  
 IMPROVEMENTS PROJECT  
 VALVE IDENTIFICATION  
 TABLE I



Project No.: 200-09308-16002  
 Designed By: BLE  
 Drawn By: DAC  
 Checked By: DUB

# D-313



CHEMICAL FACILITIES VALVES										
VALVE NUMBER	GENERAL LOCATION & ENVIRONMENT	SERVICE	VALVE SIZE	VALVE TYPE	INDOORS/ OUTDOORS	END CONNECTIONS	ACTUATOR	SPECIFICATION SECTION	SUPPLIED BY:	REMARKS
103	300-BV-103	Sodium Hypochlorite Metering Pump 1 Discharge	Sodium Hypochlorite	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer
104	300-BV-104	Sodium Hypochlorite Metering Pump 2 Discharge	Sodium Hypochlorite	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer
105	300-BV-105	Sodium Hypochlorite Metering Pump 3 Discharge	Sodium Hypochlorite	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer
106	300-BV-106	Sodium Hypochlorite Metering Pump 1 Discharge	Sodium Hypochlorite	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer
107	300-BV-107	Sodium Hypochlorite Metering Pump 2 Discharge	Sodium Hypochlorite	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer
108	300-BV-108	Sodium Hypochlorite Metering Pump 3 Discharge	Sodium Hypochlorite	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer
109	300-BV-109	Flow Meter Isolation	Sodium Hypochlorite	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor
110	300-BV-110	Flow Meter Isolation	Sodium Hypochlorite	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor
111	300-BV-111	Flow Meter Bypass	Sodium Hypochlorite	1 1/2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor
112	300-BV-112	Sodium Hypochlorite Feed Isolation	Sodium Hypochlorite	1 1/2"	PVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor
114	300-BV-114	Sodium Hypochlorite Containment Sump Discharge to Sewer	Sodium Hypochlorite	3"	PVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor
115	300-BV-115	Sodium Hypochlorite Containment Sump Discharge to Truck	Sodium Hypochlorite	3"	PVC Ball Valve	Outdoors	Solvent Welded Socket	Lever	15110	Contractor
116	300-BV-116	Utility Water Supply to Water Softeners	Utility Water	2"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Contractor
117	300-BV-117	Sodium Hypochlorite Metering Pump 1 Suction	Sodium Hypochlorite	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer
118	300-BV-118	Sodium Hypochlorite Metering Pump 2 Suction	Sodium Hypochlorite	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer
119	300-BV-119	Sodium Hypochlorite Metering Pump 3 Suction	Sodium Hypochlorite	1"	PVC Ball Valve	Indoors	Solvent Welded Socket	Lever	15110	Metering Pump Manufacturer
117	300-CV-2	Fluoride Metering Pump 1 Discharge, On skid	Hydrofluosilicic Acid	1/2"	PVC Diaphragm Check Valve	Indoors	Solvent Welded Socket	N/A	11242	Metering Pump Manufacturer
118	300-CV-3	Fluoride Metering Pump 2 Discharge, On skid	Hydrofluosilicic Acid	1/2"	PVC Diaphragm Check Valve	Indoors	Solvent Welded Socket	N/A	11242	Metering Pump Manufacturer
119	300-CV-4	Fluoride Metering Pump 3 Discharge, On skid	Hydrofluosilicic Acid	1/2"	PVC Diaphragm Check Valve	Indoors	Solvent Welded Socket	N/A	11242	Metering Pump Manufacturer
120	300-CV-5	Flushing Water	Hydrofluosilicic Acid	1"	PVC Ball Check Valve	Indoors	Solvent Welded Socket	N/A	15110	Contractor
121	300-CV-6	Brine to Water Softener 1	Brine	5/8"	PVC Ball Check Valve	Indoors	Solvent Welded Socket	N/A	15110	OSHG System Manufacturer
122	300-CV-7	Brine to Water Softener 2	Brine	5/8"	PVC Ball Check Valve	Indoors	Solvent Welded Socket	N/A	15110	OSHG System Manufacturer
123	300-CV-8	Brine to Water Softener 3	Brine	5/8"	PVC Ball Check Valve	Indoors	Solvent Welded Socket	N/A	15110	OSHG System Manufacturer
124	300-CV-9	Sodium Hypochlorite Containment Sump	Sodium Hypochlorite	4"	PVC Ball Check Valve	Indoors	Flanged	N/A	15110	Contractor
125	300-PRV-1	Fluoride Metering Pump 1 Discharge, On skid	Hydrofluosilicic Acid	1/2"	PVC Pressure Relief Valve	Indoors	Solvent Welded Socket	N/A	11242	Metering Pump Manufacturer
126	300-PRV-2	Fluoride Metering Pump 2 Discharge, On skid	Hydrofluosilicic Acid	1/2"	PVC Pressure Relief Valve	Indoors	Solvent Welded Socket	N/A	11242	Metering Pump Manufacturer
127	300-PRV-3	Fluoride Metering Pump 3 Discharge, On skid	Hydrofluosilicic Acid	1/2"	PVC Pressure Relief Valve	Indoors	Solvent Welded Socket	N/A	11242	Metering Pump Manufacturer
128	300-PRV-4	Water Softener Combined Inlet	Potable Water	2"	PVC Pressure Regulating Valve	Indoors	Solvent Welded Socket	N/A	11366	OSHG System Manufacturer
129	300-PRV-5	Brine Tank Inlet	Softened Water	1"	PVC Pressure Regulating Valve	Indoors	Solvent Welded Socket	N/A	11366	OSHG System Manufacturer
130	300-PRV-6	Hardness Monitor Inlet	Softened Water	1/4"	PVC Pressure Regulating Valve	Indoors	Solvent Welded Socket	N/A	11366	OSHG System Manufacturer
131	300-PRV-7	Sodium Hypochlorite Metering Pump 1 Discharge	Sodium Hypochlorite	1"	PVC Pressure Relief Valve	Indoors	Solvent Welded Socket	N/A	11242	Metering Pump Manufacturer
132	300-PRV-8	Sodium Hypochlorite Metering Pump 2 Discharge	Sodium Hypochlorite	1"	PVC Pressure Relief Valve	Indoors	Solvent Welded Socket	N/A	11242	Metering Pump Manufacturer
133	300-PRV-9	Sodium Hypochlorite Metering Pump 3 Discharge	Sodium Hypochlorite	1"	PVC Pressure Relief Valve	Indoors	Solvent Welded Socket	N/A	11242	Metering Pump Manufacturer
134	300-SV-1	Hardness Monitor Inlet from WS-1	Softened Water	1/4"	Solenoid Valve	Indoors	Solvent Welded Socket	Solenoid	15110	OSHG System Manufacturer
135	300-SV-2	Hardness Monitor Inlet from WS-2	Softened Water	1/4"	Solenoid Valve	Indoors	Solvent Welded Socket	Solenoid	15110	OSHG System Manufacturer
136	300-SV-3	Hardness Monitor Inlet from WS-3	Softened Water	1/4"	Solenoid Valve	Indoors	Solvent Welded Socket	Solenoid	15110	OSHG System Manufacturer
137	300-SV-4	Brine Tank Water Inlet	Softened Water	1"	Solenoid Valve	Indoors	Solvent Welded Socket	Solenoid	15110	OSHG System Manufacturer
138	300-BFV-1	Hydrogen Vent Blower 1 Discharge	Hydrogen Dilution Air	4"	Butterfly Valve	Indoors	Flanged	Lever	15110	Contractor
139	300-BFV-2	Hydrogen Vent Blower 2 Discharge	Hydrogen Dilution Air	4"	Butterfly Valve	Indoors	Flanged	Lever	15110	Contractor
140	300-BFV-3	Hydrogen Vent Blower 3 Discharge	Hydrogen Dilution Air	4"	Butterfly Valve	Indoors	Flanged	Lever	15110	Contractor
141	300-BFV-4	Hydrogen Vent Blower 4 Discharge	Hydrogen Dilution Air	4"	Butterfly Valve	Indoors	Flanged	Lever	15110	Contractor
142	300-BFV-5	Hydrogen Vent	Hydrogen Dilution Air	4"	Butterfly Valve	Indoors	Flanged	Lever	15110	Contractor
143	300-BFV-6	Hydrogen Vent	Hydrogen Dilution Air	4"	Butterfly Valve	Indoors	Flanged	Lever	15110	Contractor
144	300-BFV-7	Hydrogen Dilution Blower 1 Discharge	Hydrogen Dilution Air	4"	Butterfly Valve	Indoors	Flanged	Lever	15110	Contractor
145	300-BFV-8	Hydrogen Dilution Blower 2 Discharge	Hydrogen Dilution Air	4"	Butterfly Valve	Indoors	Flanged	Lever	15110	Contractor
146	300-BFV-9	Hydrogen Dilution Blower 3 Discharge	Hydrogen Dilution Air	4"	Butterfly Valve	Indoors	Flanged	Lever	15110	Contractor
147	300-BFV-10	Hydrogen Dilution Blower 4 Discharge	Hydrogen Dilution Air	4"	Butterfly Valve	Indoors	Flanged	Lever	15110	Contractor
148	300-CV-1	Fluoride Containment Sump	Hydrofluosilicic Acid	4"	PVC Ball Check Valve	Outdoors	Flanged	N/A	15110	Contractor

