



Booster Stations Disinfection System Improvements

Invitation for Bids # PSUT-17-09

General Information		
Project Cost Estimate	\$1,250,000	See Section 1.5
Project Timeline	270 calendar days from NTP	See Section 1.8
Evaluation of Proposals	Staff	See Section 1.7
Mandatory Pre-Bid Meeting	November 16, 2017 at 3:00 p.m. at the Public Services Building, 8300 S. Palm Drive, Pembroke Pines, FL 33025.	See Section 1.8.1
Question Due Date	November 20, 2017	See Section 1.8
Proposals will be accepted until	2:00 p.m. on December 05, 2017	See Section 1.8
5% Proposal Security / Bid Bond	Required in the event that the proposal exceeds \$200,000	See Section 4.1
100% Payment and Performance Bonds	Required in the event that the proposal exceeds \$200,000	See Section 4.2

THE CITY OF PEMBROKE PINES
PURCHASING DIVISION
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025
(954) 518-9020



Table of Contents

SECTION 1 - INSTRUCTIONS	5
1.1 NOTICE	5
1.2 PURPOSE	5
1.3 BACKGROUND	5
1.4 SCOPE OF WORK	6
1.5 PROJECT COST ESTIMATE	6
1.5.1 PERMITS	6
1.5.2 PERMIT ALLOWANCE	7
1.6 PROPOSAL REQUIREMENTS	7
1.6.1 Attachment A: Contact Information Form	7
1.6.2 Attachment B: Vendor Information Form and a W-9	8
1.6.3 Attachment C: Non-Collusive Affidavit	8
1.6.4 Attachment D: Sworn Statement on Public Entity Crimes Form	8
1.6.5 Attachment E: Local Vendor Preference Certification	8
1.6.6 Attachment F: Veteran Owned Small Business Preference Certification	8
1.6.7 Attachment G: Equal Benefits Certification Form	9
1.6.8 Attachment H: Proposer’s Completed Qualification Statement	9
1.6.9 Attachment K: References Form and Supporting Information	9
1.6.10 Attachment L: Mandatory Pre-Bid Meeting Form	9
1.6.11 Attachment N: Vendor Drug-Free Workplace Certification Form	9
1.6.12 Attachment O: Vendor Certification Regarding Scrutinized Companies List	9
1.6.13 Proposal Security (Bid Bond Form or Cashier’s Check)	9
1.7 EVALUATION OF PROPOSALS & PROCESS OF SELECTION	10
1.8 TENTATIVE SCHEDULE OF EVENTS	10
1.8.1 MANDATORY PRE-BID MEETING / SITE VISIT	11
1.9 SUBMISSION REQUIREMENTS	11
SECTION 2 - INSURANCE REQUIREMENTS	12
2.1 REQUIRED INSURANCE	13
2.2 REQUIRED ENDORSEMENTS	15
SECTION 3 - GENERAL TERMS & CONDITIONS	16
3.1 EXAMINATION OF CONTRACT DOCUMENTS	16
3.2 CONFLICT OF INSTRUCTIONS	16



3.3	ADDENDA or ADDENDUM	16
3.4	INTERPRETATIONS AND QUESTIONS	16
3.5	RULES, REGULATIONS, LAWS, ORDINANCES and LICENSES	16
3.6	WARRANTIES FOR USAGE	17
3.7	BRAND NAMES.....	17
3.8	QUALITY.....	17
3.9	SAMPLES.....	17
3.10	DEVELOPMENT COSTS.....	17
3.11	PRICING.....	17
3.12	DELIVERY POINT.....	17
3.13	TAX EXEMPT STATUS	17
3.14	CONTRACT TIME	17
3.15	COPYRIGHT OR PATENT RIGHTS	18
3.16	PUBLIC ENTITY CRIMES	18
3.17	CONFLICT OF INTEREST	18
3.18	FACILITIES	18
3.19	ENVIRONMENTAL REGULATIONS.....	18
3.20	SIGNATURE REQUIRED.....	19
3.21	MANUFACTURER’S CERTIFICATION.....	19
3.22	MODIFICATION OR WITHDRAWAL OF PROPOSAL	19
3.23	PUBLIC BID; BID OPENING AND GENERAL EXEMPTIONS	19
3.24	RESERVATIONS FOR REJECTION AND AWARD.....	20
3.25	BID PROTEST	20
3.26	INDEMNIFICATION.....	20
3.27	DEFAULT PROVISION	20
3.28	ACCEPTANCE OF MATERIAL.....	21
3.29	LOCAL GOVERNMENT PROMPT PAYMENT ACT	21
SECTION 4 - SPECIAL TERMS & CONDITIONS.....		22
4.1	PROPOSAL SECURITY.....	22
4.2	PAYMENT AND PERFORMANCE BONDS	22
4.3	OWNER’S CONTINGENCY	23
4.4	TAX SAVER PROGRAM	23
4.5	RELEASE OF LIEN.....	23



ATTACHMENTS

Attachment A: Contact Information Form

Attachment B: Vendor Information Form and a W-9

Attachment C: Non-Collusive Affidavit

Attachment D: Sworn Statement on Public Entity Crimes Form

Attachment E: Local Vendor Preference Certification

Attachment F: Veteran Owned Small Business Preference Certification

Attachment G: Equal Benefits Certification Form

Attachment H: Proposer's Completed Qualification Statement

Attachment I: Sample Insurance Certificate

Attachment J: Specimen Contract/Agreement

Attachment K: References Form

Attachment L: Mandatory Pre-Bid/Site Visit Confirmation Form

Attachment M: Standard Release of Lien Form

Attachment N: Vendor Drug-Free Workplace Certification Form

Attachment O: Vendor Certification Regarding Scrutinized Companies List

Attachment P: Technical Specifications

Attachment Q: Drawings



SECTION 1 - INSTRUCTIONS

1.1 NOTICE

Notice is hereby given that the City Commission of the City of Pembroke Pines is seeking sealed proposals for:

RFP # PSUT-17-09 “Booster Stations Disinfection System Improvements”

Solicitations may be obtained from the City of Pembroke Pines website at <http://www.ppines.com/index.aspx?NID=667> and on the www.BidSync.com website.

If you have any problems downloading the solicitation, please contact the BidSync Support line at 1-800-990-9339.

If additional information help is needed with downloading the solicitation package please contact the Purchasing Office at (954) 518-9020 or by email at purchasing@ppines.com. The Purchasing Office hours are between 7:00 a.m. - 6:00 p.m. on Monday through Thursday and is located at 8300 South Palm Drive, Pembroke Pines, Florida 33025.

The City requires all questions relating to the solicitation be entered through the “Ask a Question” option tab available on the BidSync website. Responses to the questions will be provided online at www.bidsync.com. Such request must be received by the “Question Due Date” stated in the solicitation. The issuance of a response via BidSync is considered an Addendum and shall be the only official method whereby such an interpretation or clarification will be made.

Proposals will be accepted until 2:00 p.m., Tuesday, December 05, 2017. Proposals must be **submitted electronically at www.BidSync.com**. The sealed electronic proposals will be publicly opened at 2:30 p.m. by the City Clerk’s Office, in the City Hall Administration Building, 4th Floor Conference Room located at 601 City Center Way, Pembroke Pines, Florida, 33025.

1.2 PURPOSE

The City of Pembroke Pines is seeking proposals from qualified firms, hereinafter referred to as the Contractor, to provide improvements to Booster Stations’ Disinfection System at Academic Village, 17189 Sheridan Street, Pembroke Pines, FL 33331 and also Holly Lakes, 21800 NW 8th Place, Pembroke Pines, FL 33029 , in accordance with the terms, conditions, and specifications contained in this solicitation.

1.3 BACKGROUND

Additional disinfectant may be added to the water in the distribution system in order to maintain the Florida Department of Health (FDOH) required disinfectant residual. This is accomplished



by adding liquid sodium hypochlorite (bleach) and the amount is controlled by measuring the disinfectant residual in the system. This is performed at both of the Holly Lake and Academic Village ground storage tank pumping facilities. Currently, temporary systems are installed and a permanent system is required to be installed by the FDOH.

1.4 SCOPE OF WORK

The following is a general list of the work included. It is not intended to be complete. Consult the attached contract drawings and technical specifications for all contract requirements.

A. Academic Village Booster Station

1. The construction and installation of one bulk-liquid sodium hypochlorite disinfection system, interconnecting influent and effluent disinfection piping, chemical injection points, and related appurtenances (e.g., valves, fittings, and connections to existing lines).
2. The installation of field instruments, controls, and electrical components necessary to provide a complete and properly functioning system. This portion of the project shall include excavation and backfilling of areas as necessary for installation of underground piping and components.

B. Holly Lakes Booster Station

1. The construction and installation of one bulk-liquid sodium hypochlorite disinfection system, interconnecting influent and effluent disinfection piping, chemical injection points, and related appurtenances (e.g., valves, fittings, and connections to existing lines).
2. The installation of field instruments, controls, and electrical components necessary to provide a complete and properly functioning system. This portion of the project shall include excavation and backfilling of areas as necessary for installation of underground piping and components.
3. Modifications to the interconnecting pipe between Tank No.1 and Tank No. 2 and installation of new yard piping with its related appurtenances.
4. Replacement of altitude valves with fill valves for Tank No. 1 and Tank No. 2.

1.5 PROJECT COST ESTIMATE

Staff estimates this project to cost approximately \$1,250,000.

1.5.1 PERMITS

The City anticipates this project to require the following permits:

Permit	Agency	Cost (or related method of calculation)
Building	City of Pembroke Pines Building Department	1. Construction costs up to \$2,500 (Per structure per trade) \$92.80



	(Calvin, Giordano & Associates, Inc.)	2. Construction costs greater than \$2,500 and up to \$1,000,000 2.83% 3. Construction costs greater than \$1,000,000 and up to \$3,000,000 plus 2.06% of the construction costs over \$1,000,000. \$28,322.05
Engineering	City of Pembroke Pines Engineering Department	Waived.

1.5.2 PERMIT ALLOWANCE

The City shall include a “Permit Allowance” for this project. The Contractor shall obtain all required permits to complete the work, however the City shall utilize the Permit Allowance to reimburse the contractor for the related permit, license, impact or inspection fees. Payments will be made to the contractor based on the actual cost of permits upon submission of paid permit receipts. The City shall not pay for other costs related to obtaining or securing permits.

The City shall determine the amount of the allowance at time of award. The allowance may be based on a specified percent of the proposed project amount and shall be established for the specific project being performed under the contract. This dollar amount shall be shown on the specific project purchase order as a distinct item from the vendor’s overall offer to determine the total potential dollar value of the contract. Any Permit Allowance funds that have not been utilized at the end of the project will remain with the City, if the City Permit fees exceed the allowance indicated, the City will reimburse the contractor the actual amount of City Permit Fees required for project completion.

The City anticipates that a Permit Allowance in the amount of \$50,000 will be allocated for this project.

1.6 PROPOSAL REQUIREMENTS

The following documents will need to be completed, scanned and submitted through www.bidsync.com as part of the bidder’s submittal. The proposer interested in responding to this solicitation must provide the information requested below. Submittals that do not respond completely to all requirements specified herein may be considered non-responsive and eliminated from the process.

1.6.1 Attachment A: Contact Information Form

- a. Attached is contact information form (Attachment A) where the vendor will enter their contact information and complete the proposal checklist. The Contact information form shall be electronically signed by the contact person authorized to represent the contractor. This form must be completed and submitted through



www.bidsync.com as part of the bidder's submittal. The vendor must provide their pricing through the designated lines items listed on the BidSync website.

- b. Please note vendors should be registered on BidSync under the name of the organization that they are operating as and it should match the organization name on the documents that they are submitting and utilizing when responding to the solicitation.
- c. The contact information form should contain an electronic signature of the authorized representative of the Proposer along with the address and telephone number for communications regarding the Proposal.
- d. Proposals by corporations should be executed in the corporate name by the President or other corporate officer accompanied by evidence of authority to sign. The corporate address and state of incorporation must also be shown.
- e. Proposals by partnerships should be executed in the partnership name and signed by a partner whose title and the official address of the partnership must be shown.

1.6.2 Attachment B: Vendor Information Form and a W-9

- a. In addition to the Vendor Information Form, please ensure that you provide the completed W-9 (Rev. December 2014), as previously dated versions of this form will delay the processing of any payments to the awarded vendor.

1.6.3 Attachment C: Non-Collusive Affidavit

1.6.4 Attachment D: Sworn Statement on Public Entity Crimes Form

1.6.5 Attachment E: Local Vendor Preference Certification

- a. If claiming Local Pembroke Pines Vendor Preference, business must attach a current business tax receipt from the City of Pembroke Pines
- b. If claiming Local Broward County Vendor Preference, business must attach a current business tax receipt from Broward County or the city within Broward County where the business resides.
- c. The Local Vendor Preference Certification form must be completed by/for the proposer; the proposer **WILL NOT** qualify for Local Vendor Preference based on their sub-contractors' qualifications.

1.6.6 Attachment F: Veteran Owned Small Business Preference Certification

- a. If claiming Veteran Owned Small Business Preference Certification, business must attach the "Determination Letter" from the United States



Department of Veteran Affairs Center for Verification and Evaluation notifying the business that they have been approved as a Veteran Owned Small Business (VOSB).

- b. The Veteran Owned Small Business Preference Certification form must be completed by/for the proposer; the proposer **WILL NOT** qualify for Veteran Owned Small Business Preference based on their sub-contractors' qualifications.

1.6.7 Attachment G: Equal Benefits Certification Form

1.6.8 Attachment H: Proposer's Completed Qualification Statement

1.6.9 Attachment K: References Form and Supporting Information

- a. Complete **Attachment K: References Form**, providing specific examples of similar contracts delivered by the proposed team members. Provide details on related projects (preferably where the team was the same). References should be from the last five years and should be capable of explaining and confirming your firm's capacity to successfully complete the scope of work outlined herein. As part of the proposal evaluation process, the City may conduct an investigation of references, including a record check or consumer affairs complaints. Proposers' submission of a proposal constitutes acknowledgment of the process and consent to investigate. The City is the sole judge in determining Proposers qualifications. Details should include the following:
 - b. List of ongoing contracts/projects with their current status and projected termination dates

1.6.10 Attachment L: Mandatory Pre-Bid Meeting Form

1.6.11 Attachment N: Vendor Drug-Free Workplace Certification Form

1.6.12 Attachment O: Vendor Certification Regarding Scrutinized Companies List

1.6.13 Proposal Security (Bid Bond Form or Cashier's Check)

- a. Each Proposal must be accompanied by a certified or cashier's check or by a Bid Bond made payable to the City of Pembroke Pines on an approved form, duly executed by the Proposer as principal and having as surety thereon a surety company acceptable to CITY and authorized to write such Bond under the laws of the State of Florida, in an amount not less than five percent (5%) of the amount of the base Proposal price.
- b. Contingency is not to be counted in the total amount the proposal security is based on.



- c. Proposers must submit a scanned copy of their bid security (bid bond form or cashier’s check) with their bid submittal through BidSync.
- d. Proposers must also submit their original bid security (bid bond form or cashier’s check) at time of the bid due date, or they may be deemed as non-responsive.
- e. The original Bid Bond or Cashier's Check should be in a sealed envelope, plainly marked “**BID SECURITY - IFB # PSUT-17-09 Booster Stations Disinfection System Improvements**” and sent to the City of Pembroke Pines, City Clerk's Office, 4th Floor, 601 City Center Way, Pembroke Pines, Florida, 33025.
- f. Please see SECTION 4 - SPECIAL TERMS & CONDITIONS of this IFB for additional information.

1.7 EVALUATION OF PROPOSALS & PROCESS OF SELECTION

- A. Staff will evaluate all responsive proposals received from proposers who meet or exceed the bid requirements contained in the solicitation. Evaluations shall be based upon the information contained in the proposals as submitted.
- B. Staff will make a recommendation to the City Commission for award of contract.

1.8 TENTATIVE SCHEDULE OF EVENTS

Event	Time &/or Date
Issuance of Solicitation (Posting Date)	November 07, 2017
Mandatory Pre-Bid Meeting	3:00 p.m. on November 16, 2017
Question Due Date	November 20, 2017
Anticipated Date of Issuance for the Addenda with Questions and Answers	November 23, 2017
Proposals will be accepted until	2:00 p.m. on December 05, 2017
Proposals will be opened at	2:30 p.m. on December 05, 2017
Evaluation of Proposals by Staff	TBD
Recommendation of Contractor to City Commission award	TBD
Issuance of Notice to Proceed	TBD
Project Commencement	Not later than 10 days after NTP
Project Completion	270 days after NTP



1.8.1 MANDATORY PRE-BID MEETING / SITE VISIT

There will be a mandatory scheduled pre-bid meeting and site visit on **November 16, 2017 at 3:00 p.m.** Meeting location will be at **8300 S. Palm Drive, Pembroke Pines, FL 33025.**

All vendors will be required to complete **Attachment L "Mandatory Pre-Bid Meeting Form"** at the meeting and submit it as part of their proposal to show proof of attendance to the mandatory meeting.

1.9 SUBMISSION REQUIREMENTS

Bids/proposals **must be submitted electronically** at www.bidsync.com **on or before 2:00 p.m. on December 05, 2017.**

Please note vendors should be registered on BidSync under the name of the organization that they are operating as and it should match the organization name on the documents that they are submitting and utilizing when responding to the solicitation.

The vendor must provide their pricing through the designated lines items listed on the BidSync website. In addition, the vendor must complete any webforms on the BidSync website and provide any additional information requested throughout this solicitation. Any additional information requested in the solicitation should be scanned and uploaded. **Unless otherwise specified, the City requests for vendors to upload their documents as one (1) PDF document in the order that is outline in the bid package.**

The City recommends for proposers to submit their proposals as soon as they are ready to do so. Please allow ample time to submit your proposals on the BidSync website. Proposals may be modified or withdrawn prior to the deadline for submitting Proposals. BidSync Support is happy to help you with submitting your proposal and to ensure that you are submitting your proposals correctly, but we ask that you contact their support line at 1-800-990-9339 with ample time before the bid closing date and time.

PLEASE DO NOT SUBMIT ANY PROPOSALS VIA MAIL, E-MAIL OR FAX.

However, please note that any required Bid Bond or Cashier's Check should be in a sealed envelope, plainly marked "**BID SECURITY - IFB # PSUT-17-09 Booster Stations Disinfection System Improvements**" and sent to the City of Pembroke Pines, City Clerk's Office, 4th Floor, 601 City Center Way, Pembroke Pines, Florida, 33025.



SECTION 2 - INSURANCE REQUIREMENTS

The CONTRACTOR shall indemnify and hold harmless the CITY and its officers, employees, agents and instrumentalities from any and all liability, losses or damages, including attorneys' fees and costs of defense, which the CITY or its officers, employees, agents or instrumentalities may incur as a result of claims, demands, suits, causes of actions or proceedings of any kind or nature arising out of, relating to or resulting from the performance of this Agreement by the CONTRACTOR or its employees, agents, servants, partners principals or subcontractors. The CONTRACTOR shall pay all claims and losses in connection therewith and shall investigate and defend all claims, suits or actions of any kind or nature in the name of the CITY, where applicable, including appellate proceedings, and shall pay all costs, judgments, and attorney's fees which may issue thereon. The CONTRACTOR expressly understands and agrees that any insurance protection required by this Agreement or otherwise provided by the CONTRACTOR shall in no way limit the responsibility to indemnify, keep and save harmless and defend the CITY or its officers, employees, agents and instrumentalities as herein provided.

CONTRACTOR shall not commence work under this Agreement until it has obtained all insurance required under this paragraph and such insurance has been approved by the Risk Manager of the CITY nor shall the CONTRACTOR allow any subcontractor to commence work on his subcontract until all similar such insurance required of the subcontractor has been obtained and similarly approved.

CERTIFICATES OF INSURANCE, reflecting evidence of the required insurance, shall be filed with the City's Risk Manager prior to the commencement of this Agreement. Policies shall be issued by companies authorized to do business under the laws of the State of Florida. The insurance company shall be rated no less than "A" as to management, and no less than "Class VI" as to financial strength according to the latest edition of Best's Insurance Guide published by A.M. Best Company.

Policies shall be endorsed to provide the CITY thirty (30) days' notice of cancellation, material change or non-renewal of policies required under the contract. If the carrier will not agree to this notification, the CONTRACTOR or its insurance broker shall notify the CITY of any cancellation or reduction in coverage within seven days of receipt of insurer's notification of cancellation or reduction in coverage.

Insurance shall be in force until all obligations required to be fulfilled under the terms of the Agreement are satisfactorily completed as evidenced by the formal acceptance by the CITY. In the event the insurance certificate provided indicates that the insurance shall terminate and lapse during the period of this Agreement, then in that event, the CONTRACTOR shall furnish, at least fifteen (15) days prior to the expiration of the date of such insurance, a renewed certificate of insurance as proof that equal and like coverage for the balance of the period of the Agreement and extension thereunder is in effect. The CONTRACTOR shall not commence nor continue to provide any services pursuant to this Agreement unless all required insurance remains in full force and effect. CONTRACTOR shall be liable to CITY for any lapses in service resulting from a gap in insurance coverage.

The insurance requirements specified in this Agreement are minimum requirements and in no way reduce any liability the CONTRACTOR has assumed in the indemnification/hold harmless section(s) of this Agreement.



2.1 REQUIRED INSURANCE

A. COMMERCIAL GENERAL LIABILITY INSURANCE including, but not limited to: coverage for premises & operations, personal & advertising injury, products & completed operations, Liability assumed under an Insured Contract (including tort liability of another assumed in a business contract), and independent contractors. Coverage must be written on an occurrence basis, with limits of liability no less than:

1. Each Occurrence Limit - \$1,000,000
2. Fire Damage Limit (Damage to rented premises) - \$100,000
3. Personal & Advertising Injury Limit - \$1,000,000
4. General Aggregate Limit - \$2,000,000
5. Products & Completed Operations Aggregate Limit - \$2,000,000 (**mostly for construction or equipment sold to the CITY**)

Products & Completed Operations Coverage shall be maintained for two (2) years after the final payment under this contract. (Increase to 10 years for construction projects) (For construction projects also include: Designated Construction Project(s) General Aggregate Limit)

The City of Pembroke Pines must be shown as an additional insured with respect to this coverage. City's Additional Insured status shall extend to any coverage beyond the minimum requirements for limits of liability found herein.

B. WORKERS' COMPENSATION AND EMPLOYERS LIABILITY INSURANCE covering all employees, and/or volunteers of the CONTRACTOR engaged in the performance of the scope of work associated with this Agreement. In the case any work is sublet, the CONTRACTOR shall require the subcontractors similarly to provide Workers Compensation Insurance for all the latter's employees unless such employees are covered by the protection afforded by the CONTRACTOR. Coverage for the CONTRACTOR and his subcontractors shall be in accordance with applicable state and/or federal laws that may apply to Workers' Compensation Insurance with limits of liability no less than:

1. Workers' Compensation : Coverage A – Statutory
2. Employers Liability: Coverage B \$500,000 Each Accident
\$500,000 Disease – Policy Limit
\$500,000 Disease – Each Employee

If CONTRACTOR claims to be exempt from this requirement, CONTRACTOR shall provide CITY proof of such exemption along with a written request for CITY to exempt CONTRACTOR, written on CONTRACTOR letterhead.

Coverage shall be included for injuries or claims under the USL&H or Jones Act, when applicable.

C. AUTO LIABILITY INSURANCE covering all owned, leased, hired, non-owned and employee non-owned vehicles used in connection with the performance of work under this



Agreement, with a combined single limit of liability for bodily injury and property damage no less than:

1. Any Auto (Symbol 1)
Combined Single Limit (Each Accident) - \$1,000,000
2. Hired Autos (Symbol 8)
Combined Single Limit (Each Accident) - \$1,000,000
3. Non-Owned Autos (Symbol 9)
Combined Single Limit (Each Accident) - \$1,000,000

If work under this Agreement includes transportation of hazardous materials, policy shall include pollution liability coverage equivalent to that provided by ISO pollution liability-broadened coverage for auto endorsement CA9948 and the Motor Carrier Act endorsement MCS90.

- D. PROFESSIONAL LIABILITY/ERRORS & OMISSIONS INSURANCE**, when applicable, with a limit of liability no less than \$1,000,000 per wrongful act. This coverage shall be maintained for a period of no less than three (3) years after final payment of the contract. (Increase to 10 years for construction projects)
- E. ENVIRONMENTAL/POLLUTION LIABILITY** shall be required with a limit of no less than \$1,000,000 per wrongful act whenever work under this Agreement involves potential losses caused by pollution conditions. Coverage shall include: Contractor's completed operations as well as sudden and gradual pollution conditions. If coverage is written on a claims-made basis, coverage shall be maintained for a period of no less than three (3) years after final payment of the contract. **The City of Pembroke Pines must be shown as an additional insured with respect to this coverage.** Furthermore, the CITY'S Additional Insured status shall extend to any coverage beyond the minimum requirements for limits of liability found herein.
- F. CYBER LIABILITY including Network Security and Privacy Liability** when applicable, with a limit of liability no less than \$1,000,000 per loss. Coverage shall include liability arising from: theft, dissemination and/or use of confidential information stored or transmitted in electronic form, unauthorized access to, use of, or tampering with computer systems, including hacker attacks or inability of an authorized third party to gain access to your services, including denial of service, and the introduction of a computer virus into, or otherwise causing damage to, a customer's or third person's computer, computer system, network, or similar computer-related property and the data, software and programs thereon. This coverage shall be maintained for a period of no less than three (3) years after final payment of the contract. **The City of Pembroke Pines must be shown as an additional insured with respect to this coverage.** Furthermore, the CITY'S Additional Insured status shall extend to any coverage beyond the minimum requirements for limits of liability found herein.
- G. CRIME COVERAGE** when applicable, shall include employee dishonesty, forgery or alteration, and computer fraud in an amount of no less than \$1,000,000 per loss. If Contractor is physically located on the City's premises, a third-party fidelity coverage extension shall apply.
- H. BUILDER'S RISK INSURANCE** shall be "All Risk" for one hundred percent (100%) of the completed value of the project with a deductible of not more than five percent (5%)



for Named Windstorm and \$20,000 per claim for all other perils. The Builder's Risk Insurance shall include interests of the CITY, the CONTRACTOR and subcontractors of the project. The CONTRACTOR shall include a separate line item for all costs associated with the Builder's Risk Insurance Coverage for the project. The CITY reserves the right at its sole discretion to utilize the CONTRACTOR'S Builder's Risk Insurance or for the CITY to purchase its own Builder's Risk Insurance for the Project. Prior to the CONTRACTOR purchasing the Builder's Risk insurance for the project, the CONTRACTOR shall allow the CITY the opportunity to analyze the CONTRACTOR'S coverage and determine who shall purchase the coverage. Should the CITY utilize the CONTRACTOR'S Builder's Risk Insurance, the CONTRACTOR shall be responsible for all deductibles. If the CITY chooses to purchase the Builder's Risk Coverage on the project, the CONTRACTOR shall provide the CITY with a change order deduct for all premiums and costs associated with the Builder's Risk insurance in their schedule. Should the CITY choose to utilize the CITY'S Builder's Risk Program, the CITY shall be responsible for the Named Windstorm Deductible and the CONTRACTOR shall be responsible for the All Other Perils Deductible.