**YARD PIPING VALVE SCHEDULE**

VALVE NUMBER	GENERAL LOCATION & ENVIRONMENT	SERVICE	VALVE SIZE	VALVE TYPE	ABOVEGROUND / BURIED	END CONNECTIONS	ACTUATOR	SPECIFICATION SECTION
<b>Yard Valves</b>								
100-BFV-1	Existing Tank Inlet for Well No. 1	Raw water	16"	Butterfly Valve	Aboveground	Flanged	Handwheel	15110
100-BFV-2	Existing Tank Inlet for Well No. 4	Raw water	24"	Butterfly Valve	Aboveground	Flanged	Handwheel	15110
100-BFV-3	Tank Inlet Upstream of Static Mixer	Raw water	30"	Butterfly Valve	Aboveground	Flanged	Handwheel	15110
100-BFV-4	Tank Inlet Downstream of Static Mixer	Raw water	30"	Butterfly Valve	Aboveground	Flanged	Handwheel	15110
100-BFV-5	Existing Tank Outlet	Finished Water	24"	Butterfly Valve	Buried	Flanged	2" Square Nut	15110
100-BFV-6	To Distribution	Finished Water	24"	Butterfly Valve	Buried	Flanged	2" Square Nut	15110
100-BFV-7	To Distribution	Finished Water	24"	Butterfly Valve	Buried	Flanged	2" Square Nut	15110
100-BFV-8	To Distribution	Finished Water	24"	Butterfly Valve	Buried	Flanged	2" Square Nut	15110
100-BV-1	Chemical Injection at Static Mixer	Sodium Hypochlorite	1 1/2"	Ball Valve	Aboveground	Socket Welded	Lever	15110
100-BV-2	Chemical Injection at Static Mixer	Hydrofluosilicic Acid	1/2"	Ball Valve	Aboveground	Socket Welded	Lever	15110
100-BV-3	Chemical Injection at Static Mixer	Sodium Hypochlorite	1 1/2"	Ball Check Valve	Aboveground	Socket Welded	N/A	15110
100-BV-4	Chemical Injection at Static Mixer	Hydrofluosilicic Acid	1/2"	Ball Check Valve	Aboveground	Socket Welded	N/A	15110
<b>Well Pumps</b>								
200-ARV-1	Well Pump 1	Raw water	2"	Air Relief Valve	Aboveground	Threaded	N/A	15110
200-ARV-4	Well Pump 4	Raw water	2"	Air Relief Valve	Aboveground	Threaded	N/A	15110
200-ARV-5	Well Pump 5	Raw water	2"	Air Relief Valve	Aboveground	Threaded	N/A	15110
200-CV-1	Well Pump 1	Raw water	8"	Duo-Check Valve	Aboveground	Flanged	Handwheel	15110
200-CV-4	Well Pump 4	Raw water	12"	Duo-Check Valve	Aboveground	Flanged	Handwheel	15110
200-CV-5	Well Pump 5	Raw water	20"	Duo-Check Valve	Aboveground	Flanged	Handwheel	15110
200-GV-1	Well Pump 1	Raw water	8"	Gate Valve	Aboveground	Flanged	Handwheel	15110
200-GV-2	Well Pump 1 - Bearing Prelube Water Assembly	Raw water	2"	Gate Valve	Aboveground	Flanged	Handwheel	15110
200-GV-3	Well Pump 1 - Bearing Prelube Water Assembly	Raw water	2"	Gate Valve	Aboveground	Flanged	Handwheel	15110
200-GV-4	Well Pump 4	Raw water	8"	Gate Valve	Aboveground	Flanged	Handwheel	15110
200-GV-5	Well Pump 4 - Bearing Prelube Water Assembly	Raw water	2"	Gate Valve	Aboveground	Flanged	Handwheel	15110
200-GV-6	Well Pump 4 - Bearing Prelube Water Assembly	Raw water	2"	Gate Valve	Aboveground	Flanged	Handwheel	15110
200-GV-7	Well Pump 5	Raw water	8"	Gate Valve	Aboveground	Flanged	Handwheel	15110
200-GV-8	Well Pump 5 - Bearing Prelube Water Assembly	Raw water	2"	Gate Valve	Aboveground	Flanged	Handwheel	15110
200-GV-9	Well Pump 5 - Bearing Prelube Water Assembly	Raw water	2"	Gate Valve	Aboveground	Flanged	Handwheel	15110
200-BFV-1	Well Pump 1	Raw water	8"	Butterfly Valve	Aboveground	Flanged	Handwheel	15110
200-BFV-2	Well Pump 1	Raw water	8"	Butterfly Valve	Buried	Flanged	2" Square Nut	15110
200-BFV-3	Well Pump 4	Raw water	12"	Butterfly Valve	Aboveground	Flanged	Handwheel	15110
200-BFV-4	Well Pump 4	Raw water	12"	Butterfly Valve	Buried	Flanged	2" Square Nut	15110
200-BFV-5	Well Pump 5	Raw water	12"	Butterfly Valve	Aboveground	Flanged	Handwheel	15110
200-BFV-6	Well Pump 5	Raw water	20"	Butterfly Valve	Buried	Flanged	2" Square Nut	15110

**YARD PIPING VALVE SCHEDULE**

VALVE NUMBER	GENERAL LOCATION & ENVIRONMENT	SERVICE	VALVE SIZE	VALVE TYPE	ABOVEGROUND / BURIED	END CONNECTIONS	ACTUATOR	SPECIFICATION SECTION
<b>High Service Pumps</b>								
400-BFV-1	HSP No. 1 Suction	Finished Water	16"	Butterfly Valve	Aboveground	Flanged	Handwheel	15110
400-BFV-2	HSP No. 1 Discharge	Finished Water	16"	Butterfly Valve	Aboveground	Flanged	Handwheel	15110
400-BFV-3	HSP No. 2 Suction	Finished Water	16"	Butterfly Valve	Aboveground	Flanged	Handwheel	15110
400-BFV-4	HSP No. 2 Discharge	Finished Water	16"	Butterfly Valve	Aboveground	Flanged	Handwheel	15110
400-BFV-5	HSP No. 3 Suction	Finished Water	16"	Butterfly Valve	Aboveground	Flanged	Handwheel	15110
400-BFV-6	HSP No. 3 Discharge	Finished Water	16"	Butterfly Valve	Aboveground	Flanged	Handwheel	15110
400-BV-1	HSP No. 1	Finished Water	16"	Ball Control Valve	Aboveground	Flanged	Electric	15111
400-BV-2	HSP No. 2	Finished Water	16"	Ball Control Valve	Aboveground	Flanged	Electric	15111
400-BV-3	HSP No. 3	Finished Water	16"	Ball Control Valve	Aboveground	Flanged	Electric	15111
400-CV-1	HSP No. 1	Finished Water	16"	Duo-Check Valve	Aboveground	Flanged	Handwheel	15110
400-CV-2	HSP No. 2	Finished Water	16"	Duo-Check Valve	Aboveground	Flanged	Handwheel	15110
400-CV-3	HSP No. 3	Finished Water	16"	Duo-Check Valve	Aboveground	Flanged	Handwheel	15110

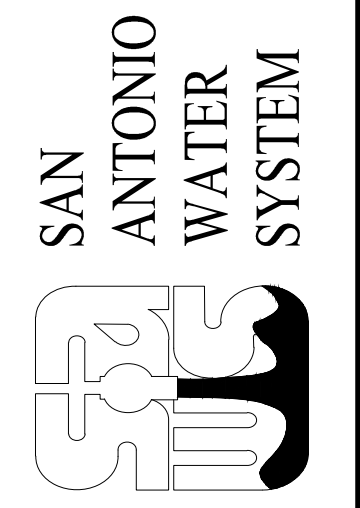
NOTE:

- NOT ALL VALVES ARE SCHEDULED, E.G. ISOLATION VALVES FOR INSTRUMENTS, PRESSURE GAUGES, SAMPLE TAPS, AND OTHER APPURTENANCES ARE NOT SCHEDULED.

10/31/2017 9:12:40 AM - O:\PROJECTS\SAN ANTONIO\09308\200-09308-16002\CAD\SHEETFILES\ZARZAMORA\ - VALVE IDENTIFICATION TABLES.DWG - THOMAS, BRYAN



BID SET



MARK	DATE	DESCRIPTION
1	10/31/17	ADDENDUM #1

**SAN ANTONIO WATER SYSTEM  
ZARZAMORA PUMP STATION  
IMPROVEMENTS PROJECT  
VALVE IDENTIFICATION  
TABLE II**



Project No.: 200-09308-16002  
Designed By: BLE  
Drawn By: DAC  
Checked By: DJB

**D-314**

Bar Measures 1 inch

Copyright: Tetra Tech



10/30/2017 2:48:29 PM - R:\TETRA TECH\2015 LA ROSA AND ZARZAMORA PUMP STATIONS\DESIGN\_ZARZAMORA\BID SET\100% DRAWINGS\DRAWING E-301 OSHG BUILDING FLOOR PLAN - ELECTRICAL.DWG - SGRAF - JOHNATHAN PETERS

- KEYED NOTES:**
- 1 SODIUM HYPOCHLORITE TANK #1 LEVEL TRANSMITTER.
  - 2 SODIUM HYPOCHLORITE TANK #2 LEVEL TRANSMITTER.
  - 3 SODIUM HYPOCHLORITE TANK #1 DIFFERENTIAL PRESSURE SWITCH.
  - 4 SODIUM HYPOCHLORITE TANK #2 DIFFERENTIAL PRESSURE SWITCH.
  - 5 DILUTION BLOWER PUMP.
  - 6 EYE WASH STATION FLOW SWITCH.
  - 7 SUMP PUMP CONTROL PANEL. REFER TO E-504 FOR DETAILS.
  - 8 SODIUM HYPOCHLORITE TANK #1 HEAT TRACE.
  - 9 SODIUM HYPOCHLORITE TANK #2 HEAT TRACE.
  - 10 SODIUM HYPOCHLORITE METERING PUMPS.
  - 11 TO SODIUM HYPOCHLORITE METERING PUMP CONTROL PANELS (MECP1-2-3).
  - 12 BRINE TANK HEAT TRACE.
  - 13 TRAP PRIMER (TP-B).
  - 14 LEAK DETECTION PANEL.
  - 15 MAGNETIC FLOW TRANSMITTER.
  - 16 HVAC UNIT MOUNTED ON TOP OF ROOF. PROVIDE NEMA 4X DISCONNECT SWITCH AND RECEPTACLE MOUNTED ON STAINLESS STEEL RACK ON TOP OF ROOF.
  - 17 MOTORIZED DAMPER FOR HVAC LOUVER. INTERLOCK TO EXHAUST FAN.
  - 18 ROOF TOP UNIT #1
  - 19 ROOF TOP UNIT #2

- 20 BLOWER VENT PUMP.
- 21 TO BLOWER CONTROL PANEL.
- 22 TO OSGH COMMON CONTROL PANEL (OSHG-CCP)
- 23 TO OSGH PLC-1.
- 24 TO OSGH PLC-2.
- 25 OSGH TRANSFORMER/RECTIFIER #1.
- 26 OSGH TRANSFORMER/RECTIFIER #2.
- 27 HARMONIC FILTER.
- 28 BRINE TANK LEVEL CONTROL PANEL.
- 29 BRINE TANK SALT LEVEL SENSOR.
- 30 BRINE TANK ULTRASONIC LEVEL TRANSMITTER.
- 31 TO BRINE TANK HEAT TRACE PANEL.
- 32 HYDROGEN DETECTOR. SENSOR TO BE MOUNTED ON CEILING.
- 33 TO POWER PANEL 'D' (PP 'D')
- 34 TO POWER PANEL 'E' (PP 'E')
- 35 TO POWER PANEL 'F' (PP 'F')
- 36 TO TANK HEAT TRACE PANEL #1
- 37 TO TANK HEAT TRACE PANEL #2
- 38 METERING PUMP CONTROL PANEL #1
- 39 METERING PUMP CONTROL PANEL #2
- 40 METERING PUMP CONTROL PANEL #3
- 41 TANK HEAT TRACE PANEL #1. REFER TO SPECIFICATION 13216 FOR DETAILS.
- 42 TANK HEAT TRACE PANEL #2. REFER TO SPECIFICATION 13216 FOR DETAILS.

- 43 HVAC EXHAUST FAN.
- 44 COMMON CONTROL PANEL (CPP).
- 45 SALT LEVEL CONTROL PANEL.
- 46 HARDNESS MONITOR.
- 47 BRINE TANK HEAT TRACE PANEL #3. REFER TO SPECIFICATION 13216 FOR DETAILS.
- 48 BRINE TANK BRINE LEVEL TRANSMITTER.
- 49 BLOWER CONTROL PANEL. SIDE BY SIDE DOUBLE DOOR CABINET SHALL BE SPECIFIED WITH BARRIER TO SEPARATE 480V CIRCUITS AND EQUIPMENT FROM 120V AND 24V CIRCUITS AND EQUIPMENT.
- 50 OSGH DISCHARGE VALVES.