- I. **SEXUAL ABUSE** may not be excluded from any policy for Agreements involving any interaction with minors or seniors.

2.2 REQUIRED ENDORSEMENTS

1. The City of Pembroke Pines shall be named as an Additional Insured on each of the General Liability policies required herein
2. Waiver of all Rights of Subrogation against the CITY
3. 30 Day Notice of Cancellation or Non-Renewal to the CITY
4. CONTRACTORS' policies shall be Primary & Non-Contributory
5. All policies shall contain a "severability of interest" or "cross liability" liability clause without obligation for premium payment of the CITY
6. The City of Pembroke Pines shall be named as a Loss Payee on all Property and/or Inland Marine Policies as their interest may appear.

CONTRACTOR shall name the CITY, as an additional insured on each of the General Liability policies required herein and shall hold the CITY, its agents, officers and employees harmless on account of claims for damages to persons, property or premises arising out of the services provided hereunder. Any insurance required of the CONTRACTOR pursuant to this Agreement must also be required by any subcontractor in the same limits and with all requirements as provided herein, including naming the CITY as an additional insured, in any work is subcontracted unless such subcontractor is covered by the protection afforded by the CONTRACTOR and provided proof of such coverage is provided to CITY. The CONTRACTOR and any subcontractors shall maintain such policies during the term of this Agreement.

The CITY reserves the right to require any other additional types of insurance coverage and/or higher limits of liability it deems necessary based on the nature of work being performed under this Contract.



SECTION 3 - GENERAL TERMS & CONDITIONS

3.1 EXAMINATION OF CONTRACT DOCUMENTS

Before submitting a Proposal, each Proposer should (a) consider federal, state and local laws, ordinances, rules and regulations that may in any manner affect cost or performance of the work, (b) study and carefully correlate the Proposer's observations with the Proposal Documents; and (c) notify the Purchasing Manager of all conflicts, errors and discrepancies, if any, in the Proposal Documents.

The Proposer, by and through the submission of a Proposal, agrees that Proposer shall be held responsible for having familiarized themselves with the nature and extent of the work and any local conditions that may affect the work to be done and the services, equipment, materials, parts and labor required.

3.2 CONFLICT OF INSTRUCTIONS

If a conflict exists between the General Conditions and Instructions stated herein and specific conditions and instructions contained in specifications, the specifications shall govern.

3.3 ADDENDA or ADDENDUM

A formal solicitation may require an Addendum to be issued. An addendum in some way may clarify, correct or change the original solicitation (i.e. due date/time, specifications, terms, conditions, line item). Vendors submitting a proposal should check the BidSync website for any addenda issued. Vendors are cautioned not to consider verbal modifications to the solicitation, as the addendum issued through BidSync will be the only official method whereby changes will be made.

3.4 INTERPRETATIONS AND QUESTIONS

If the Proposer is in doubt as to the meaning of any of the Proposal Documents, is of the opinion that the Conditions and Specifications contain errors or contradictions or reflect omissions, or has any question concerning the conditions and specifications, the Proposer shall submit a question for interpretation or clarification. The City requires all questions relating to the solicitation be entered through the “**Ask a Question**” option tab available on the BidSync website. Responses to the questions will be provided online at www.bidsync.com. Such request must be received by the “**Question Due Date**” stated in the solicitation. Questions received after “**Question Due Date**” shall not be answered. Interpretations or clarifications in response to such questions will be issued via BidSync. The issuance of a response via BidSync is considered an Addendum and shall be the only official method whereby such an interpretation or clarification will be made.

BidSync Support is also available to assist proposers with submitting their proposal and to ensure that proposers are submitting their proposals correctly. Proposers should ensure that they contact their BidSync support line at 1-800-990-9339 with ample time before the bid closing date and time.

For all other questions related to this solicitation, please contact the Purchasing Division at purchasing@ppines.com.

3.5 RULES, REGULATIONS, LAWS, ORDINANCES and LICENSES

The awarded contractor shall observe and obey all laws, ordinances, rules, and regulations of the federal, state, and CITY, which may be applicable to the service being provided. The awarded firm shall have or be responsible for obtaining all necessary permits or licenses required, if necessary, in order to provide this service.



Bidder warrants by submittal that prices quoted here are in conformity with the latest federal price guidelines, if any.

3.6 WARRANTIES FOR USAGE

Whenever a bid is sought, seeking a source of supply for a specified time for materials or service, the quantities or usage shown are estimated only. No guarantee or warranty is given or implied by the City as to the total amount that may or may not be purchased from any resulting contracts. These quantities are for bidders information only and will be used for tabulation and presentation of bid.

3.7 BRAND NAMES

If and wherever in the specifications a brand name, make, name of manufacturer, trade name, or vendor catalog number is mentioned, it is for the purpose of establishing a grade or quality of material only. Since the City does not wish to rule out other competition and equal brands or makes, the phrase "OR EQUAL" is added. However, if a product other than that specified is bid, Bidders shall indicate on their proposal and clearly state the proposed substitution and deviation. It is the vendor's responsibility to provide any necessary documentation and samples within their bid submittal to prove that the product is equal to that specified. Such samples are to be furnished before the date of bid opening, unless otherwise specified. Additional evidence in the form of documentation and samples may be requested if the proposed brand is other than that specified. The City retains the right to determine if the proposed brand shall be considered as an approved equivalent or not.

3.8 QUALITY

All materials used for the manufacture or construction of any supplies, materials, or equipment covered by this bid shall be new, the latest model, of the best quality, and

highest grade workmanship, unless otherwise noted.

3.9 SAMPLES

Samples, when requested, must be furnished before, or at the bid opening, unless otherwise specified, and delivered free of expense to the City and if not used in testing or destroyed, will upon request within thirty (30) days of bid award be returned at the bidders expense.

3.10 DEVELOPMENT COSTS

Neither the City nor its representatives shall be liable for any expenses incurred in connection with the preparation, submission or presentation of a Bid in response to this Invitation for Bid. All information in the Bid shall be provided at no cost to the City.

3.11 PRICING

Prices should be stated in units of quantity specified in the bidding specifications. In case of discrepancy in computing the amount of the bid, the unit prices quoted will govern.

Bidder warrants by virtue of bidding that prices, terms, and conditions quoted in his bid will be firm for acceptance for a period of ninety (90) days from date of bid opening unless otherwise stated by the City or bidder.

3.12 DELIVERY POINT

All items shall be delivered F.O.B. destination, and delivery cost and charges included in the bid price. Failure to do so may be cause for rejection of bid.

3.13 TAX EXEMPT STATUS

The City is exempt from Florida Sales and Federal Excise taxes on direct purchase of tangible property.

3.14 CONTRACT TIME

By virtue of the submission of the Proposal, Proposer agrees and fully understands that



the completion time of the work of the Contract is an essential and material condition of the Contract and that time is of the essence. The Successful Proposer agrees that all work shall be prosecuted regularly, diligently and uninterrupted at such rate of progress as will ensure full completion thereof within the time specified. Failure to complete the work within the time period specified shall be considered a default.

In addition, time will be of the essence for any orders placed as a result of this bid. Purchaser reserves the right to cancel such orders, or part thereof, without obligation if delivery is not made at the time(s) or place(s) specified.

3.15 COPYRIGHT OR PATENT RIGHTS

Bidder warrants that there have been no violations of copyrights or patent rights in manufacturing, producing, or selling other goods shipped or ordered as a result of this bid, and seller agrees to hold the purchaser harmless from any and all liability, loss or expense occasioned by such violation.

3.16 PUBLIC ENTITY CRIMES

“A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list.”

The Public Entity Crime Affidavit Form, attached to this solicitation, includes

documentation that shall be executed by an individual authorized to bind the Proposer. The Proposer further understands and accepts that any contract issued as a result of this solicitation shall be either voidable or subject to immediate termination by the City. In the event there is any misrepresentation or lack of compliance with the mandates of Section 287.133 or Section 287.134, respectively, Florida Statutes. The City in the event in such termination, shall not incur any liability to the Bidder for any goods, services or materials furnished.

3.17 CONFLICT OF INTEREST

The award of any contract hereunder is subject to the provisions of Chapter 112, Florida Statutes. Proposers must disclose with their Proposal the name of any officer, director, partner, proprietor, associate or agent who is also an officer or employee of CITY or any of its agencies. Further, all Proposers must disclose the name of any officer or employee of CITY who owns, directly or indirectly, an interest of five percent (5%) or more in the Proposer 's firm or any of its branches or affiliate companies.

3.18 FACILITIES

The City reserves the right to inspect the Bidder's facilities at any time with prior notice.

3.19 ENVIRONMENTAL REGULATIONS

CITY reserves the right to consider Proposer's history of citations and/or violations of environmental regulations in determining a Proposer's responsibility, and further reserves the right to declare a Proposer not responsible if the history of violations warrant such determination. Proposer shall submit with the Proposal, a complete history of all citations and/or violations, notices and dispositions thereof. The non-submission of any such documentation shall be deemed to be an affirmation by the Proposer that there are no citations or violations. Proposer shall notify



CITY immediately of notice of any citation or violation that Proposer may receive after the Proposal opening date and during the time of performance of any contract awarded to Proposers.

3.20 SIGNATURE REQUIRED

All proposals must be signed with the firm name and by an officer or employee having authority to bind the company or firm by his signature. FAILURE TO PROPERLY SIGN PROPOSAL SHALL INVALIDATE SAME, AND IT MAY NOT BE CONSIDERED FOR AWARD.

The individual executing this Bid on behalf of the Company warrant to the City that the Company is authorized to do business in the State of Florida, is in good standing and that Company possesses all of the required licenses and certificates of competency required by the State of Florida and Broward County to provide the goods or perform the services herein described.

The signed bid shall be considered an offer on the part of the bidder or contractor, which offer shall be deemed accepted upon approval by the City Commission of the City of Pembroke Pines and in case of default on the part of the bidder or contractor after such acceptance, the City of Pembroke Pines may take such action as it deems appropriate including legal action for damages or specific performance.

3.21 MANUFACTURER'S CERTIFICATION

The City of Pembroke Pines reserves the right to request from bidder separate manufacturer certification of all statements made in the proposal.

3.22 MODIFICATION OR WITHDRAWAL OF PROPOSAL

The City recommends for proposers to submit their proposals as soon as they are ready to do so. Please allow ample time to submit your proposals on the BidSync

website. Proposals may be modified or withdrawn prior to the deadline for submitting Proposals.

3.23 PUBLIC BID; BID OPENING AND GENERAL EXEMPTIONS

All submittals received by the deadline will be recorded, and will subsequently be publicly opened on the same business day at 2:30 p.m. at the office of the City Clerk, 601 City Center Way, Pembroke Pines, FL.

All Proposals received from Proposers in response to the solicitation will become the property of CITY and will not be returned to the Proposers. In the event of Contract award, all documentation produced as part of the Contract shall become the exclusive property of CITY. Proposers are requested to identify specifically any information contained in their Proposals which they consider confidential and/or proprietary and which they believe to be exempt from disclosure, citing specifically the applicable exempting law.

Pursuant to Section 119.071 of the Florida Statutes, sealed bids, proposals, or replies received by a Florida public agency shall remain exempt from disclosure until an intended decision is announced or until 30 days from the opening, whichever is earlier.

Therefore, bidders will not be able to procure a copy of their competitor's bids until an intended decision is reached or 30 days has elapsed since the time of the bid opening.

However, pursuant to Section 255.0518 of the Florida Statutes, when opening sealed bids that are received pursuant to a competitive solicitation for **construction or repairs on a public building or public work**, the entity shall:

- (a) Open the sealed bids at a public meeting.
- (b) Announce at that meeting the name of each bidder and the price submitted in the bid.



- (c) Make available upon request the name of each bidder and the price submitted in the bid.

For solicitations that are **not** for “**construction or repairs on a public building or public work**” the City shall not reveal the prices submitted in the bids until an intended decision is announced or until 30 days from the opening, whichever is earlier.

3.24 RESERVATIONS FOR REJECTION AND AWARD

The City of Pembroke Pines reserves the right to accept or reject any and all bids or parts of bids, to waive irregularities and technicalities, and to request rebids. The City also reserves the right to award a contract on such items(s) or service(s) the City deems will best serve its interests. All bids shall be awarded to the most responsive/responsible bidder, provided the (City) may for good cause reject any bid or part thereof. It further reserves the right to award a contract on a split order basis, or such combinations as shall best serve the interests of the City unless otherwise specified. No premiums, rebates or gratuities permitted, either with, prior to, or after award. This practice shall result in the cancellation of said award and/or return of items (as applicable) and the recommended removal of bidder from bid list(s).

3.25 BID PROTEST

Any protests or challenges to this competitive procurement shall be governed by Section 35.38 of the City’s Code of Ordinances.

3.26 INDEMNIFICATION

The Successful Proposer shall pay all claims, losses, liens, settlements or judgments of any nature whatsoever in connection with the subsequent indemnifications including, but not limited to, reasonable attorney’s fees (including appellate attorney’s fees) and costs.

CITY reserves the right to select its own legal counsel to conduct any defense in any such proceeding and all costs and fees associated therewith shall be the responsibility of Successful Proposer under the indemnification agreement. Nothing contained herein is intended nor shall it be construed to waive City’s rights and immunities under the common law or Florida Statute 768.28 as amended from time to time.