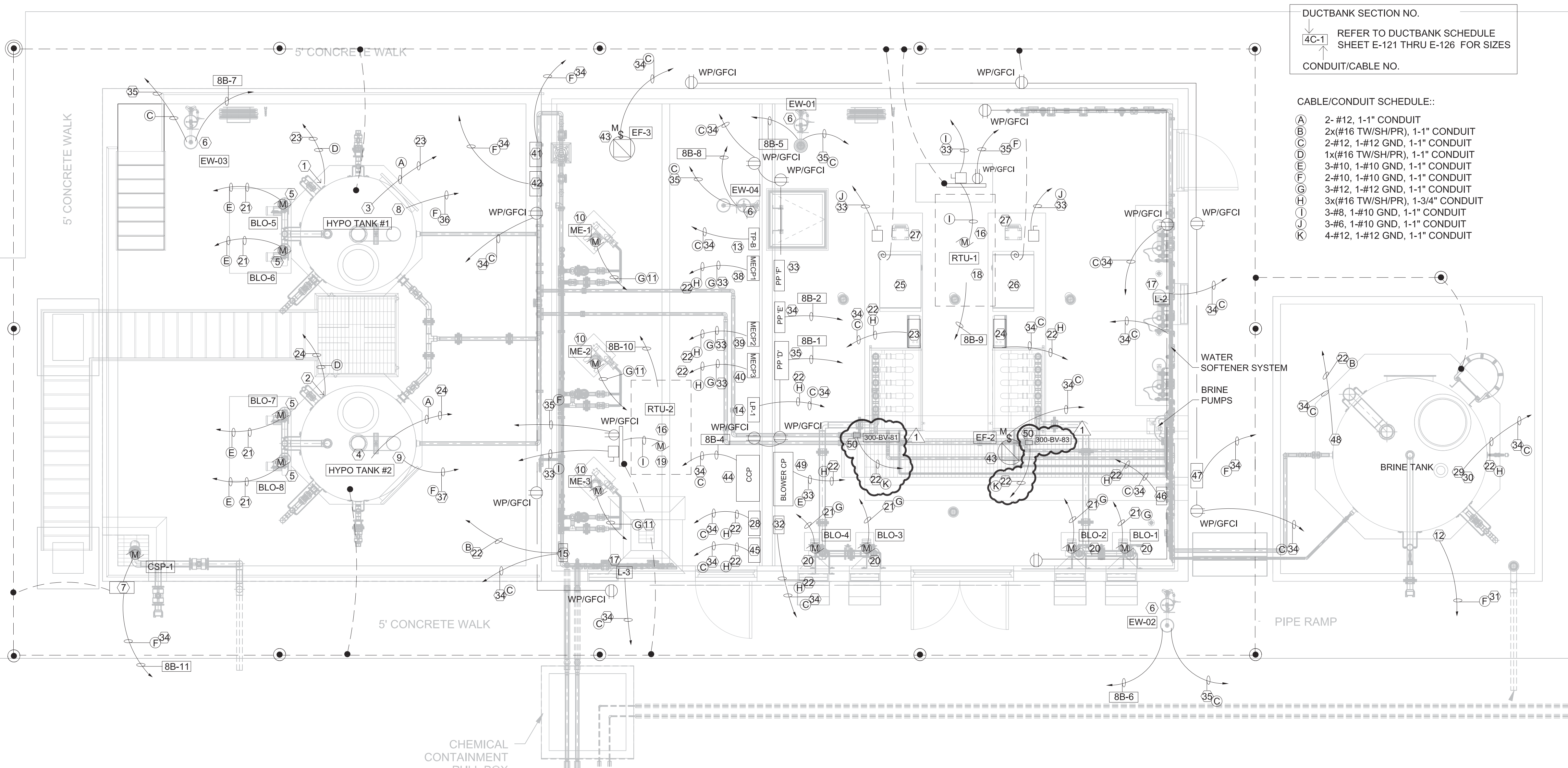
**GROUNDING NOTES:**

1. GROUNDING SYSTEM IS A SOLIDLY GROUND NEUTRAL SYSTEM THAT IS MULTI GROUND.
2. THE GROUNDING ELECTRODE IS THE GROUNDING RING FORMED BY THE CONDUCTORS.
3. GROUND WIRE TO BE INSTALLED NOT LESS THAN 30" DEEP.
4. SEE DRAWING E-114 FOR GROUNDING DETAILS.
5. GROUND ROD RESISTANCE TO BE 5 OHMS OR LESS.
6. GROUND RODS TO BE SPACED AT LEAST 20' APART.

**GROUNDING LEGEND:**

- GROUNDING CONNECTION EXOTHERMIC WELD OR COMPRESSION
- GATE FLEXIBLE GROUNDING STRAP.
- ⊙ GROUND ROD CONNECTION 3/4" X 10' LONG.
- ⊙ TEST WELL WITH GROUND ROD CONNECTION 3/4" X 10' LONG
- #2/0 STRANDED BARE COPPER WIRE, SOFT DRAWN AS SHOWN ON PLANS
- ABOVE GRADE TAIL FOR EQUIPMENT AND STRUCTURE GROUND CONNECTION. TO BE LOCATED FOR PROPER EQUIPMENT ENTRANCE. PENETRATION THRU CONCRETE TO HAVE SCHEDULE 80 PVC PIPE SEGMENT.

**GRUBB ENGINEERING, INC.**  
 ELECTRICAL POWER SYSTEMS  
 DESIGN AND TESTING  
 TBP# FIRM REGISTRATION NO. 3904  
 2727 N. ST. MARY'S ST. SAN ANTONIO, TEXAS 78212  
 BUS: (210) 658 7250 FAX: (210) 658 9805



**DUCTBANK SECTION NO.**  
 4C-1 REFER TO DUCTBANK SCHEDULE SHEET E-121 THRU E-126 FOR SIZES  
**CONDUIT/CABLE NO.**

- CABLE/CONDUIT SCHEDULE::**
- A 2- #12, 1-1" CONDUIT
  - B 2x(#16 TW/SH/PR), 1-1" CONDUIT
  - C 2-#12, 1-#12 GND, 1-1" CONDUIT
  - D 1x(#16 TW/SH/PR), 1-1" CONDUIT
  - E 3-#10, 1-#10 GND, 1-1" CONDUIT
  - F 2-#10, 1-#10 GND, 1-1" CONDUIT
  - G 3-#12, 1-#12 GND, 1-1" CONDUIT
  - H 3x(#16 TW/SH/PR), 1-3/4" CONDUIT
  - I 3-#8, 1-#10 GND, 1-1" CONDUIT
  - J 3-#6, 1-#10 GND, 1-1" CONDUIT
  - K 4-#12, 1-#12 GND, 1-1" CONDUIT

**A OSHG BUILDING - ELECTRICAL PLAN**  
 SCALE: NTS

**TETRA TECH**  
 Texas Registration No. F-3924  
 www.tetratech.com  
 700 N. St. Mary's, Suite 300  
 San Antonio, TX 78205  
 PH: (210) 299-7900 FAX: (210) 226-8487

**SAN ANTONIO WATER SYSTEM**

MARK	DATE	DESCRIPTION
1	10-30-17	ADDENDUM NO. 2

**SAN ANTONIO WATER SYSTEM**  
 ZARZAMORA PUMP STATION  
 IMPROVEMENTS PROJECT  
**OSHG BUILDING FLOOR PLAN - ELECTRICAL**

Project No.:  
 Designed By: JP, CG, JT  
 Drawn By: SG  
 Checked By: SM

**E-301**

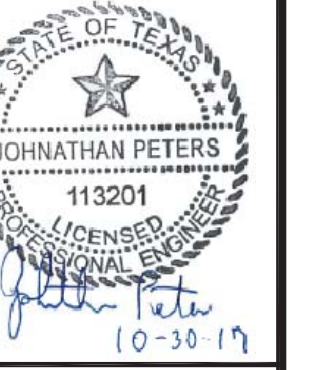
Bar Measures 1 inch



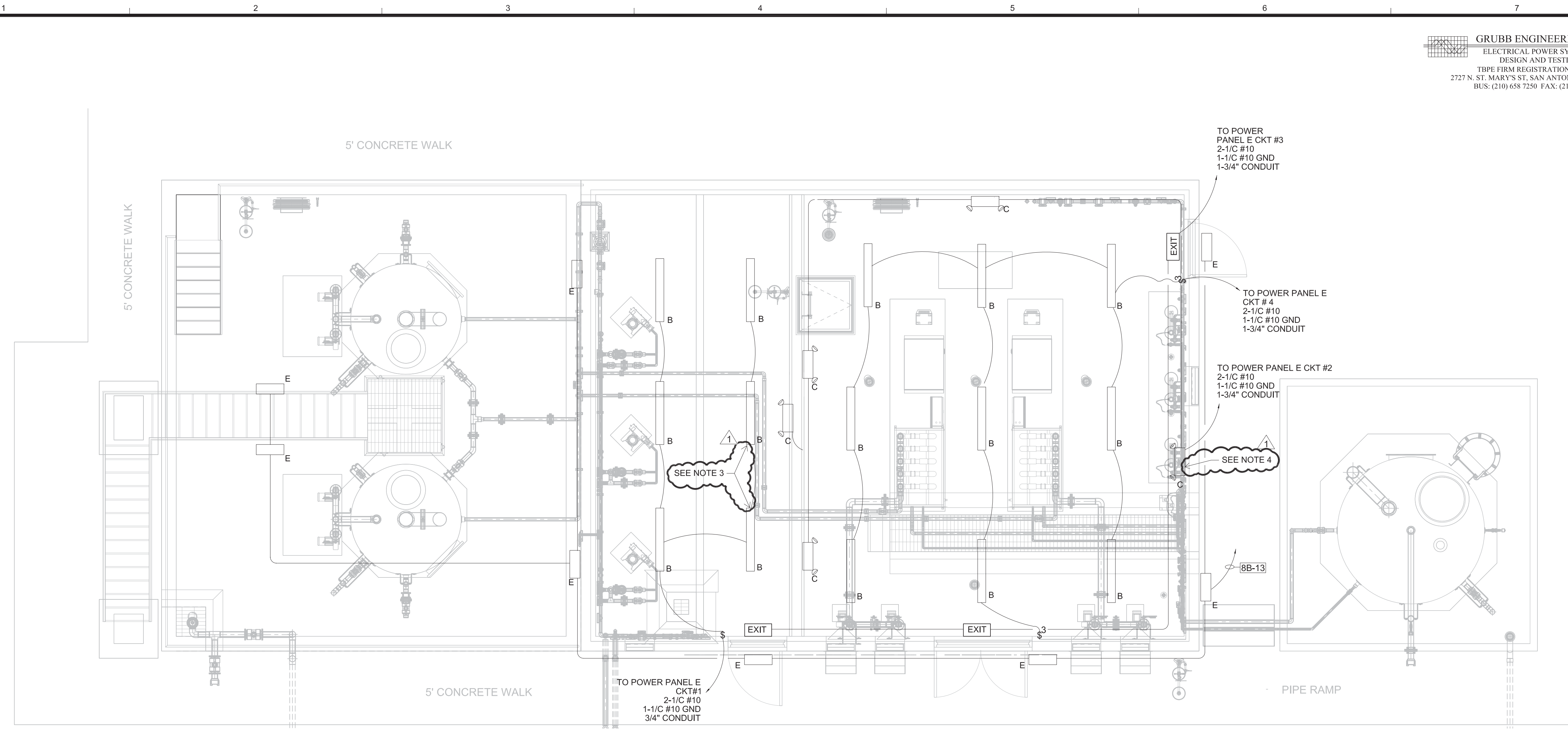
10/31/2017 8:20:40 AM - R:\TETRA TECH\2015 LA ROSA AND ZARZAMORA PUMP STATIONS\DESIGN\_ZARZAMORA BID SET\100% DRAWINGS\DRAWINGS\E-302 OSHG BUILDING LIGHTING PLAN.DWG - ISGRAF - JOHNATHAN PETERS