Additional indemnification requirements may be included under Special Terms and Conditions and/or as part of a specimen contract included in the solicitation package.

General Indemnification: To the fullest extent permitted by laws and regulations, Successful Proposer shall indemnify, defend, save and hold harmless the CITY, its officers, agents and employees, harmless from any and all claims, damages, losses, liabilities and expenses, direct, indirect or consequential arising out of or in consequential arising out of or alleged to have arisen out of or in consequence of the products, goods or services furnished by or operations of the Successful Proposer or his subcontractors, agents, officers, employees or independent contractors pursuant to or in the performance of the Contract.

Patent and Copyright Indemnification: Successful Proposer agrees to indemnify, defend, save and hold harmless the CITY, its officers, agents and employees, from all claims, damages, losses, liabilities and expenses arising out of any alleged infringement of copyrights, patent rights and/or the unauthorized or unlicensed use of any invention, process, material, property or other work manufactured or used in connection with the performance of the Contract, including its use by CITY.

3.27 DEFAULT PROVISION

In the case of default by the bidder or contractor, the City of Pembroke Pines may procure the articles or services from any



other sources and hold the bidder or contractor responsible for any excess costs occasioned or incurred thereby.

The City shall be the sole judge of nonperformance, which shall include any failure on the part of the successful Bidder to accept the Award, to furnish required documents, and/or to fulfill any portion of the contract within the time stipulated. Upon default by the successful Bidder to meet any terms of this agreement, the City will notify the Bidder five (5) days (weekends and holidays excluded) to remedy the default. Failure on the Contractor's part to correct the default within the required five (5) days shall result in the contract being terminated and upon the City notifying in writing the Contractor of its intentions and the effective date of the termination. The following shall constitute default:

- A. Failure to perform the Work required under the contract and/or within the time required or failing to use the subcontractor, entities and personnel as identified and set forth, and to the degree specified in the contract.
- B. Failure to begin the Work under this Bid within the time specified.
- C. Failure to perform the Work with sufficient Workers and equipment or with sufficient materials to ensure timely completion.
- D. Neglecting or refusing to remove materials or perform new Work where prior Work has been rejected as non-conforming with the terms of the contract.
- E. Becoming insolvent, being declared bankrupt, or committing act of bankruptcy or insolvency, or making an assignment renders the successful Bidder incapable of performing the Work in accordance with and as required by the contract.
- F. Failure to comply with any of the terms of the contract in any material respect.

In the event of default of a contract, the successful Bidder shall pay all attorney's fees and court costs incurred in collecting any damages. The successful Bidder shall pay the City for any and all costs incurred in ensuing the completion of the project.

Additional provisions may be included in the specimen contract.

3.28 ACCEPTANCE OF MATERIAL

The material delivered under this proposal shall remain the property of the seller until a physical inspection and actual usage of this material and/or services is made and thereafter accepted to the satisfaction of the City and must comply with the terms herein, and be fully in accord with specifications and of the highest quality. In the event the material and/or services supplied to the City are found to be defective or do not conform to specifications, the City reserves the right to cancel the order upon written notice to the seller and return product to seller at the sellers expense.

3.29 LOCAL GOVERNMENT PROMPT PAYMENT ACT

The City complies with Florida Statute 218.70, Florida Prompt Payment Act.



SECTION 4 - SPECIAL TERMS & CONDITIONS

4.1 PROPOSAL SECURITY

Proposal Security Requirements: Each Proposal must be accompanied by a certified or cashier's check or by a Bid Bond made payable to the City of Pembroke Pines on an approved form, duly executed by the Proposer as principal and having as surety thereon a surety company acceptable to CITY and authorized to write such Bond under the laws of the State of Florida, in an amount not less than five percent (5%) of the amount of the base Proposal price. **Note: Contingency is not to be counted in the total amount the proposal security is based on.**

Proposers must submit a scanned copy of their bid security (bid bond form or cashier's check) with their bid submittal through BidSync. Proposers must also submit their original bid security (bid bond form or cashier's check) at time of the bid due date, or they may be deemed as non-responsive. The original Bid Bond or Cashier's Check should be in a sealed envelope, plainly marked "**BID SECURITY - IFB # PSUT-17-09 Booster Stations Disinfection System Improvements**" and sent to the:

City of Pembroke Pines,
City Clerk's Office, 4th Floor,
601 City Center Way,
Pembroke Pines, FL 33025.

Successful Proposer: The Proposal Security of the Successful Proposer will be retained until such Proposer has executed the Contract and furnished the required insurance, payment and performance bonds, whereupon the Proposal Security will be returned. If the Successful Proposer fails to execute and deliver the Contract and furnish the required insurance and bonds within fifteen (15) calendar days of the Notice of Award, CITY may annul the Notice of Award

and the entire sum of the Proposal Security shall be forfeited.

Three Lowest Proposers: The Proposal Security of the three (3) lowest Proposers will be returned within seven (7) calendar days after CITY and the Successful Proposer have executed the written Contract or if no such written Contract is executed within ninety (90) calendar days after the date of the Proposal opening, upon the demand of any Proposer at any time thereafter, provided that he has not been notified of the acceptance of his Proposal.

All Other Proposers: Proposal Security of all other Proposer will be returned within seven (7) calendar days after the proposal opening. The agent or attorney in fact or other officer who signs a Bid Bond for a surety company must file with such bond a certified copy of his power of attorney authorizing him to do so.

4.2 PAYMENT AND PERFORMANCE BONDS

Within fifteen (15) calendar days after Notice of Award and in any event prior to commencing work, the Contractor shall execute and furnish to City a performance bond and a payment bond, each written by a corporate surety, having a resident agent in the State of Florida and having been in business with a record of successful continuous operation for at least five (5) years. The surety shall hold a current certificate of authority from the Secretary of Treasury of the United States as an acceptable surety on federal bonds in accordance with United States Department of Treasury Circular No. 570. If the amount of the Bond exceeds the underwriting limitation set forth in the circular, in order to qualify, the net retention of the surety company shall not exceed the underwriting limitation in the circular and the excess risks must be protected by coinsurance, reinsurance, or other methods, in accordance with Treasury Circular 297,



revised September 1, 1978 (31DFR, Section 223.10, Section 223.11). Further, the surety company shall provide City with evidence satisfactory to City, that such excess risk has been protected in an acceptable manner. The surety company shall have at least the following minimum qualification in accordance with the latest edition of A.M. Best's Insurance Guide, published by Alfred M. Best Company, Inc., Ambest Road, Oldwick, New Jersey 08858:

B+ to A+

Two (2) separate bonds are required and both must be approved by the City. **The penal sum stated in each bond shall be 100% of the contract price, not including contingency.** The performance bond shall be conditioned that the Contractor performs the contract in the time and manner prescribed in the contract. The payment bond shall be conditioned that the Contractor promptly make payments to all persons who supply the Contractor with labor, materials and supplies used directly or indirectly by the Contractor in the prosecution of the work provided for in the Contract and shall provide that the surety shall pay the same in the amount not exceeding the sum provided in such bonds, together with interest at the maximum rate allowed by law; and that they shall indemnify and save harmless the City to the extent of any and all payments in connection with the carrying out of said Contract which the City may be required to make under the law.

Pursuant to the requirements of Section 255.05(1)(a), Florida Statutes, it shall be the duty of the Contractor to record the aforesaid payment and performance bonds in the public records of Broward County, with the Contractor to pay all recording costs.

4.3 OWNER'S CONTINGENCY

While the specifications contained in this solicitation and any ensuing Purchase Orders or contracts have incorporated all

anticipated work to be accomplished, there may be unanticipated work required of the vendor in conjunction with a specific project. For this reason, the City Commission may award a project with an "Owner's Contingency". This contingency or allowance authorizes the City execute change orders up to the amount of the contingency without the need to obtain additional Commission approval. The Owner's Contingency is usually based on a specified percent of the proposed project amount and is established for the specific project being performed under the contract. This dollar amount shall be shown on the specific project purchase order as a distinct item from the vendor's overall offer to determine the total potential dollar value of the contract. It is hereby understood and agreed that the vendor shall not expend any dollars in connection with the Owner's Contingency without the expressed prior approval of the City's authorized representative. Any Owner's Contingency funds that have not been utilized at the end of the project will remain with the Owner, the contractor shall only be paid for the proposed project cost as approved by the City Commission along with any Owner Contingency expenses that were approved by the City's authorized representative.

4.4 TAX SAVER PROGRAM

The Contractor shall cooperate on certain projects to allow the City to avail itself of a sales tax savings program.

4.5 RELEASE OF LIEN

Contractor must provide an executed Partial/Final Release of Lien utilizing the City's standard Release of Lien Form in order for the City to release any payments to the Contractor.



CONTACT INFORMATION FORM

IN ACCORDANCE WITH “IFB # PSUT-17-09” dated **November 1, 2017** titled “**Booster Stations Disinfection System Improvements**” attached hereto as a part hereof, the undersigned submits the following:

A) Contact Information

The Contact information form shall be electronically signed by one duly authorized to do so, and in case signed by a deputy or subordinate, the principal's properly written authority to such deputy or subordinate must accompany the proposal. This form must be completed and submitted through www.bidsync.com as part of the bidder's submittal. The vendor must provide their pricing through the designated lines items listed on the BidSync website.

COMPANY INFORMATION:

COMPANY:

STREET ADDRESS:

CITY, STATE & ZIP CODE:

PRIMARY CONTACT FOR THE PROJECT:

NAME: TITLE:

E-MAIL:

TELEPHONE: FAX:

AUTHORIZED APPROVER:

NAME: TITLE:

E-MAIL:

TELEPHONE: FAX:

SIGNATURE:

B) Proposal Checklist

Are all materials, freight, labor and warranties included? Yes

Did you submit the Proposal Security/Bid Bonds as required in Section 4.1 of the bid package? No Yes

C) Sample Proposal Form

The following sample price proposal is for information only. The vendor must provide their pricing through the designated lines items listed on the BidSync website.

A) HOLLY LAKE AND ACADEMIC VILLAGE BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS

Item #	Product Description	Estimated Quantity	Unit	Unit Price
1.01	General Requirements (Temporary Facilities, bonds and insurance)	1	LS	Price to be Submitted Via BidSync
1.02	Mobilization / Demobilization	1	LS	Price to be Submitted Via BidSync
1.03	Testing & Survey	1	LS	Price to be Submitted Via BidSync
1.04	Prevention, control and abatement of erosion and water pollution	1	LS	Price to be Submitted Via BidSync
1.05	Trench Safety Act Compliance	1	LS	Price to be Submitted Via BidSync

B) HOLLY LAKE BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS

Item #	Product Description	Estimated Quantity	Unit	Per Unit Cost
2.01	Site Work	1	LS	Price to be Submitted Via BidSync
2.02	Structural Work	1	LS	Price to be Submitted Via BidSync
2.03	Mechanical Work	1	LS	Price to be Submitted Via BidSync
2.04	Electrical Work	1	LS	Price to be Submitted Via BidSync
2.05	Instrumentation and Controls Work	1	LS	Price to be Submitted Via BidSync

C) ACADEMIC VILLAGE BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS

Item #	Product Description	Estimated Quantity	Unit	Per Unit Cost
3.01	Site Work	1	LS	Price to be Submitted Via BidSync
3.02	Structural Work	1	LS	Price to be Submitted Via BidSync
3.03	Mechanical Work	1	LS	Price to be Submitted Via BidSync
3.04	Electrical Work	1	LS	Price to be Submitted Via BidSync
3.05	Instrumentation and Controls Work	1	LS	Price to be Submitted Via BidSync

D) MISCELLANEOUS

Item #	Product Description	Estimated Quantity	Unit	Per Unit Cost
4.01	Permitting Allowance	1	AL	\$50,000.00



(OFFICE USE ONLY) Vendor number:

Please complete this vendor information form entirely along with the IRS Form W-9, scan and upload it to the www.bidsync.com

Vendor Information Form

Operating Name (Payee)			
Legal Name (as filed with IRS)			
Remit-to Address (For Payments)			
Remit-to Contact Name:		Title:	
Email Address:			
Phone #:		Fax #	
Order-from Address (For purchase orders)			
Order-from Contact Name:		Title:	
Email Address:			
Phone #:		Fax #	
Return-to Address (For product returns)			
Return-to Contact Name		Title:	
Email Address:			
Phone #:		Fax #	
Payment Terms:			

Type of Business (please check one and provide Federal Tax identification or social security Number)

- | | | |
|--|-----------------------------|----------------------|
| <input type="checkbox"/> Corporation | Federal ID Number: | <input type="text"/> |
| <input type="checkbox"/> Sole Proprietorship/Individual | Social Security No.: | <input type="text"/> |
| <input type="checkbox"/> Partnership | | |
| <input type="checkbox"/> Health Care Service Provider | | |
| <input type="checkbox"/> LLC – C (C corporation) – S (S corporation) – P (partnership) | | |
| <input type="checkbox"/> Other (Specify): | <input type="text"/> | |

Name of Applicant / Signature _____

Title of Applicant _____ **Date** _____

Request for Taxpayer Identification Number and Certification

**Give Form to the
 requester. Do not
 send to the IRS.**

Print or type See Specific Instructions on page 2.	1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.	
	2 Business name/disregarded entity name, if different from above	
	3 Check appropriate box for federal tax classification; check only one of the following seven boxes: <input type="checkbox"/> Individual/sole proprietor or single-member LLC <input type="checkbox"/> C Corporation <input type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate <input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶ _____ Note. For a single-member LLC that is disregarded, do not check LLC; check the appropriate box in the line above for the tax classification of the single-member owner. <input type="checkbox"/> Other (see instructions) ▶ _____	
	4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3): Exempt payee code (if any) _____ Exemption from FATCA reporting code (if any) _____ <i>(Applies to accounts maintained outside the U.S.)</i>	
	5 Address (number, street, and apt. or suite no.)	
	Requester's name and address (optional)	
	6 City, state, and ZIP code	
7 List account number(s) here (optional)		

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the instructions for line 1 and the chart on page 4 for guidelines on whose number to enter.

Social security number									
-				-					
or									
Employer identification number									
-									

Part II Certification

Under penalties of perjury, I certify that:

- The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
- I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
- I am a U.S. citizen or other U.S. person (defined below); and
- The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

Sign Here	Signature of U.S. person ▶	Date ▶
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General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. Information about developments affecting Form W-9 (such as legislation enacted after we release it) is at www.irs.gov/fw9.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following:

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)

- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
 - Form 1099-C (canceled debt)
 - Form 1099-A (acquisition or abandonment of secured property)
- Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.
- If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding? on page 2.*
- By signing the filled-out form, you:
- Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
 - Certify that you are not subject to backup withholding, or
 - Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
 - Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting?* on page 2 for further information.

Note. If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States:

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.
4. The type and amount of income that qualifies for the exemption from tax.
5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,
2. You do not certify your TIN when required (see the Part II instructions on page 3 for details),

3. The IRS tells the requester that you furnished an incorrect TIN,

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code* on page 3 and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships* above.

What is FATCA reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code* on page 3 and the Instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of \$50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a \$500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account, list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

Note. ITIN applicant: Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or "doing business as" (DBA) name on line 2.

c. **Partnership, LLC that is not a single-member LLC, C Corporation, or S Corporation.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulations section 301.7701-2(c)(2)(iii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, "Business name/disregarded entity name." If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

Line 3

Check the appropriate box in line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box in line 3.

Limited Liability Company (LLC). If the name on line 1 is an LLC treated as a partnership for U.S. federal tax purposes, check the "Limited Liability Company" box and enter "P" in the space provided. If the LLC has filed Form 8832 or 2553 to be taxed as a corporation, check the "Limited Liability Company" box and in the space provided enter "C" for C corporation or "S" for S corporation. If it is a single-member LLC that is a disregarded entity, do not check the "Limited Liability Company" box; instead check the first box in line 3 "Individual/sole proprietor or single-member LLC."

Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space in line 4 any code(s) that may apply to you.

Exempt payee code.

- Generally, individuals (including sole proprietors) are not exempt from backup withholding.
- Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.
- Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.
- Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

- 1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)
- 2—The United States or any of its agencies or instrumentalities
- 3—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities
- 4—A foreign government or any of its political subdivisions, agencies, or instrumentalities
- 5—A corporation
- 6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession
- 7—A futures commission merchant registered with the Commodity Futures Trading Commission
- 8—A real estate investment trust
- 9—An entity registered at all times during the tax year under the Investment Company Act of 1940
- 10—A common trust fund operated by a bank under section 584(a)
- 11—A financial institution
- 12—A middleman known in the investment community as a nominee or custodian
- 13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over \$600 required to be reported and direct sales over \$5,000 ¹	Generally, exempt payees 1 through 5 ²
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

¹ See Form 1099-MISC, Miscellaneous Income, and its instructions.

² However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 581

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

Note. You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited Liability Company (LLC)* on this page), enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at www.ssa.gov. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at www.irs.gov/businesses and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting IRS.gov or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, or 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code* earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below.

- 1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983.** You must give your correct TIN, but you do not have to sign the certification.
- 2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983.** You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.
- 3. Real estate transactions.** You must sign the certification. You may cross out item 2 of the certification.
- 4. Other payments.** You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).
- 5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions.** You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account ¹
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor ²
4. a. The usual revocable savings trust (grantor is also trustee) b. So-called trust account that is not a legal or valid trust under state law	The grantor-trustee ¹ The actual owner ¹
5. Sole proprietorship or disregarded entity owned by an individual	The owner ³
6. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A))	The grantor*
For this type of account:	Give name and EIN of:
7. Disregarded entity not owned by an individual	The owner
8. A valid trust, estate, or pension trust	Legal entity ⁴
9. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
10. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
11. Partnership or multi-member LLC	The partnership
12. A broker or registered nominee	The broker or nominee
13. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
14. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i)(B))	The trust

¹ List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

² Circle the minor's name and furnish the minor's SSN.

³ You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

⁴ List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships* on page 2.

*Note. Grantor also must provide a Form W-9 to trustee of trust.

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Publication 4535, Identity Theft Prevention and Victim Assistance.

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to phishing@irs.gov. You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at: spam@uce.gov or contact them at www.ftc.gov/idtheft or 1-877-IDTHEFT (1-877-438-4338).

Visit IRS.gov to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

**NON-COLLUSIVE AFFIDAVIT**

BIDDER is the _____,

(Owner, Partner, Officer, Representative or Agent)

BIDDER is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;

Such Bid is genuine and is not a collusive or sham Bid;

Neither the said BIDDER nor any of its officers, partners, owners, agents, representative, employees or parties in interest, including this affidavit, have in any way colluded, conspired, connived or agreed, directly or indirectly, with any other BIDDER, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted; or to refrain from bidding in connection with such Contract; or have in any manner, directly or indirectly, sought by agreement or collusion, or communications, or conference with any BIDDER, firm, or person to fix the price or prices in the attached Bid or any other BIDDER, or to fix any overhead, profit, or cost element of the Bid Price or the Bid Price of any other BIDDER, or to secure through any collusion conspiracy, connivance, or unlawful agreement any advantage against (Recipient), or any person interested in the proposed Contract;

The price of items quoted in the attached Bid are fair and proper and are not tainted by collusion, conspiracy, connivance, or unlawful agreement on the part of the BIDDER or any other of its agents, representatives, owners, employees or parties in interest, including this affidavit.

Printed Name/Signature

Title

Name of Company



**SWORN STATEMENT
ON PUBLIC ENTITY CRIMES
UNDER FLORIDA STATUTES CHAPTER 287.133(3)(a).**

1. This sworn statement is submitted _____ (name of entity submitting sworn statement) whose business address is _____ and (if applicable) its Federal Employer Identification Number (FEIN) is _____. (If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement: _____.)
2. My name is _____ and my _____ (Please print name of individual signing) relationship to the entity named above is _____.
3. I understand that a "public entity crime" as defined in Paragraph 287.133(1)(g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or with the United States, including, but not limited to, any bid, proposal, reply, or contract for goods or services, any lease for real property, or any contract for the construction or repair of a public building or public work, involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.
4. I understand that a "convicted" or "conviction" as defined in Paragraph 287.133(1)(b), Florida Statutes, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.
5. I understand that an "affiliate" as defined in Paragraph 287.133(1)(a), Florida Statutes, means:
 1. A predecessor or successor of a person convicted of a public entity crime: or
 2. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The Cityship by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.
6. I understand that a "person" as defined in Paragraph 287.133(1)(e), Florida Statutes, means any natural person or any entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts let by a public entity, or which otherwise transacts or applies to transact business with a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders,

employees, members, and agents who are active in management of an entity.

7. Based on information and belief, the statement which I have marked below is true in relation to the entity submitting this sworn statement. **(Please indicate which statement applies.)**

A) Neither the entity submitting this sworn statement, nor any officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, nor any affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989.

B) The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989, AND **(Please indicate which additional statement applies.)**

B1) There has been a proceeding concerning the conviction before a hearing officer of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer did not place the person or affiliate on the convicted vendor list. **(Please attach a copy of the final order.)**

B2) The person or affiliate was placed on the convicted vendor list. There has been a subsequent proceeding before a hearing officer of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer determined that it was in the public interest to remove the person or affiliate from the convicted vendor list. **(Please attach a copy of the final order.)**

B3) The person or affiliate has not been placed on the convicted vendor list. **(Please describe any action taken by or pending with the Department of General Services.)**

Bidder's Name/Signature

Company

Date



LOCAL VENDOR PREFERENCE CERTIFICATION

SECTION 1 GENERAL TERM

LOCAL PREFERENCE

The evaluation of competitive bids is subject to section 35.36 of the City's Procurement Procedures which, except where contrary to federal and state law, or any other funding source requirements, provides that preference be given to local businesses. To satisfy this requirement, the vendor shall affirm in writing its compliance with either of the following objective criteria as of the bid or proposal submission date stated in the solicitation. A local business shall be defined as:

1. "Local Pembroke Pines Vendor" shall mean a business entity which has maintained a permanent place of business with full-time employees within the City limits for a minimum of one (1) year prior to the date of issuance of a bid or proposal solicitation. The permanent place of business may not be a post office box. The business location must actually distribute goods or services from that location. In addition, the business must have a current business tax receipt from the City of Pembroke Pines.

OR;

2. "Local Broward County Vendor" shall mean or business entity which has maintained a permanent place of business with full-time employees within the Broward County limits for a minimum of one (1) year prior to the date of issuance of a bid or proposal solicitation. The permanent place of business may not be a post office box. The business location must actually distribute goods or services from that location. In addition, the business must have a current business tax receipt from the Broward County or the city within Broward County where the business resides.

A preference of five percent (5%) of the total evaluation point, or five percent (5%) of the total price, shall be given to the **Local Pembroke Pines Vendor(s)**; A preference of two and a half percent (2.5%) of the total evaluation point for local, or two and a half percent (2.5%) of the total price, shall be given to the **Local Broward County Vendor(s)**.

COMPARISON OF QUALIFICATIONS

The preferences established in no way prohibit the right of the City to compare quality of supplies or services for purchase and to compare qualifications, character, responsibility and fitness of all persons, firms or corporations submitting bids or proposals. Further, the preference established in no way prohibit the right of the city from giving any other preference permitted by law instead of the preferences granted, nor prohibit the city to select the bid or proposal which is the most responsible and in the best interests of the city.

SECTION 2 AFFIRMATION

LOCAL PREFERENCE CERTIFICATION:

Place a check mark here only if affirming bidder meets requirements above as a Local Pembroke Pines Vendor.

In addition, the business must attach a current business tax receipt from the City of Pembroke Pines along with any previous business tax receipts to indicate that the business entity has maintained a permanent place of business for a minimum of one (1) year.

Place a check mark here only if affirming bidder meets requirements above as a Local Broward County Vendor.

In addition, the business must attach a current business tax receipt from the Broward County or the city within Broward County where the business resides along with any previous business tax receipts to indicate that the business entity has maintained a permanent place of business for a minimum of one (1) year.

Place a check mark here only if affirming bidder does not meet the requirements above as a Local Vendor.

Failure to complete this certification at this time (by checking either of the boxes above) shall render the vendor ineligible for Local Preference. This form must be completed by/for the proposer; the proposer WILL NOT qualify for Local Vendor Preference based on their sub-contractors' qualifications.

COMPANY NAME:

PRINTED NAME / AUTHORIZED SIGNATURE:



VETERAN OWNED SMALL BUSINESS (VOSB) PREFERENCE CERTIFICATION

SECTION 1 GENERAL TERM

VETERAN OWNED SMALL BUSINESS (VOSB) PREFERENCE

The evaluation of competitive bids is subject to section 35.37 of the City's Procurement Procedures which, except where contrary to federal and state law, or any other funding source requirements, provides that preference be given to veteran owned small businesses. To satisfy this requirement, the vendor shall affirm in writing its compliance with the following objective criteria as of the bid or proposal submission date stated in the solicitation. A veteran owned small business shall be defined as:

1. "Veteran Owned Small Business" shall mean a business entity which has received a "Determination Letter" from the United States Department of Veteran Affairs Center for Verification and Evaluation notifying the business that they have been approved as a Veteran Owned Small Business (VOSB).

A preference of two and a half percent (2.5%) of the total evaluation point, or two and a half percent (2.5%) of the total price, shall be given to the **Veteran Owned Small Business (VOSB)**. This shall mean that if a **VOSB** submits a bid/quote that is within 2.5% of the lowest price submitted by any vendor, the **VOSB** shall have an option to submit another bid which is at least 1% lower than the lowest responsive bid/quote. If the **VOSB** submits a bid which is at least 1% lower than that lowest responsive bid/quote, then the award will go to the **VOSB**. If not, the award will be made to the vendor that submits the lowest responsive bid/quote. If the lowest responsive and responsible bidder IS a "**Local Pembroke Pines Vendor**" (**LPPV**) or a "**Local Broward County Vendor**" (**LBCV**) as established in Section 35.36 of the City's Code of Ordinances, entitled "Local Vendor Preference", then the award will be made to that vendor and no other bidders will be given an opportunity to submit additional bids as described herein.

If there is a **LPPV**, a **LBCV**, and a **VOSB** participating in the same bid solicitation and all three vendors qualify to submit a second bid, the **LPPV** will be given first option. If the **LPPV** cannot beat the lowest bid received by at least 1%, an opportunity will be given to the **LBCV**. If the **LBCV** cannot beat the lowest bid by at least 1%, an opportunity will be given to the **VOSB**. If the **VOSB** cannot beat the lowest bid by at least 1%, then the bid will be awarded to the lowest bidder.

If multiple **VOSBs** submit bids/quotes which are within 2.5% of the lowest bid/quote and there are no **LPPV** or **LBCV** as described in Section 35.36 of the City's Code of Ordinance, entitled "Local Vendor Preference", then all **VOSBs** will be asked to submit a **Best and Final Offer (BAFO)**. The award will be made to the **VOSB** submitting the lowest **BAFO** providing that that **BAFO** is at least 1% lower than the lowest bid/quote received in the original solicitation. If no **VOSB** can beat the lowest bid/quote by at least 1%, then the award will be made to the lowest responsive bidder.