**GRUBB ENGINEERING, INC.**  
 ELECTRICAL POWER SYSTEMS  
 DESIGN AND TESTING  
 TBPE FIRM REGISTRATION NO. 3904  
 2727 N. ST. MARY'S ST, SAN ANTONIO, TEXAS 78212  
 BUS. (210) 658 7250 FAX: (210) 658 9805

**TETRA TECH**  
 Texas Registration No. F-3924  
 www.tetratech.com  
 700 N. St. Mary's, Suite 300  
 San Antonio, TX 78212  
 PH: (210) 299-7800 FAX: (210) 226-9497



**SAN ANTONIO WATER SYSTEM**



**A OSG BUILDING - LIGHTING PLAN**  
 SCALE: 1/4" = 1'-0"

LIGHT FIXTURE SCHEDULE						
TYPE	LAMPS	MOUNTING	VOLTAGE	MANUFACTURER	DESCRIPTION	CATALOG
A	LED	PENDENT MOUNTED	120	LITHONIA	INTERIOR LIGHTING	DMW2 L24 3000LM WD PCL MVOLT GZ1 30K 80CRI PMP4X WLFENO2 WITH PENDANT MONOPOINT
B	LED	HANGING	120	LIGHT EDGE	OSG BUILDING	VMON2-4-40-40-MV-XX
C	2	WALL MOUNTED	120	LITHONIA	EMERGENCY LIGHTS	ELM2LED MOUNT 7.5 AFF OR ABOVE DOOR
D	LED	HANGING	120	LIGHT EDGE	OSG BUILDING	VMON-4-34-40-MV-XX
YARD LIGHT	LED	POLE	120	LITHONIA	AREA LIGHTING	KAD LED 1 63B530/40K SR5 208 SPD 09 DX BXD W/POLE SSA205GDM19VDDDB
EXIT		WALL MOUNTED	120	LITHONIA	EXIT	LQC1RELN WALL MOUNTED ABOVE DOOR
E	LED	WALL MOUNTED	120	LITHONIA	WALL PACK	MRW LED 2 10A700/50K SR3 120DDBXD WITH EMERGENCY LED SOURCE
F	LED	RECESSED LAY-IN	120	LITHONIA	PUMP HOUSE LIGHTS	WRTL G-L48-5000LM-AFL-MVOLT-EZ1-30K-80CRI
F1	LED	RECESSED LAY-IN	120	LITHONIA	PUMP HOUSE LIGHTS	WRTL G-L48-5000LM-AFL-MVOLT-EZ1-30K-80CRI PS1050 WITH EMERGENCY BATTERY BACKUP
G	LED	RECESSED LAY-IN	120	LITHONIA	PUMP HOUSE LIGHTS	2 GTL2 3300LMLP835

**B LIGHT FIXTURE SCHEDULE**  
 SCALE: N.T.S.

DUCTBANK SECTION NO.  
 4C-1 REFER TO DUCTBANK SCHEDULE SHEET E-121 THRU E-126 FOR SIZES  
 CONDUIT/CABLE NO.

- NOTES:
- CONTRACTOR TO AFFIX LIGHTS TO JOINTS USING UNISTRUT.
  - SEE ARCHITECTURE DRAWINGS FOR MOUNTING.
  - HANGING LIGHT FIXTURES TYPE 'B' TO BE POSITIONED BELOW PIPING TO PREVENT OBSTRUCTING LIGHT PATH.
  - RELOCATE LIGHT FIXTURE IF WATER SOFTENER AND PIPING INTERFERES WITHIN 5' OF LOCATION.

MARK	DATE	DESCRIPTION
△	10-30-17	ADDENDUM NO. 2

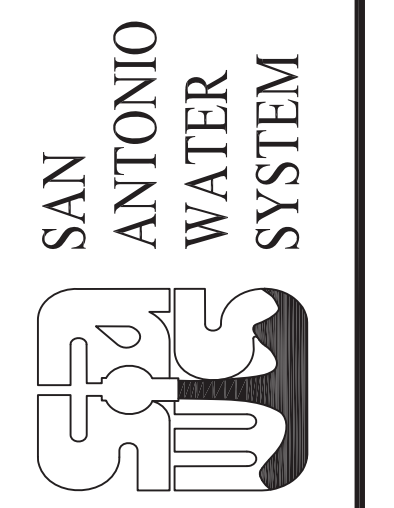
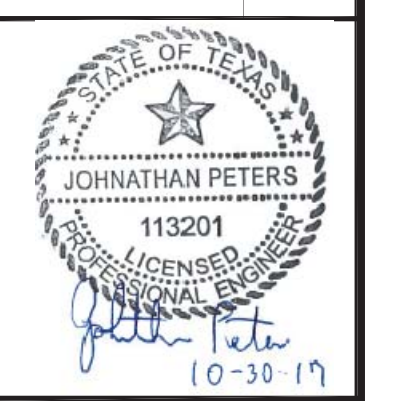
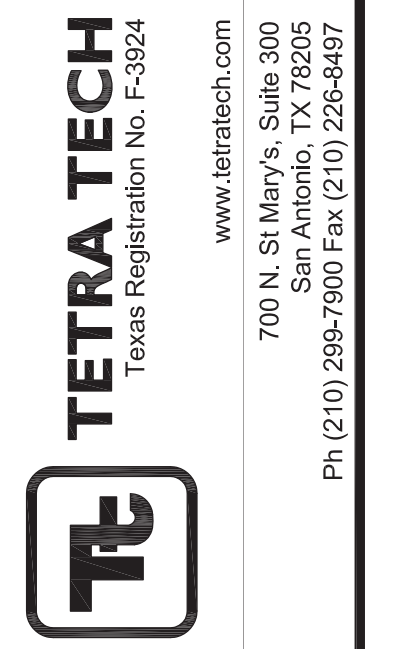
SAN ANTONIO WATER SYSTEM  
 ZARZAMORA PUMP STATION  
 IMPROVEMENTS PROJECT  
 OSHG BUILDING  
 LIGHTING PLAN

Project No.:  
 Designed By: JP, CG, JT  
 Drawn By: SG  
 Checked By: SM

**E-302**

10/30/2017 10:17:20 AM - R:R:TETRA TECH\2015 LA ROSA AND ZARZAMORA PUMP STATIONS\DESIGN\_ZARZAMORABID SET\100% DRAWINGS\DRAWINGS\IE-350 ELECTRICAL BUILDING - FIRST FLOOR - ELECTRICAL PLAN.DWG - SGRAF - JOHNATHAN PETERS

**GRUBB ENGINEERING, INC.**  
 ELECTRICAL POWER SYSTEMS  
 DESIGN AND TESTING  
 TBE FIRM REGISTRATION NO. 3994  
 2727 N. ST. MARY'S ST. SAN ANTONIO, TEXAS 78212  
 BUS: (210) 658 7250 FAX: (210) 658 9805



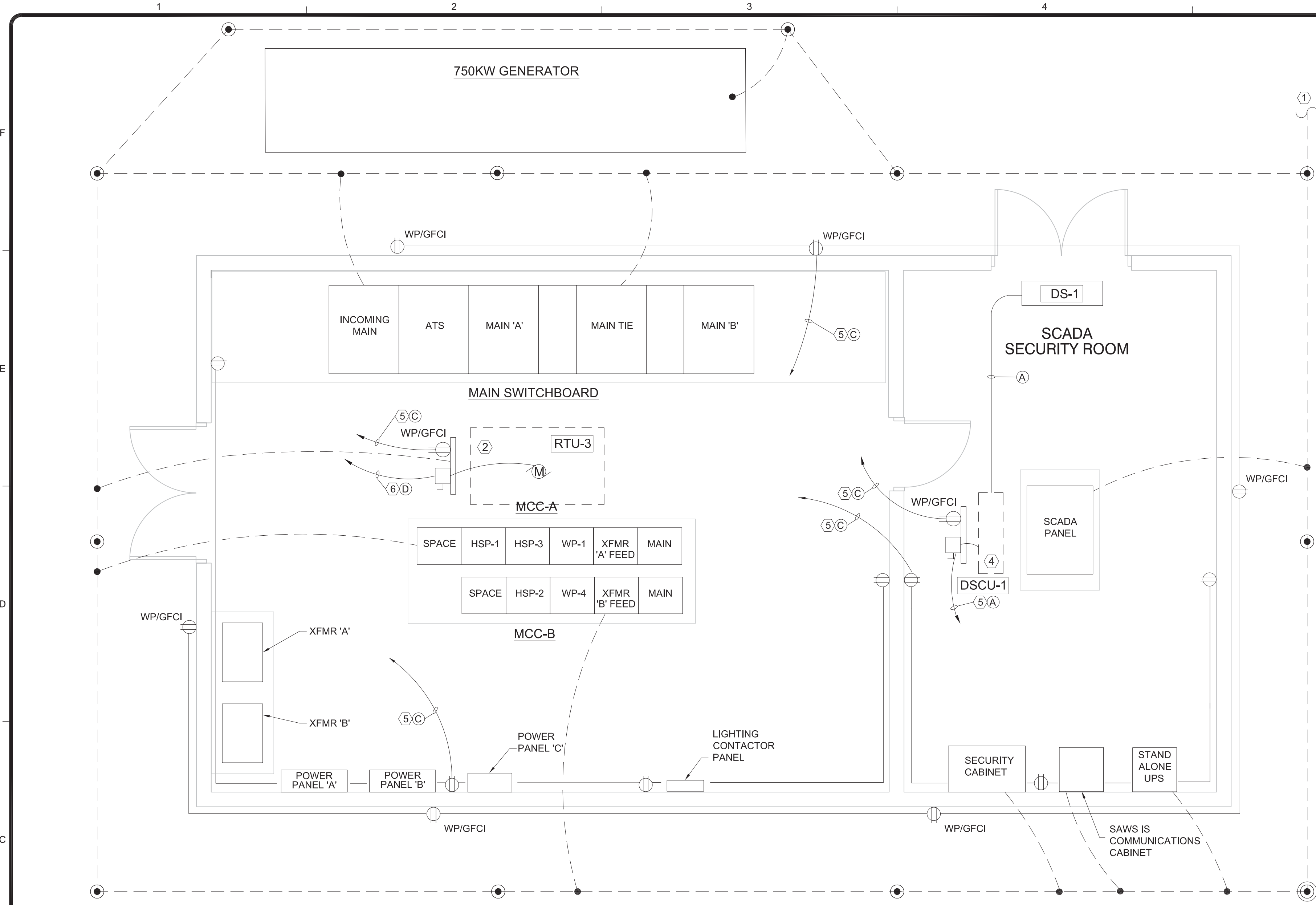
MARK	DATE	DESCRIPTION
BY		
	10-30-17	ADDENDUM NO. 2

SAN ANTONIO WATER SYSTEM  
 ZARZAMORA PUMP STATION  
 IMPROVEMENTS PROJECT  
**ELECTRICAL BUILDING -  
 FIRST FLOOR -  
 ELECTRICAL PLAN**