COMPARISON OF QUALIFICATIONS

The preferences established in no way prohibit the right of the City to compare quality of supplies or services for purchase and to compare qualifications, character, responsibility and fitness of all persons, firms or corporations submitting bids or proposals. Further, the preference established in no way prohibit the right of the city from giving any other preference permitted by law instead of the preferences granted, nor prohibit the city to select the bid or proposal which is the most responsible and in the best interests of the city.

SECTION 2 AFFIRMATION

VETERAN OWNED SMALL BUSINESS (VOSB) PREFERENCE CERTIFICATION:

Place a check mark here only if affirming bidder meets requirements above as a Veteran Owned Small Business.

In addition, the bidder must attach the "Determination Letter" from the U.S. Dept. of Veteran Affairs Center.

Place a check mark here only if affirming bidder does not meet the requirements above as a VOSB.

Failure to complete this certification at this time (by checking either of the boxes above) shall render the vendor ineligible for VOSB Preference. This form must be completed by/for the proposer; the proposer WILL NOT qualify for VOSB Preference based on their sub-contractors' qualifications.

COMPANY NAME:

PRINTED NAME / AUTHORIZED SIGNATURE:



EQUAL BENEFITS CERTIFICATION FORM FOR DOMESTIC PARTNERS AND ALL MARRIED COUPLES

Except where federal or state law mandates to the contrary, a Contractor awarded a Contract pursuant to a competitive solicitation shall provide benefits to Domestic Partners and spouses of its employees, irrespective of gender, on the same basis as it provides benefits to employees' spouses in traditional marriages.

The Contractor shall provide the City and/or the City Manager or his/her designee, access to its records for the purpose of audits and/or investigations to ascertain compliance with the provisions of this section, and upon request shall provide evidence that the Contractor is in compliance with the provisions of this section upon each new bid, contract renewal, or when the City Manager has received a complaint or has reason to believe the Contractor may not be in compliance with the provisions of this section. Records shall include but not be limited to providing the City and/or the City Manager or his/her designee with certified copies of the Contractor's records pertaining to its benefits policies and its employment policies and practices.

The Contractor must conspicuously make available to all employees and applicants for employment the following statement:

“During the performance of a contract with the City of Pembroke Pines, Florida, the Contractor will provide Equal Benefits to its employees with spouses, as defined by Section 35.39 of the City’s Code of Ordinances, and its employees with Domestic Partners and all Married Couples”.

The posted statement must also include a City contact telephone number and email address which will be provided to each contractor when a covered contract is executed.

SECTION 1 DEFINITIONS

- 1. Benefits** means the following plan, program or policy provided or offered by a contractor to its employees as part of the employer's total compensation package which may include but is not limited to sick leave, bereavement leave, family medical leave, and health benefits.
- 2. Cash Equivalent** mean the amount of money paid to an employee with a domestic partner or spouse in lieu of providing benefits to the employee's domestic partner or spouse. The cash equivalent is equal to the employer's direct expense of providing benefits to an employee for his or her spouse from a traditional marriage.
- 3. Covered Contract** means a contract between the City and a contractor awarded subsequent to the date when this section becomes effective valued at over \$25,000 or the threshold amount required for competitive bids as required in section 35.18(A) of the Procurement Code.
- 4. Domestic Partner** shall mean any two (2) adults of the same or different sex who have registered as domestic partners with a governmental body pursuant to state or local law authorizing such registration, or with an internal registry maintained by the employer of at least one of the domestic partners. A contractor may institute an internal registry to allow for the provision of equal benefits to employees with domestic partners who do not register their partnerships pursuant to a governmental body authorizing such registration, or who are located in a jurisdiction where no such governmental domestic partnership registry exists. A contractor that institutes such registry shall not impose criteria for registration that are more stringent than those required for domestic partnership registration by the City of Pembroke Pines.
- 5. Equal benefits** means the equality of benefits between employees with spouses and/or dependents of spouses and employees with domestic partners and/or dependents of domestic partners, and/or between spouses of employees and/or dependents of spouses and domestic partners of employees and/or dependents of domestic partners.

6. Spouse means one member of a married pair legally married under the laws of any state within the United States of America or any other jurisdiction under which such marriage is legally recognized, irrespective of gender.

7. Traditional marriage means a marriage between one man and one woman.

SECTION 2 CERTIFICATION OF CONTRACTOR

The firm providing a response, by virtue of the signature below, certifies that it is aware of the requirements of Section 35.39 "City Contractors providing Equal Benefits for Domestic Partners and all Married Couples" of the City's Code of Ordinances, and certifies the following (**Check only one box below**):

- A. Contractor currently complies with the requirements of this section; or
- B. Contractor will comply with the conditions of this section at the time of contract award; or
- C. Contractor will not comply with the conditions of this section at the time of contract award: or
- D. Contractor does not comply with the conditions of this section because of the following allowable exemption (**Check only one box below**):

1. The Contractor does not provide benefits to employees' spouses in traditional marriages;

2. The Contractor provides an employee the cash equivalent of benefits because the Contractor is unable to provide benefits to employees' Domestic Partners or spouses despite making reasonable efforts to provide them. To meet this exception, the Contractor shall provide a notarized affidavit that it has made reasonable efforts to provide such benefits. The affidavit shall state the efforts taken to provide such benefits and the amount of the cash equivalent. Cash equivalent means the amount of money paid to an employee with a Domestic Partner or spouse rather than providing benefits to the employee's Domestic Partner or spouse. The cash equivalent is equal to the employer's direct expense of providing benefits to an employee's spouse;

3. The Contractor is a religious organization, association, society, or any non-profit charitable or educational institution or organization operated supervised or controlled by or in conjunction with a religious organization, association, or society;

4. The Contractor is a governmental agency;

The certification shall be signed by an authorized officer of the Contractor. Failure to provide such certification (by checking the appropriate boxes above along with completing the information below) shall result in a Contractor being deemed non-responsive.

COMPANY NAME:

AUTHORIZED OFFICER NAME / SIGNATURE:



PROPOSER'S QUALIFICATIONS STATEMENT

PROPOSER shall furnish the following information. Failure to comply with this requirement will render Bid non responsive and shall cause its rejection. Additional sheets shall be attached as required.

PROPOSER'S Name and Principal Address:

Contact Person's Name and Title:

Contact Person's E-mail Address:

PROPOSER'S Telephone and Fax Number:

PROPOSER'S License Number:

(Please attach certificate of status, competency, and/or state registration.)

PROPOSER'S Federal Identification Number:

Number of years your organization has been in business

State the number of years your firm has been in business under your present business name

State the number of years your firm has been in business in the work specific to this solicitation:

Names and titles of all officers, partners or individuals doing business under trade name:

The business is a: Sole Proprietorship Partnership Corporation

IF USING A FICTITIOUS NAME, SUBMIT EVIDENCE OF COMPLIANCE WITH FLORIDA FICTITIOUS NAME STATUTE. (ATTACH IN PROPOSER EXHIBIT SECTION)

Under what former name has your business operated? Include a description of the business. Failure to include such information shall be deemed to be intentional misrepresentation by the City and shall render the proposer RFP submittals non-responsive.

At what address was that business located?

Name, address, and telephone number of surety company and agent who will provide the required bonds on this contract:

Have you ever failed to complete work awarded to you. If so, when, where and why?

Have you personally inspected the proposed WORK and do you have a complete plan for its performance?

Will you subcontract any part of this WORK? If so, give details including a list of each sub-contractor(s) that will perform work in excess of ten percent (10%) of the contract amount and the work that will be performed by each subcontractor(s).

The foregoing list of subcontractor(s) may not be amended after award of the contract without the prior written approval of the Contract Administrator, whose approval shall not be reasonably withheld.

List and describe all bankruptcy petitions (voluntary or involuntary) which have been filed by or against the Proposer, its parent or subsidiaries or predecessor organizations during the past five (5) years. Include in the description the disposition of each such petition.

List and describe all successful Bond claims made to your surety (ies) during the last five (5) years. The list and descriptions should include claims against the bond of the Proposer and its predecessor organization(s).

List all claims, arbitrations, administrative hearings and lawsuits brought by or against the Proposer or its predecessor organizations(s) during the last (10) years. The list shall include all case names; case, arbitration or hearing identification numbers; the name of the project over which the dispute arose; and a description of the subject matter of the dispute.

List and describe all criminal proceedings or hearings concerning business related offenses in which the Proposer, its principals or officers or predecessor organization(s) were defendants.

Has the Proposer, its principals, officers or predecessor organization(s) been CONVICTED OF A Public Entity Crime, debarred or suspended from bidding by any government entity? If so, provide details.

Are you an Original provider sales representative distributor, broker, manufacturer other, of the commodities/services proposed upon? If other than the original provider, explain below.

Have you ever been debarred or suspended from doing business with any governmental agency? If yes, please explain:

Describe the firm's local experience/nature of service with contracts of similar size and complexity, it the previous three (3) years:

The PROPOSER acknowledges and understands that the information contained in response to this Qualification Statement shall be relied upon by CITY in awarding the contract and such information is warranted by PROPOSER to be true. The discovery of any omission or misstatement that materially affects the PROPOSER'S qualifications to perform under the contract shall cause the CITY to reject the Bid, and if after the award, to cancel and terminate the award and/or contract.

(Company Name)

(Printed Name/Signature)

ACORD CERTIFICATE OF LIABILITY INSURANCE DATE (MM/DD[YY])

PRODUCER INSURED <div style="border: 1px solid black; padding: 10px; text-align: center; font-size: 24px; font-weight: bold;">YOUR COMPANY NAME HERE</div>	THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. <div style="text-align: center; border: 1px solid black; padding: 5px; font-weight: bold;">INSURERS AFFORDING COVERAGE</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%; border: 1px solid black;">INSURER A:</td> <td rowspan="5" style="border: 1px solid black; text-align: center; vertical-align: middle; font-size: 24px; font-weight: bold;">Companies providing coverage</td> </tr> <tr> <td style="border: 1px solid black;">INSURER B.</td> </tr> <tr> <td style="border: 1px solid black;">INSURER C.</td> </tr> <tr> <td style="border: 1px solid black;">INSURER D.</td> </tr> <tr> <td style="border: 1px solid black;">INSURER E.</td> </tr> </table>	INSURER A:	Companies providing coverage	INSURER B.	INSURER C.	INSURER D.	INSURER E.
INSURER A:	Companies providing coverage						
INSURER B.							
INSURER C.							
INSURER D.							
INSURER E.							

COVERAGES
 THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DDIYY)	POLICY EXPIRATION DATE (MM/DDIYY)	LIMITS								
	GENERAL LIABILITY <input type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input checked="" type="checkbox"/> CLAIMS MADE <input type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> policy <input type="checkbox"/> project <input type="checkbox"/> loc	Must Include General Liability			EACH OCCURRENCE \$ FIRE DAMAGE (Any one fire) \$ MED EXP (Any one person) \$ PERSONAL & ADV INJURY \$ GENERAL AGGREGATE \$ PRODUCTS - COMP/OP AGG \$								
	AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS	SAMPLE CERTIFICATE											
	GARAGE LIABILITY <input type="checkbox"/> ANY AUTO				AUTO ONLY - EA ACCIDENT \$ OTHER THAN EA ACC \$ AUTO ONLY: AGG \$								
	EXCESS LIABILITY <input type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS MADE <input type="checkbox"/> DEDUCTIBLE <input type="checkbox"/> RETENTION \$				EACH OCCURRENCE \$ AGGREGATE \$ \$ \$ \$								
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY				<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">WC STATUTORY LIMITS</td> <td style="width: 40%;">OTHER</td> </tr> <tr> <td>E.L. EACH ACCIDENT</td> <td>\$</td> </tr> <tr> <td>E.L. DISEASE - EA EMPLOYEE</td> <td>\$</td> </tr> <tr> <td>E.L. DISEASE - POLICY LIMIT</td> <td>\$</td> </tr> </table>	WC STATUTORY LIMITS	OTHER	E.L. EACH ACCIDENT	\$	E.L. DISEASE - EA EMPLOYEE	\$	E.L. DISEASE - POLICY LIMIT	\$
WC STATUTORY LIMITS	OTHER												
E.L. EACH ACCIDENT	\$												
E.L. DISEASE - EA EMPLOYEE	\$												
E.L. DISEASE - POLICY LIMIT	\$												
	OTHER												

Certificate must contain wording similar to what appears below

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCL

"THE CERTIFICATE HOLDER IS NAMED AS ADDITIONALLY INSURED WITH REGARD TO GENERAL LIABILITY"

CERTIFICATE HOLDER City of Pembroke Pines 10100 Pines Boulevard Pembroke Pines FL 33026	ADDITIONAL INSURED; INSURER LETTER:	CANCELLATION SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE, THIS CERTIFICATE SHALL BE VOIDED WITHIN 30 DAYS WRITTEN LEFT. AUTHORIZED REPRESENTATIVE
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City Must Be Named as Certificate Holder



CONSTRUCTION AGREEMENT

THIS IS AN AGREEMENT, dated the _____ day of _____, «Contract_Signature_Year», by and between:

CITY OF PEMBROKE PINES, a municipal corporation of the State of Florida with a business address of **601 City Center Way, Pembroke Pines, Florida 33025** hereinafter referred to as "CITY",

and

«Vendor_Name_Upper_Case», a «Vendor_Business_Type», authorized to do business in the State of Florida, with a business address of «Vendor_Address_Line_1», «Vendor_Address_Line_2» (hereinafter referred to as the "CONTRACTOR"). CITY and CONTRACTOR may hereinafter be referred to collectively as the "Parties."