Project No.:  
 Designed By: JP, CG, JT  
 Drawn By: SG  
 Checked By: SM

**E-350**

Bar Measures 1 inch



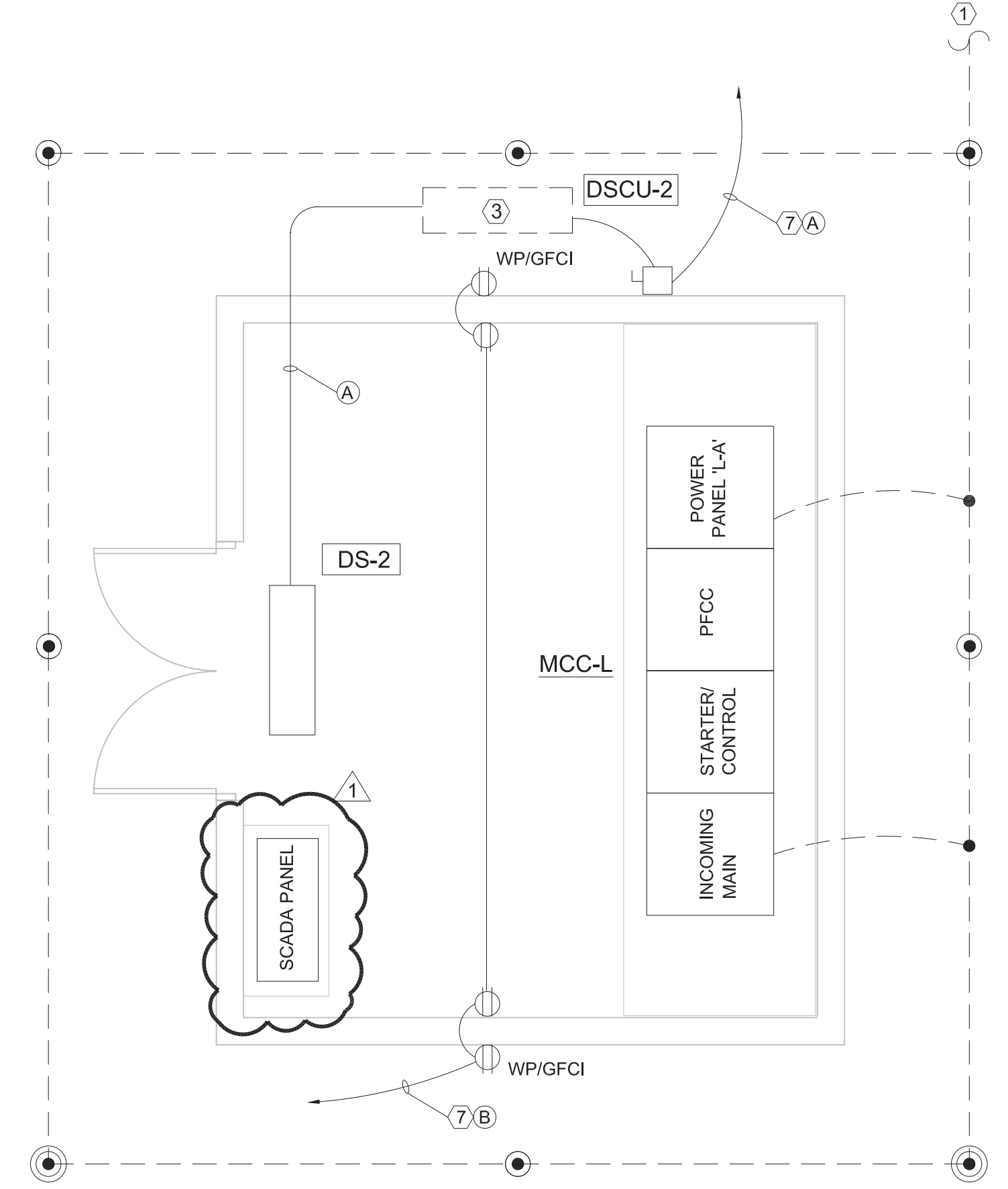
**A ELECTRICAL/SCADA BUILDING LAYOUT - ZARZAMORA**  
 SCALE: N.T.S.

- KEYED NOTES:**
- ① TIE TO EXISTING GROUND GRID.
  - ② HVAC UNIT MOUNTED ON TOP OF ROOF. PROVIDE NEMA 4X DISCONNECT SWITCH AND RECEPTACLE MOUNTED ON STAINLESS STEEL RACK ON TOP OF ROOF.
  - ③ DSCU-2 DUCTLESS SPLIT SYSTEM UNIT MOUNTED ON CONCRETE PAD. PROVIDE NEMA 4X DISCONNECT SWITCH TO BE WALL MOUNTED.
  - ④ DSCU-1 DUCTLESS SPLIT SYSTEM UNIT MOUNTED ON TOP OF ROOF. PROVIDE NEMA4X DISCONNECT SWITCH AND RECEPTACLE MOUNTED ON STAINLESS STEEL RACK ON TOP OF ROOF
  - ⑤ POWER PANEL 'A'
  - ⑥ POWER PANEL 'C'
  - ⑦ POWER PANEL 'LA'

DUCTBANK SECTION NO.	REFER TO DUCTBANK SCHEDULE SHEET E-121 THRU E-126 FOR SIZES
4C-1	
CONDUIT/CABLE NO.	

**CABLE/CONDUIT SCHEDULE::**

(A)	3-#12, 1-#12 GND, 1-1" CONDUIT
(B)	2-#12, 1-#12 GND, 1-1" CONDUIT
(C)	2-#10, 1-#10 GND, 1-3/4" CONDUIT
(D)	4-#10, 1-#10 GND, 1-1" CONDUIT



**B ELECTRICAL BUILDING LAYOUT - LINDEN**  
 SCALE: N.T.S.

**GROUNDING NOTES:**

1. GROUNDING SYSTEM IS A SOLIDLY GROUNDED NEUTRAL SYSTEM THAT IS MULTI GROUNDED.
2. THE GROUNDING ELECTRODE IS THE GROUNDING RING FORMED BY THE CONDUCTORS.
3. GROUND WIRE TO BE INSTALLED NOT LESS THAN 30" DEEP.
4. SEE DRAWING E-114 FOR GROUNDING DETAILS.
5. GROUND ROD RESISTANCE TO BE 5 OHMS OR LESS.
6. GROUND RODS TO BE SPACED AT LEAST 20' APART.

**GROUNDING LEGEND**

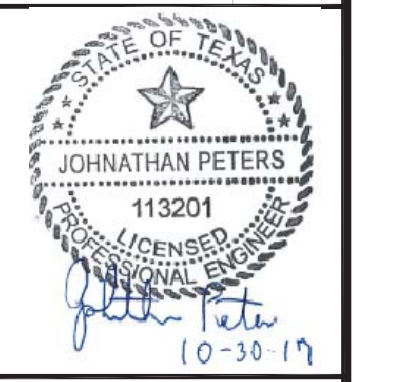
- GROUNDING CONNECTION EXOTHERMIC WELD OR COMPRESSION
- GATE FLEXIBLE GROUNDING STRAP.
- ⊙ GROUND ROD CONNECTION 3/4" X 10' LONG.
- ⊕ TEST WELL WITH GROUND ROD CONNECTION 3/4" X 10' LONG
- #2/0 STRANDED BARE COPPER WIRE, SOFT DRAWN AS SHOWN ON PLANS



10/30/2017 3:11:42 PM - R:\TETRA TECH\2015 LA ROSA AND ZARZAMORA PUMP STATIONS\DESIGN\_ZARZAMORA\SET100% DRAWINGS\DRAWINGS\302 PROCESS FLOW DIAGRAM OSHG-HYPO - II (NEW).DWG - SGRAF - JOHNATHAN PETERS

GRUBB ENGINEERING, INC.  
ELECTRICAL POWER SYSTEMS  
DESIGN AND TESTING  
TPE FIRM REGISTRATION NO. 3904  
2727 N. ST. MARY'S ST, SAN ANTONIO, TEXAS 78212  
BUS. (210) 658 7250 FAX: (210) 658 9805

**TETRA TECH**  
Texas Registration No. F-3924  
www.tetratech.com  
700 N. St. Mary's, Suite 300  
San Antonio, TX 78212  
PH: (210) 299-7800 FAX: (210) 226-9497



**SAN ANTONIO WATER SYSTEM**

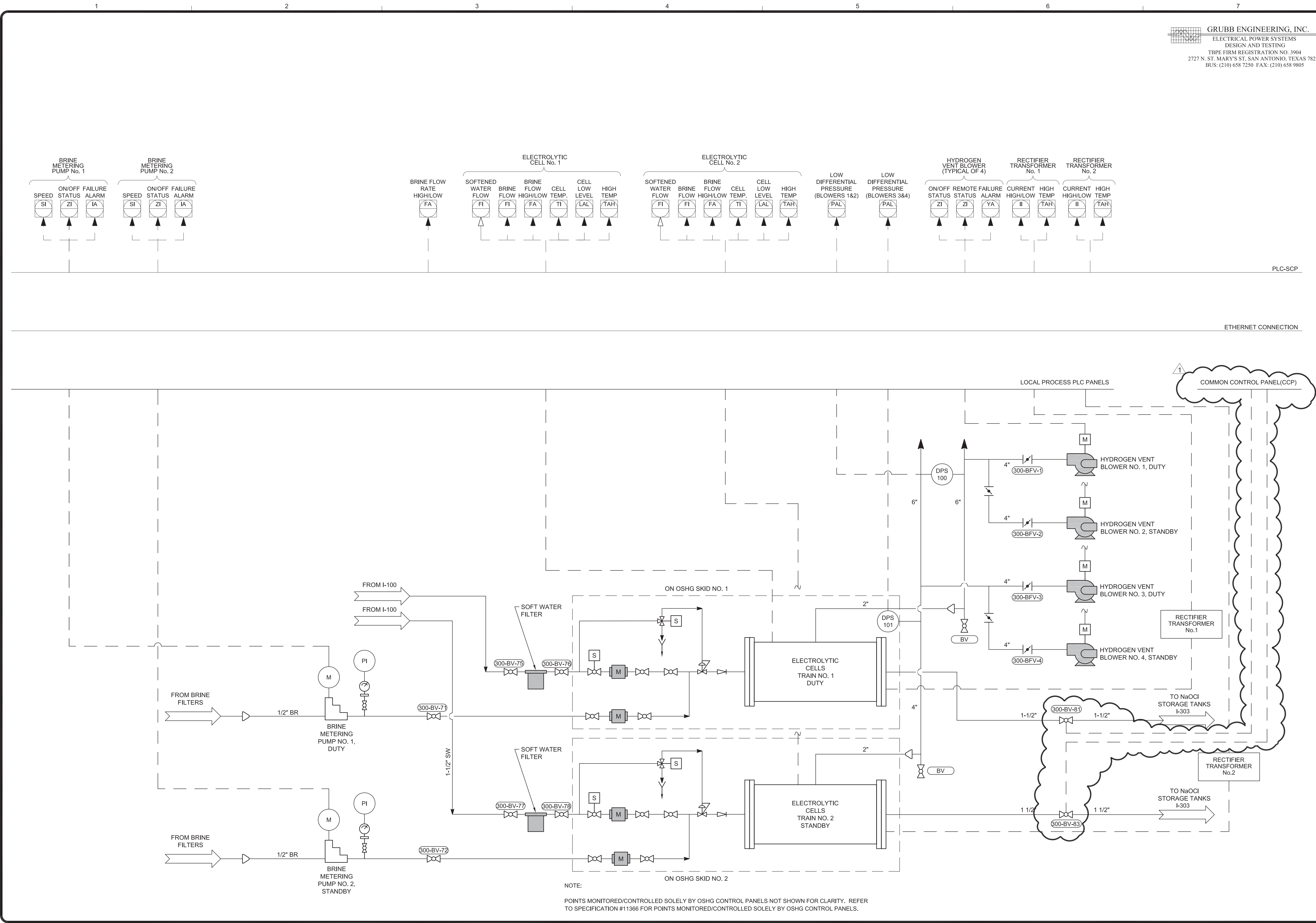
MARK	DATE	DESCRIPTION
A	10-30-17	ADDENDUM NO. 2

SAN ANTONIO WATER SYSTEM  
ZARZAMORA PUMP STATION  
IMPROVEMENTS PROJECT  
**PROCESS AND INSTRUMENTATION  
DIAGRAM OSHG SYSTEM II**

Project No.:  
Designed By: JP, CG, JT  
Drawn By: SM  
Checked By: SM

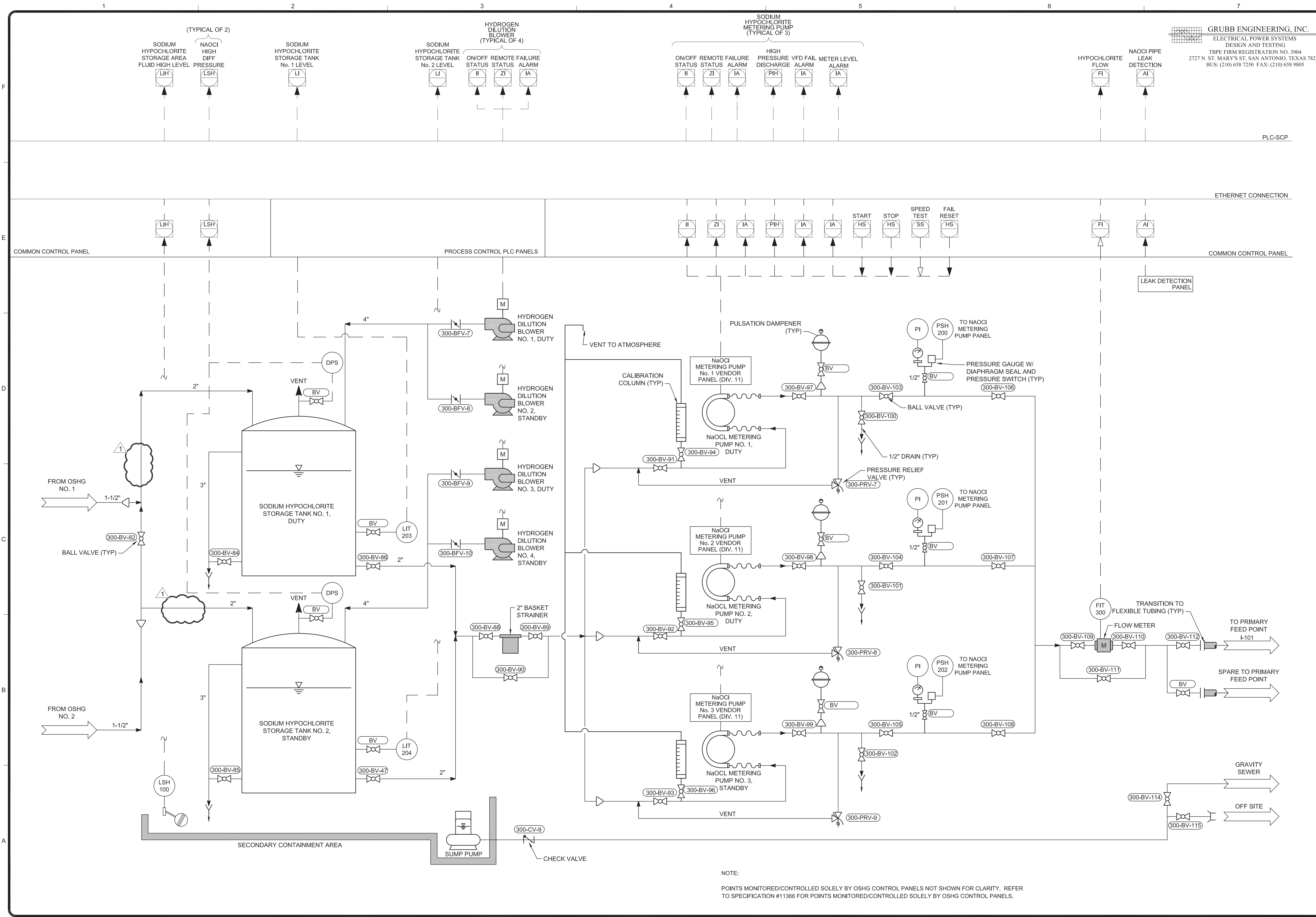
**I-302**

Copyright: Tetra Tech



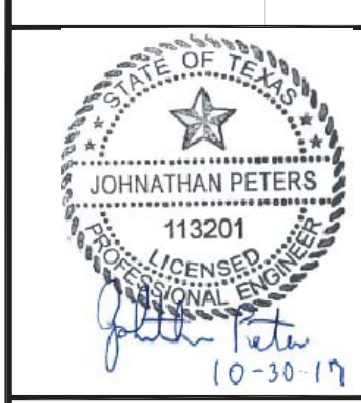
NOTE:  
POINTS MONITORED/CONTROLLED SOLELY BY OSHG CONTROL PANELS NOT SHOWN FOR CLARITY. REFER TO SPECIFICATION #11366 FOR POINTS MONITORED/CONTROLLED SOLELY BY OSHG CONTROL PANELS.

10/30/2017 3:14:46 PM - R:\TETRA TECH\2015 LA ROSA AND ZARZAMORA PUMP STATIONS\DESIGN\_ZARZAMORA\BID SET\100% DRAWINGS\DRAWINGS\303 PROCESS AND INSTRUMENTATION DIAGRAM - OSHG SYSTEM III.DWG - SGRAF - JOHNATHAN PETERS



GRUBB ENGINEERING, INC.  
ELECTRICAL POWER SYSTEMS  
DESIGN AND TESTING  
TPE FIRM REGISTRATION NO. 3904  
2727 N. ST. MARY'S ST, SAN ANTONIO, TEXAS 78212  
BUS: (210) 658 7250 FAX: (210) 658 9805

**TETRA TECH**  
Texas Registration No. F-3924  
www.tetrattech.com  
700 N. St. Mary's, Suite 300  
San Antonio, TX 78212  
PH: (210) 299-7800 FAX: (210) 226-9497



**SAN ANTONIO WATER SYSTEM**

MARK	DATE	DESCRIPTION	BY
1	10-30-17	ADDENDUM NO. 2	

**SAN ANTONIO WATER SYSTEM**  
ZARZAMORA PUMP STATION  
IMPROVEMENTS PROJECT  
**PROCESS AND INSTRUMENTATION DIAGRAM - OSHG SYSTEM III**

Project No.:  
Designed By: JP, CG, JT  
Drawn By: SG  
Checked By: SM

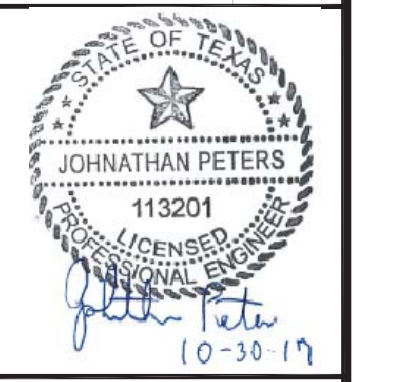
**I-303**

NOTE:  
POINTS MONITORED/CONTROLLED SOLELY BY OSHG CONTROL PANELS NOT SHOWN FOR CLARITY. REFER TO SPECIFICATION #11366 FOR POINTS MONITORED/CONTROLLED SOLELY BY OSHG CONTROL PANELS.

Copyright: Tetra Tech



10/31/2017 8:57:00 AM - R:\TETRA TECH\2015 LA ROSA AND ZARZAMORA PUMP STATIONS\DESIGN\_ZARZAMORA\BID SET\100% DRAWINGS\DRAWINGS\506 SCADA PANEL COMMUNICATIONS DIAGRAM.DWG - SGRAF - JOHNATHAN PETERS



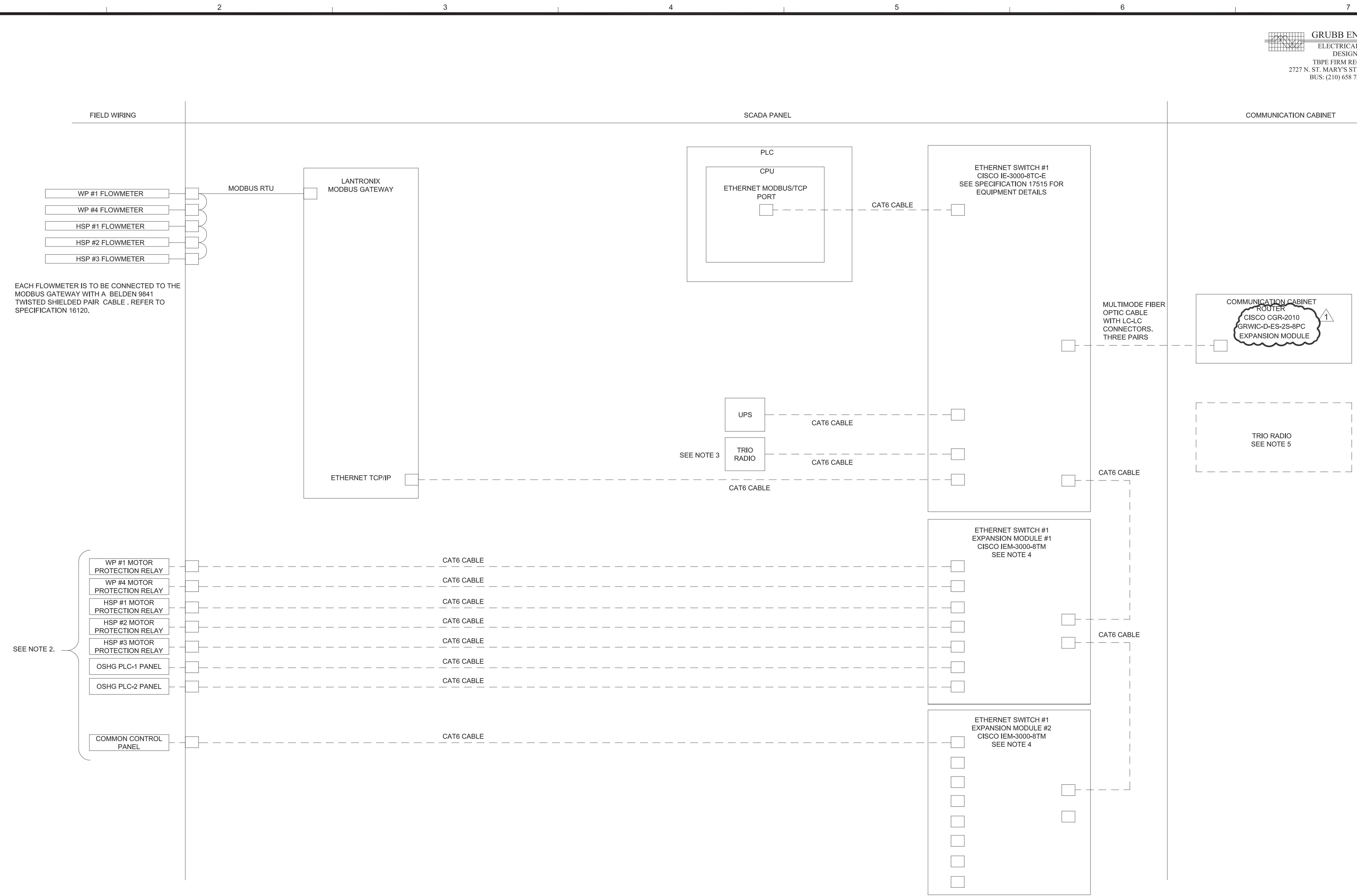
MARK	DATE	DESCRIPTION	BY
1	10-30-17	ADDENDUM NO. 2	