WITNESSETH:

In consideration of the mutual terms and conditions, promises, covenants and payments hereinafter set forth, CITY and CONTRACTOR agree as follows:

ARTICLE 1
PREAMBLE

In order to establish the background, context and form of reference for this Agreement, and to generally express the objectives and intentions of the respective parties herein, the following statements, representations, and explanations shall be accepted as predicates for the undertakings and commitments included within the provisions which follow, and may be relied upon by the parties as essential elements of the mutual considerations upon which this Agreement is based.

1.1 On «Solicitation_Advertisement_Date», the CITY advertised its notice to bidders of the CITY's desire to hire a firm to «Service_Description» as more particularly described in **Exhibit "A"** attached hereto and by this reference made a part hereof, for the said bid entitled:

«Solicitation_Type_Abbreviation» # «Solicitation_Number»
"«Solicitation_Title»"

1.2 On «Bid_Opening_Date», the bids were opened at the offices of the City Clerk.

1.3 On «Commission_Award_Date», the CITY awarded the bid to CONTRACTOR and authorized the proper CITY officials to negotiate and enter into an agreement with CONTRACTOR to render the services more particularly described herein below.



1.4 Negotiations pertaining to the services to be performed by the CONTRACTOR were undertaken and this Agreement incorporates the results of such negotiation.

ARTICLE 2

SERVICES AND RESPONSIBILITIES

2.1 CONTRACTOR hereby agrees to perform the services for the «**Service_Description**», as more particularly described in **Exhibit "A"** attached hereto and by this reference made a part hereof, ("Property") in accordance with the Scope of Services outlined in the specifications, "**Solicitation_Type_Abbreviation**» # «**Solicitation_Number**»", attached hereto and made a part hereof as **Exhibit "A"** and CONTRACTOR's response thereto, attached hereto and made a part hereof as **Composite Exhibit "B"**. CONTRACTOR agrees to do everything required by this Agreement, the Sealed Bid Package, Addenda to this Agreement, and Commission award complete with proposal form.

2.2 CONTRACTOR shall furnish all services, labor, equipment, and materials necessary and as may be required in the performance of this Agreement, except as otherwise specifically provided for herein, and all work performed under this Agreement shall be done in a professional manner.

2.3 CONTRACTOR shall supervise the work force to ensure that all workers conduct themselves and perform their work in a safe and professional manner. CONTRACTOR shall comply with all OSHA safety rules and regulations in the operation of equipment and in the performance of the work. CONTRACTOR shall at all times have a competent field supervisor on the job site to enforce these policies and procedures at the CONTRACTOR's expense.

2.4 CONTRACTOR shall provide CITY with seventy-two (72) hours written notice prior to the beginning of work under this Agreement and prior to any schedule change with the exception of changes caused by inclement weather.

2.5 CONTRACTOR hereby represents to CITY, with full knowledge that CITY is relying upon these representations when entering into this Agreement with CONTRACTOR, that CONTRACTOR has the professional expertise, experience and manpower to perform the services to be provided by CONTRACTOR pursuant to the terms of this Agreement.

2.6 CONTRACTOR hereby represents to CITY that CONTRACTOR is properly licensed by the applicable federal, state, and local agencies to provide the services under this Agreement. Furthermore, CONTRACTOR agrees to maintain such licenses during the term of this Agreement. If CONTRACTOR's license is revoked, suspended, or terminated for any reason by any governmental agency, CONTRACTOR shall notify the CITY immediately.

2.7 CONTRACTOR shall comply with any and all Federal, State, and local laws and regulations now in effect, or hereinafter enacted during the term of this Agreement, which are applicable to CONTRACTOR, its employees, agents or subcontractors, if any, with respect to the work and services described herein. A violation of any federal, state, or local law or regulation may be cause for breach, allowing the CITY to terminate this Agreement.



ARTICLE 3
TIME OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

3.1 The work to be performed under this Agreement shall be commenced after CITY execution of the Agreement and not later than ten (10) days after the date that CONTRACTOR receives CITY's Notice to Proceed. The work shall be completed within «Number_of_Calendar_Days_from_NTP_to_Comm» from issuance of CITY's Notice to Proceed, subject to any permitted extensions of time under the Contract Documents. For the purposes of this Agreement, completion shall mean the issuance of final permit.

3.2 During the pre-construction portion of the work hereunder, the parties agree to work diligently and in good faith in performing their obligations hereunder, so that all required permits for the construction portion of the work may be obtained. In the event that any delays in the pre-construction or construction portion of the work occur, despite the diligent efforts of the parties hereto, and such delays are the result of force majeure or are otherwise outside of the control of either party hereto, then the parties shall agree on an equitable extension of the time for substantial completion hereunder and any resulting increase in general condition costs.

3.3 In the event that CONTRACTOR abandons this Agreement or causes it to be terminated, he shall indemnify CITY against any loss pertaining to this termination up to a maximum of the full contracted fee amount. All finished or unfinished documents, data, studies, surveys, and reports prepared by CONTRACTOR shall become the property of CITY and shall be delivered by CONTRACTOR to CITY.

ARTICLE 4
COMPENSATION AND METHOD OF PAYMENT

4.1 CITY agrees to compensate CONTRACTOR for all services performed by CONTRACTOR upon issuance of final inspection approval / monthly for work that has been completed, inspected and properly invoiced «Compensation_Type» «Compensation_Amount_Written» («Compensation_Amount_Numerical»), which includes a «Contingency_Fee_Percent» owner's contingency fee of «Contingency_Fee_Written» («Contingency_Fee_Numerical») and a «Permit_Fee_Percent» permit allowance of «Permit_Fee_Written» («Permit_Fee_Numerical»).

4.1.1 This contingency or allowance authorizes the City to execute change orders up to the amount of the contingency without the need to obtain additional Commission approval. **It is hereby understood and agreed that the vendor shall not expend any dollars in connection with the Owner's Contingency or Allowance without the expressed prior approval of the City's authorized representative.** Any Owner's Contingency funds or allowance that have not been utilized at the end of the project will remain with the Owner, the contractor shall only be paid for the proposed project cost as approved by the City Commission along with any Owner Contingency expenses or allowances that were approved by the City's authorized representative.

4.1.2 The total compensation amount may not be exceeded without a written amendment to this Agreement. A retainage of ten percent (10%) will be deducted from monthly payments until fifty



percent (50%) of the project is complete. Retainage will be reduced to five percent (5%) thereafter. Retainage monies will be released upon satisfactory completion and final inspection of the work. Invoices must bear the project name, project number, bid number and purchase order number. CITY has up to thirty (30) days to review, approve and pay all invoices after receipt. CONTRACTOR shall invoice CITY and provide a written request to CITY to commence the one (1) year warranty period. All necessary Releases and Affidavits and approval of Final Payments shall be processed before the warranty period begins. All payments shall be governed by the Florida Prompt Payment Act, as set forth in Part VII, Chapter 218, Florida Statutes.

4.2 **Method of Billing and Payment.**

4.2.1 The CITY shall within thirty (30) days, from the date the City's Public Service Director approves the Application for Payment, pay the CONTRACTOR the amount approved by the City Public Services Director or his or her assignees.

4.2.2 Payment will be made to CONTRACTOR at:

«Vendor_Name»
«Vendor_Address_Line_1»
«Vendor_Address_Line_2»

ARTICLE 5 WAIVER OF LIENS

5.1 Prior to final payment of the Contract Sum, a final waiver of lien shall be submitted by all suppliers, subcontractors, and/or contractors who worked on the project that is the subject of this Agreement. Payment of the invoice and acceptance of such payment by CONTRACTOR shall release CITY from all claims of liability by CONTRACTOR in connection with this Agreement.

ARTICLE 6 WARRANTY

6.1 CONTRACTOR warrants the work against defect for a period of one (1) year from the date of completion of work. In the event that defect occurs during this time, CONTRACTOR shall perform such steps as required to remedy the defects. CONTRACTOR shall be responsible for any damages caused by defect to affected area or to interior structure. The one (1) year warranty period does not begin until substantial completion of the entire project, and the subsequent release of any Performance or Payment Bonds, which may be required by the original bid document.

ARTICLE 7 CHANGES IN SCOPE OF WORK

7.1 CITY or CONTRACTOR may request changes that would increase, decrease, or otherwise modify the Scope of Services, as described in **Exhibit "A,"** to be provided under this Agreement as described in Article 2 of this Agreement. These changes will affect the monthly compensation accordingly. Such changes or additional services must be in accordance with the provisions of the



Code of Ordinances of the CITY, and must be contained in a written amendment, executed by the parties hereto, with the same formality, equality and dignity herewith prior to any deviation from the terms of this Agreement, including the initiation of any additional or extra work.

7.2 In no event will the CONTRACTOR be compensated for any work which has not been described in a separate written agreement executed by the parties hereto.

ARTICLE 8 **INDEMNIFICATION**

8.1 Pursuant to 725.06, Florida Statutes, the parties agree that one hundred percent (100%) of the total compensation paid to CONTRACTOR for the Work under this Agreement shall constitute specific consideration to CONTRACTOR for the indemnification to be provided under this Agreement. CONTRACTOR shall indemnify and hold harmless the CITY, its trustees, elected and appointed officers, agents, servants, assigns, employees, consultants, separate contractors, any of their subcontractors, sub-subcontractors, agents and employees from and against claims, demands, or causes of action whatsoever, and the resulting losses, damages, costs and expenses, including but not limited to attorneys' fees, including paralegal expenses, liabilities, damages, orders, judgments, or decrees, sustained by the CITY arising out of or resulting from performance of the Work or the failure of the CONTRACTOR to take out and maintain insurance as required under this Agreement.

8.2 Upon completion of all Services, obligations and duties provided for in this Agreement, or in the event of termination of this Agreement for any reason, the terms and conditions of this Article shall survive indefinitely.

8.3 CITY reserves the right to select its own legal counsel to conduct any defense in any such proceeding and all costs and fees associated therewith shall be the responsibility of CONTRACTOR.

8.4 Nothing contained herein is intended nor shall be construed to waive City's rights and immunities under the common law or §768.28, Florida Statutes, as may be amended from time to time.

ARTICLE 9 **INSURANCE**

9.1 The CONTRACTOR shall indemnify and hold harmless the CITY and its officers, employees, agents and instrumentalities from any and all liability, losses or damages, including attorneys' fees and costs of defense, which the CITY or its officers, employees, agents or instrumentalities may incur as a result of claims, demands, suits, causes of actions or proceedings of any kind or nature arising out of, relating to or resulting from the performance of this Agreement by the CONTRACTOR or its employees, agents, servants, partners principals or subcontractors. The CONTRACTOR shall pay all claims and losses in connection therewith and shall investigate and defend all claims, suits or actions of any kind or nature in the name of the CITY, where applicable, including appellate proceedings, and shall pay all costs, judgments, and attorney's fees



which may issue thereon. The CONTRACTOR expressly understands and agrees that any insurance protection required by this Agreement or otherwise provided by the CONTRACTOR shall in no way limit the responsibility to indemnify, keep and save harmless and defend the CITY or its officers, employees, agents and instrumentalities as herein provided.

9.2 CONTRACTOR shall not commence work under this Agreement until it has obtained all insurance required under this paragraph and such insurance has been approved by the Risk Manager of the CITY nor shall the CONTRACTOR allow any subcontractor to commence work on his subcontract until all similar such insurance required of the subcontractor has been obtained and similarly approved.

9.3 Certificates of Insurance, reflecting evidence of the required insurance, shall be filed with the City's Risk Manager prior to the commencement of this Agreement. Policies shall be issued by companies authorized to do business under the laws of the State of Florida. The insurance company shall be rated no less than "A" as to management, and no less than "Class VI" as to financial strength according to the latest edition of Best's Insurance Guide published by A.M. Best Company.

9.4 Policies shall be endorsed to provide the CITY thirty (30) days notice of cancellation or the CONTRACTOR shall obtain written agreement from its Agent to provide the CITY thirty (30) days notice of cancellation.

9.5 Insurance shall be in force until all obligations required to be fulfilled under the terms of the Agreement are satisfactorily completed as evidenced by the formal acceptance by the CITY. In the event the insurance certificate provided indicates that the insurance shall terminate and lapse during the period of this Agreement, then in that event, the CONTRACTOR shall furnish, at least forty-five (45) days prior to the expiration of the date of such insurance, a renewed certificate of insurance as proof that equal and like coverage for the balance of the period of the Agreement and extension thereunder is in effect. The CONTRACTOR shall not commence nor continue to provide any services pursuant to this Agreement unless all required insurance remains in full force and effect. CONTRACTOR shall be liable to CITY for any lapses in service resulting from a gap in insurance coverage.

9.6 REQUIRED INSURANCE

9.6.1 Comprehensive General Liability Insurance written on an occurrence basis including, but not limited to: coverage for bodily injury and property damage, personal & advertising injury, products & completed operations, and contractual liability. Coverage must be written on an occurrence basis, with limits of liability no less than:

1. Each Occurrence Limit - \$1,000,000
2. Fire Damage Limit (Damage to rented premises) - \$100,000
3. Personal & Advertising Injury Limit - \$1,000,000
4. General Aggregate Limit - \$2,000,000
5. Products & Completed Operations Aggregate Limit - \$2,000,000



Products & Completed Operations Coverage shall be maintained for two (2) years after the final payment under this contract.

The City of Pembroke Pines must be shown as an additional insured with respect to this coverage.