SAN ANTONIO WATER SYSTEM  
ZARZAMORA PUMP STATION  
IMPROVEMENTS PROJECT  
**SCADA PANEL  
COMMUNICATIONS  
DIAGRAM - ZARZAMORA**

Project No.:  
Designed By: JP, CG, JT  
Drawn By: S  
Checked By: SM

**I-506**

Copyright: Tetra Tech



**A SCADA PANEL COMMUNICATIONS - ZARZAMORA**  
SCALE: N.T.S.

- NOTES:
- ALL CABLES, CONNECTORS, & PINOUT CONNECTIONS SHALL BE SUBMITTED TO OWNER FOR APPROVAL.
  - EACH RELAY IS TO BE PROVIDED WITH AN ETHERNET PORT. CONTRACTOR TO INTEGRATE, CONFIGURE AND PROGRAM RELAYS INCLUDING GRAPHICS AT THE TOP END.
  - IF THERE IS NO BROADBAND RADIO PRESENT AT THE COMPLETION OF THE ZARZAMORA STATION UPGRADES, AN ADDITIONAL TRIO RADIO SHALL BE ADDED TO THE ETHERNET SWITCH TO ESTABLISH COMMUNICATIONS WITH THE LINDEN WELL SITE.
  - REFERENCE SPECIFICATION 17515 FOR COMMUNICATIONS INTERFACE EQUIPMENT DETAILS.
  - IF TRIO RADIO IN SCADA PANEL IS COMMUNICATING TO THE TOP END, THEN TRIO RADIO IN COMMUNICATIONS CABINET WILL NEED TO BE INSTALLED AND CONNECTION SET UP TO COMMUNICATE TO LINDEN.



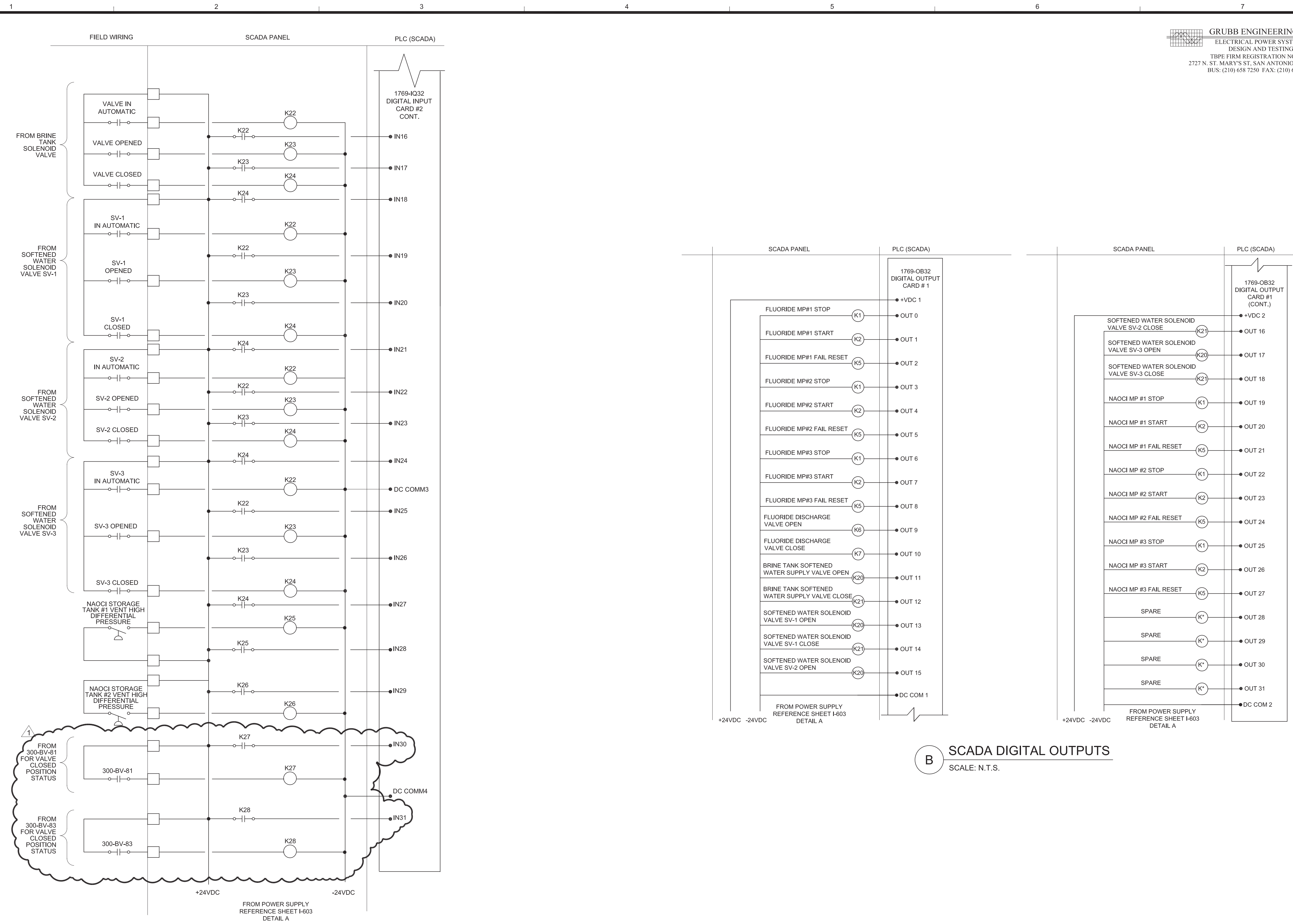
10/31/2017 8:05:59 AM - R:\TETRA TECH\2015 LA ROSA AND ZARZAMORA PUMP STATIONS\DESIGN\_ZARZAMORA\BID SET\100% DRAWINGS\DRAWINGS\I-602 PLC CONNECTION DIAGRAM DIGITAL OUTPUTS COMMON CONTROL PANEL.DWG - ..... JOHNATHAN PETERS

**GRUBB ENGINEERING, INC.**  
 ELECTRICAL POWER SYSTEMS  
 DESIGN AND TESTING  
 TBPE FIRM REGISTRATION NO. 3904  
 2727 N. ST. MARY'S ST., SAN ANTONIO, TEXAS 78212  
 BUS: (210) 658 7250 FAX: (210) 658 9805

**TETRA TECH**  
 Texas Registration No. F-3924  
 www.tetra-tech.com  
 700 N. St. Mary's, Suite 300  
 San Antonio, TX 78212  
 PH: (210) 299-7900 FAX: (210) 226-9497



**SAN ANTONIO WATER SYSTEM**



**A SCADA DIGITAL INPUTS - COMMON CONTROL PANEL PLC (CONT)**  
 SCALE: N.T.S.

**B SCADA DIGITAL OUTPUTS**  
 SCALE: N.T.S.

MARK	DATE	DESCRIPTION
A	10-30-17	ADDENDUM NO. 2

SAN ANTONIO WATER SYSTEM  
 ZARZAMORA PUMP STATION  
 IMPROVEMENTS PROJECT  
**PLC CONNECTION DIAGRAM  
 DIGITAL OUTPUTS  
 COMMON CONTROL PANEL**

Project No.:  
 Designed By: JP, CG, JT  
 Drawn By: SG  
 Checked By: SM

**I-602**

Copyright: Tetra Tech



10/31/2017 9:00:00 AM - R:\TETRA TECH\2015 LA ROSA AND ZARZAMORA PUMP STATIONS\DESIGN\_ZARZAMORA\BID SET\100% DRAWINGS\DRAWINGS\I-700 SECURITY SYSTEM CONNECTION DIAGRAM.DWG - SGRAF - JOHNATHAN PETERS

NOTES:

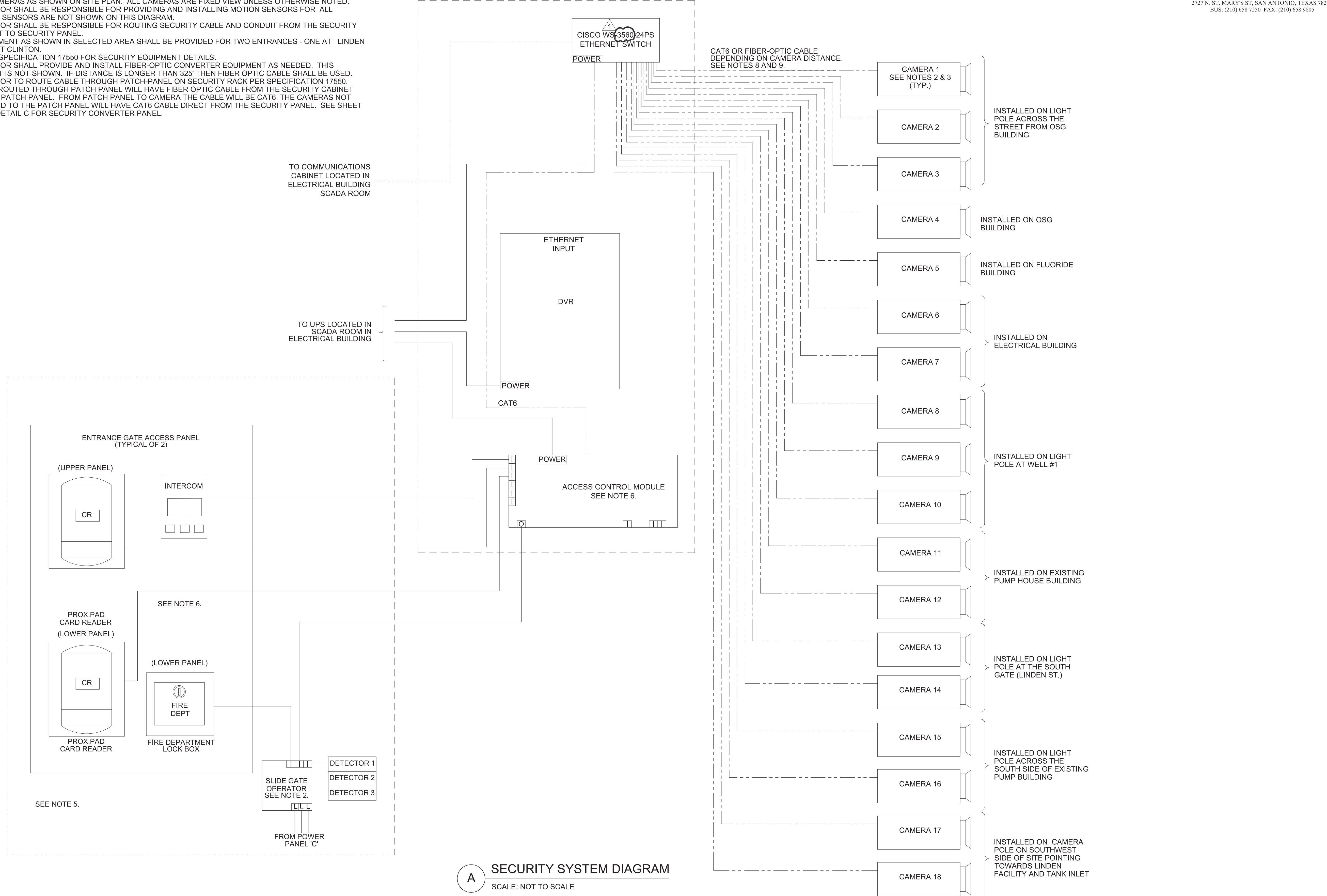
1. SURGE ARRESTORS TO BE PROVIDED BY CONTRACTOR FOR CAT6 CABLE. MANUFACTURER SHALL BE PHOENIX CONTACT OR EQUAL.
2. MOUNT CAMERAS AS SHOWN ON SITE PLAN. ALL CAMERAS ARE FIXED VIEW UNLESS OTHERWISE NOTED. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING MOTION SENSORS FOR ALL CAMERAS. SENSORS ARE NOT SHOWN ON THIS DIAGRAM.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ROUTING SECURITY CABLE AND CONDUIT FROM THE SECURITY EQUIPMENT TO SECURITY PANEL.
4. ALL EQUIPMENT AS SHOWN IN SELECTED AREA SHALL BE PROVIDED FOR TWO ENTRANCES - ONE AT LINDEN AND ONE AT CLINTON.
5. REFER TO SPECIFICATION 17550 FOR SECURITY EQUIPMENT DETAILS.
6. CONTRACTOR SHALL PROVIDE AND INSTALL FIBER-OPTIC CONVERTER EQUIPMENT AS NEEDED. THIS EQUIPMENT IS NOT SHOWN. IF DISTANCE IS LONGER THAN 325' THEN FIBER OPTIC CABLE SHALL BE USED.
7. CONTRACTOR TO ROUTE CABLE THROUGH PATCH-PANEL ON SECURITY RACK PER SPECIFICATION 17550.
8. CAMERAS ROUTED THROUGH PATCH PANEL WILL HAVE FIBER OPTIC CABLE FROM THE SECURITY CABINET TO TO THE PATCH PANEL. FROM PATCH PANEL TO CAMERA THE CABLE WILL BE CAT6. THE CAMERAS NOT CONNECTED TO THE PATCH PANEL WILL HAVE CAT6 CABLE DIRECT FROM THE SECURITY PANEL. SEE SHEET I-707 FOR DETAIL C FOR SECURITY CONVERTER PANEL.

SECURITY CABINET LOCATED IN ELECTRICAL BUILDING  
SEE NOTE 4. EQUIPMENT CABINET TO BE HOFFMAN MODEL PTHS362424G3  
WITH TFD SERIES FAN AND FILTER PACKAGE, REAR ANGLE RACKS PTR36T  
AND PANEL A36P24.

GRUBB ENGINEERING, INC.  
ELECTRICAL POWER SYSTEMS  
DESIGN AND TESTING  
TBPPE FIRM REGISTRATION NO. 3904  
2727 N. ST. MARY'S ST, SAN ANTONIO, TEXAS 78212  
BUS: (210) 658 7250 FAX: (210) 658 9805

**TETRA TECH**  
Texas Registration No. F-3924  
www.tetratech.com  
700 N. St. Mary's, Suite 300  
San Antonio, TX 78212  
PH: (210) 299-7800 FAX: (210) 226-9497

**SAN ANTONIO WATER SYSTEM**



**A SECURITY SYSTEM DIAGRAM**  
SCALE: NOT TO SCALE

MARK	DATE	DESCRIPTION
A	10-30-17	ADDENDUM NO. 2

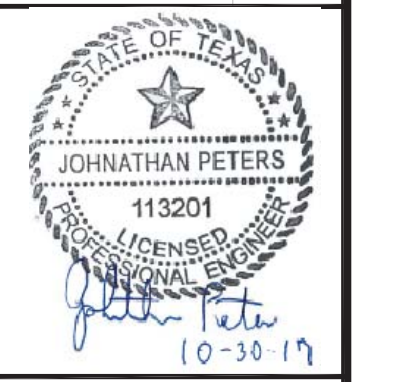
SAN ANTONIO WATER SYSTEM  
ZARZAMORA PUMP STATION  
IMPROVEMENTS PROJECT  
SECURITY SYSTEM  
CONNECTION  
DIAGRAM

Project No.:  
Designed By: JP, CG, JT  
Drawn By: SO  
Checked By: SM

**I-700**

Copyright Tetra Tech

10/31/2017 9:03:39 AM - R:\TETRA TECH\2015 LA ROSA AND ZARZAMORA PUMP STATIONS\DESIGN\_ZARZAMORA BID SET\100% DRAWINGS\DRAWINGS\I-703 COMMUNICATIONS SYSTEM CONNECTION DIAGRAM.DWG - SGRAF - JOHNATHAN PETERS



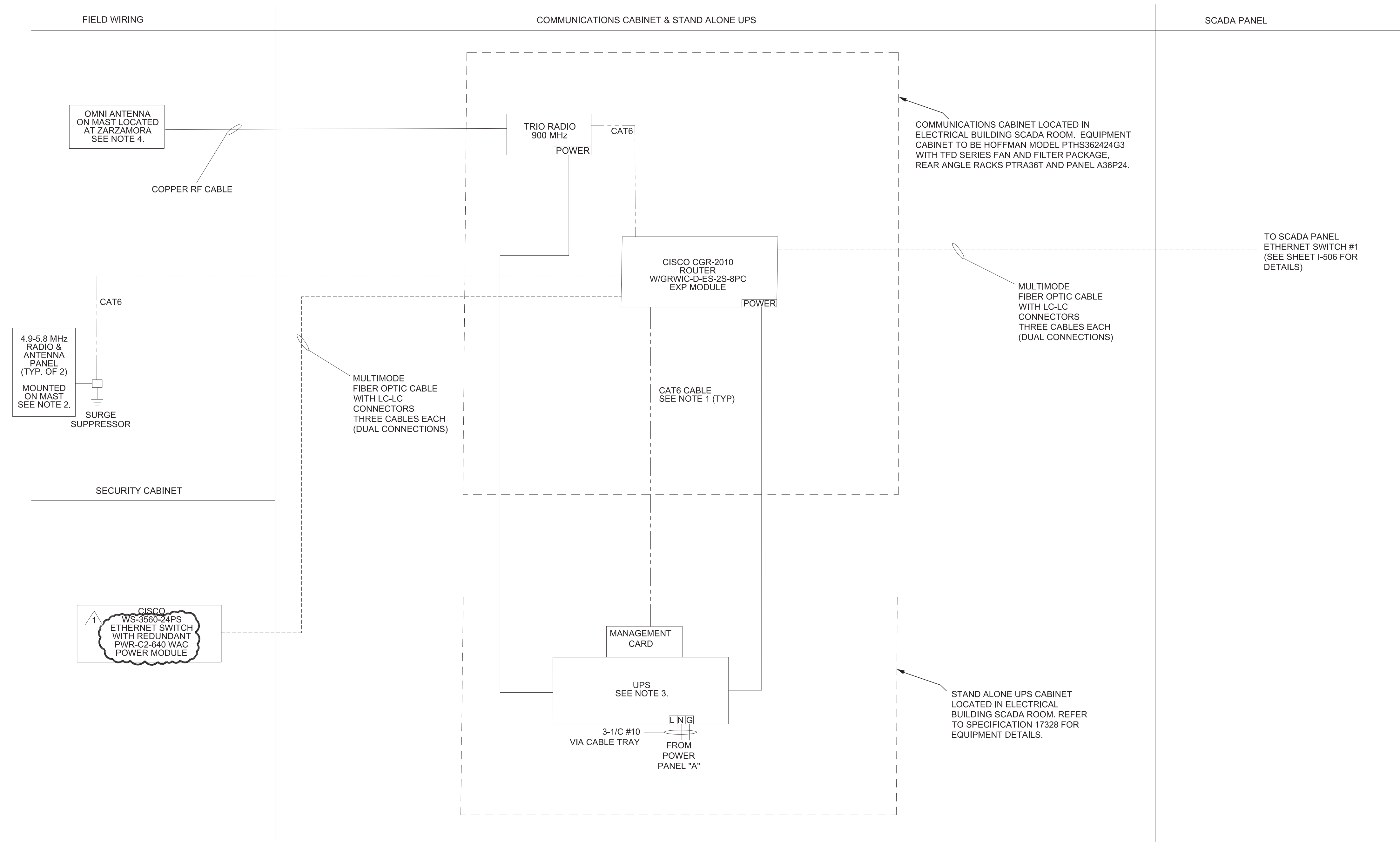
MARK	DATE	DESCRIPTION	BY
1	10-30-17	ADDENDUM NO. 2	

SAN ANTONIO WATER SYSTEM  
 ZARZAMORA PUMP STATION  
 IMPROVEMENTS PROJECT  
**COMMUNICATION SYSTEM  
 CONNECTION  
 DIAGRAM**

Project No.:  
 Designed By: JP, CG, JT  
 Drawn By: SG  
 Checked By: SM

**I-703**

Copyright Tetra Tech



- NOTES:
1. SURGE ARRESTORS TO BE PROVIDED BY CONTRACTOR FOR CAT6 CABLE. MANUFACTURER SHALL BE PHOENIX CONTACT OR EQUAL.
  2. BROADBAND RADIOS, ANTENNAS, CABLES & MASTS SHALL BE INSTALLED AS A SEPARATE PROJECT. SEE SPECIFICATIONS 17515 & 17550 FOR EQUIPMENT DETAILS.
  3. UPS IS A STANDALONE UNIT. UPS SHALL BE APC SMART UPS MODEL SYAK8P OR SIMILAR BY APC. PROVIDE EXTENDED RUNTIME MODULES AS NECESSARY TO ALLOW FOR 2 HOUR RUNTIME AT FULL SYSTEM LOAD. ALSO PROVIDE APC UPS NETWORK MANAGEMENT CARD V2 MODEL AP9630, OR SIMILAR.
  4. REFER TO SPECIFICATION 17515 FOR COMMUNICATIONS EQUIPMENT DETAILS.
  5. CONTRACTOR SHALL PROVIDE AND INSTALL FIBER-OPTIC CONVERTER EQUIPMENT AS NEEDED. THIS EQUIPMENT IS NOT SHOWN.

**A COMMUNICATIONS SYSTEM DIAGRAM**  
 SCALE: NOT TO SCALE