9.6.2 Worker's Compensation and Employers Liability Insurance covering all employees, and/or volunteers of the CONTRACTOR engaged in the performance of the scope of work associated with this Agreement. In the case any work is sublet, the CONTRACTOR shall require the subcontractors similarly to provide Workers Compensation Insurance for all the latter's employees unless such employees are covered by the protection afforded by the CONTRACTOR. Coverage for the CONTRACTOR and his subcontractors shall be in accordance with applicable state and/or federal laws that may apply to Workers' Compensation Insurance with limits of liability no less than:

1. Workers' Compensation: Coverage A – Statutory
2. Employers Liability: Coverage B \$500,000 Each Accident
\$500,000 Disease – Policy Limit
\$500,000 Disease – Each Employee

If CONTRACTOR claims to be exempt from this requirement, CONTRACTOR shall provide CITY proof of such exemption along with a written request for CITY to exempt CONTRACTOR, written on CONTRACTOR letterhead.

9.6.3 Comprehensive Auto Liability Insurance covering all owned, non-owned and hired vehicles used in connection with the performance of work under this Agreement, with a combined single limit of liability for bodily injury and property damage no less than:

1. Any Auto (Symbol 1)
Combined Single Limit (Each Accident) - \$1,000,000
2. Hired Autos (Symbol 8)
Combined Single Limit (Each Accident) - \$1,000,000
3. Non-Owned Autos (Symbol 9)
Combined Single Limit (Each Accident) - \$1,000,000

9.6.4 Professional Liability/Errors & Omissions Insurance, when applicable, with a limit of liability no less than \$1,000,000 per wrongful act. This coverage shall be maintained for a period of no less than two (2) years after final payment of the contract.

9.6.5 Sexual Abuse may not be excluded from any policy.

9.7 REQUIRED ENDORSEMENTS

9.7.1 The City of Pembroke Pines shall be named as an Additional Insured on each of the General Liability policies required herein



- 9.7.2 Waiver of all Rights of Subrogation against the CITY
- 9.7.3 30 Day Notice of Cancellation or Non-Renewal to the CITY
- 9.7.4 CONTRACTORS' policies shall be Primary & Non-Contributory
- 9.7.5 All policies shall contain a "severability of interest" or "cross liability" liability clause without obligation for premium payment of the CITY
- 9.7.6 The City of Pembroke Pines shall be named as a Loss Payee on all Property and/or Inland Marine Policies as their interest may appear.

9.8 CONTRACTOR shall name the CITY, as an additional insured on each of the General Liability policies required herein and shall hold the CITY, its agents, officers and employees harmless on account of claims for damages to persons, property or premises arising out of the services provided hereunder.

9.9 Any insurance required of the CONTRACTOR pursuant to this Agreement must also be required by any subcontractor in the same limits and with all requirements as provided herein, including naming the CITY as an additional insured, in any work that is subcontracted unless such subcontractor is covered by the protection afforded by the CONTRACTOR and provided proof of such coverage is provided to CITY. The CONTRACTOR and any subcontractors shall maintain such policies during the term of this Agreement.

9.10 The City reserves the right to require any other additional types of insurance coverage and/or higher limits of liability it deems necessary based on the nature of work being performed under this Contract.

ARTICLE 10

NON-DISCRIMINATION & EQUAL OPPORTUNITY EMPLOYMENT

10.1 During the performance of the Agreement, neither CONTRACTOR nor its subcontractors shall discriminate against any employee or applicant for employment because of race, religion, color, gender, national origin, sex, age, marital status, political affiliation, familial status, sexual orientation, or disability if qualified. CONTRACTOR will take affirmative action to ensure that employees are treated during employment, without regard to their race, religion, color, gender, national origin, sex, age, marital status, political affiliation, familial status, sexual orientation, or disability if qualified. Such actions must include, but not be limited to, the following: employment, promotion; demotion or transfer; recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. CONTRACTOR shall agree to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause. CONTRACTOR further agrees that he/she/it will ensure that subcontractors, if any, will be made aware of and will comply with this nondiscrimination clause.

ARTICLE 11

INDEPENDENT CONTRACTOR



11.1 This Agreement does not create an employee/employer relationship between the parties. It is the intent of the parties that the CONTRACTOR is an independent contractor under this Agreement and not the CITY's employee for all purposes, including but not limited to, the application of the Fair Labor Standards Act minimum wage and overtime payments, Federal Insurance Contribution Act, the Social Security Act, the Federal Unemployment Tax Act, the provisions of the Internal Revenue Code, the State Workers' Compensation Act, and the State unemployment insurance law. The CONTRACTOR shall retain sole and absolute discretion in the judgment of the manner and means of carrying out CONTRACTOR's activities and responsibilities hereunder provided, further that administrative procedures applicable to services rendered under this Agreement shall be those of CONTRACTOR, which policies of CONTRACTOR shall not conflict with CITY, State, H.U.D., or United States policies, rules or regulations relating to the use of CONTRACTOR's Funds provided for herein. The CONTRACTOR agrees that it is a separate and independent enterprise from the CITY, that it has full opportunity to find other business, that it has made its own investment in its business, and that it will utilize a high level of skill necessary to perform the work. This Agreement shall not be construed as creating any joint employment relationship between the CONTRACTOR and the CITY and the CITY will not be liable for any obligation incurred by CONTRACTOR, including but not limited to unpaid minimum wages and/or overtime premiums.

ARTICLE 12

TERMINATION

12.1 *Termination for Convenience:* This Agreement may be terminated by CITY for convenience, upon «**Termination for Convenience**» of written notice by the terminating party to the other party for such termination in which event CONTRACTOR shall be paid its compensation for services performed to termination date, including services reasonably related to termination. In the event that CONTRACTOR abandons this Agreement or causes it to be terminated, CONTRACTOR shall indemnify CITY against loss pertaining to this termination.

12.2 *Default by CONTRACTOR:* In addition to all other remedies available to CITY, this Agreement shall be subject to cancellation by CITY for cause, should CONTRACTOR neglect or fail to perform or observe any of the terms, provisions, conditions, or requirements herein contained, if such neglect or failure shall continue for a period of thirty (30) days after receipt by CONTRACTOR of written notice of such neglect or failure.

ARTICLE 13

UNCONTROLLABLE FORCES

13.1 Neither CITY nor CONTRACTOR shall be considered to be in default of this Agreement if delays in or failure of performance shall be due to Uncontrollable Forces, the effect of which, by the exercise of reasonable diligence, the non-performing party could not avoid. The term "Uncontrollable Forces" shall mean any event which results in the prevention or delay of performance by a party of its obligations under this Agreement and which is beyond the reasonable control of the nonperforming party. It includes, but is not limited to fire, flood, earthquakes, storms, lightning, epidemic, war, riot, civil disturbance, sabotage, and governmental actions.

13.2 Neither party shall, however, be excused from performance if nonperformance is due to forces, which are preventable, removable, or remediable, and which the nonperforming party could



have, with the exercise of reasonable diligence, prevented, removed, or remedied with reasonable dispatch. The nonperforming party shall, within a reasonable time of being prevented or delayed from performance by an uncontrollable force, give written notice to the other party describing the circumstances and uncontrollable forces preventing continued performance of the obligations of this Agreement.

ARTICLE 14
AGREEMENT SUBJECT TO FUNDING

14.1 This agreement shall remain in full force and effect only as long as the expenditures provided for in the Agreement have been appropriated by the City Commission of the City of Pembroke Pines in the annual budget for each fiscal year of this Agreement, and is subject to termination based on lack of funding.

ARTICLE 15
VENUE

15.1 This Agreement shall be governed by the laws of the State of Florida as now and hereafter in force. The venue for actions arising out of this agreement shall be in Broward County, Florida.

ARTICLE 16
SIGNATORY AUTHORITY

16.1 CONTRACTOR shall provide CITY with copies of requisite documentation evidencing that the signator for CONTRACTOR has the authority to enter into this Agreement.

ARTICLE 17
MERGER; AMENDMENT

17.1 This Agreement constitutes the entire Agreement between CONTRACTOR and CITY, and negotiations and oral understandings between the parties are merged herein. This Agreement can be supplemented or amended only by a written document executed by both CONTRACTOR and CITY with the same formality and equal dignity herewith.

ARTICLE 18
DEFAULT OF CONTRACT & REMEDIES

18.1.1 **Damages.** CITY reserves the right to recover any ascertainable actual damages incurred as a result of the failure of CONTRACTOR to perform in accordance with the requirements of this Agreement, or for losses sustained by CITY resultant from CONTRACTOR's failure to perform in accordance with the requirements of this Agreement.

18.1.2 **Liquidated Damages.** As a breach of the service provided by this Agreement would cause serious and substantial damage to CITY Property, and the nature of this Agreement would render it impracticable or extremely difficult to fix the actual damage sustained by CITY by such breach, it is agreed that, in case of breach of service wherein CONTRACTOR fails to maintain the Property, leaving the said property in disrepair, CITY may elect to collect liquidated damages for



each such breach, and CONTRACTOR will pay CITY as liquidated damages, and not as penalty, «**Liquidated Damages Per Day Written**» («**Liquidated Damages Per Day Numerical**») for every day of such malfunction. This sum is the agreed upon amount by which CITY will be damaged by the breach of such service. An election to seek such remedies shall not be construed as a waiver of any legal remedies CITY may have as to any subsequent breach of service under this Agreement.

18.1.3 **Correction of Work.** If, in the judgment of CITY, work provided by CONTRACTOR does not conform to the requirements of this Agreement, or if the work exhibits poor workmanship, CITY reserves the right to require that CONTRACTOR correct all deficiencies in the work to bring the work into conformance without additional cost to CITY, and / or replace any personnel who fail to perform in accordance with the requirements of this Agreement. CITY shall be the sole judge of non-conformance and the quality of workmanship.

18.2 **Default of Contract.** The occurrence of any one or more of the following events shall constitute a default and breach of this Agreement by CONTRACTOR:

18.2.1. The abandonment of the Property by CONTRACTOR for a period of more than seven (7) business days.

18.2.2 The abandonment, unnecessary delay, refusal of, or failure to comply with any of the terms of this Agreement or neglect, or refusal to comply with the instructions of the Public Services Director relative thereto.

18.2.3. The failure by CONTRACTOR to observe or perform any of the terms, covenants, or conditions of this Agreement to be observed or performed by CONTRACTOR, where such failure shall continue for a period of seven (7) days after written notice thereof by CITY to CONTRACTOR; provided, however, that if the nature of CONTRACTOR's default is such that more than seven (7) days are reasonably required for its cure, then CONTRACTOR shall not be deemed to be in default if CONTRACTOR commences such cure within said seven (7) day period and thereafter diligently prosecutes such cure to completion.

18.2.4. The assignment and/or transfer of this Agreement or execution or attachment thereon by CONTRACTOR or any other party in a manner not expressly permitted hereunder.

18.2.5. The making by CONTRACTOR of any general assignment or general arrangement for the benefit of creditors, or the filing by or against CONTRACTOR of a petition to have CONTRACTOR adjudged a bankruptcy, or a petition for reorganization or arrangement under any law relating to bankruptcy (unless, in the case of a petition filed against CONTRACTOR, the same is dismissed within sixty (60) days); or the appointment of a trustee or a receiver to take possession of substantially all of CONTRACTOR's assets, or for CONTRACTOR's interest in this Agreement, where possession is not restored to CONTRACTOR within thirty (30) days; for attachment, execution or other judicial seizure of substantially all of CONTRACTOR's assets, or for CONTRACTOR's interest in this Agreement, where such seizure is not discharged within thirty (30) days.

18.3 **Remedies in Default.** In case of default by CONTRACTOR, CITY shall notify CONTRACTOR, in writing, of such abandonment, delay, refusal, failure, neglect, or default and



direct him to comply with all provisions of the Agreement. If the abandonment, delay, refusal, failure, neglect or default is not cured within seven (7) days of when notice was sent by CITY, CITY may declare a default of the Agreement and notify CONTRACTOR of such declaration of default and terminate the Agreement.

18.3.1. Upon such declaration of default, all payments remaining due CONTRACTOR at the time of default, less all sums due CITY for damages suffered, or expenses incurred by reason of default, shall be due and payable to CITY.

18.3.2. CITY may complete the Agreement, or any part thereof, either by day labor or re-letting a contract for the same, and procure the equipment and the facilities necessary for the completion of the Agreement, and charge the cost of same to CONTRACTOR and/or the Surety together with the costs incident thereto to such default.

18.3.3. In the event CITY completes the Agreement at a lesser cost than would have been payable to CONTRACTOR under this Agreement, if the same had been fulfilled by CONTRACTOR, CITY shall retain such differences. Should such cost to CITY be greater, CONTRACTOR shall pay the amount of such excess to the CITY.

18.3.4 Notwithstanding the other provisions in this Section, CITY reserves the right to terminate the Agreement at any time, whenever the service provided by CONTRACTOR fails to meet reasonable standards of the trade after CITY gives written notice to the CONTRACTOR of the deficiencies as set forth in the written notice within fourteen calendar (14) days of the receipt by CONTRACTOR of such notice from CITY.

ARTICLE 19 **BANKRUPTCY**

19.1 It is agreed that if CONTRACTOR is adjudged bankrupt, either voluntarily or involuntarily, then this Agreement shall terminate effective on the date and at the time the bankruptcy petition is filed.

ARTICLE 20 **DISPUTE RESOLUTION**

20.1 **Arbitration.** In addition to any other remedy provided hereunder, CITY, at its option, may use arbitration to resolve any controversy or claim arising out of or relating to this Agreement if arbitration is elected by CITY. Any controversy or claim arising out of or relating to this Agreement, or breach thereof, may be settled by arbitration in accordance with the rules of the American Arbitration Association and judgment upon the award rendered by the arbitrators may be entered into by any court having jurisdiction thereof. In the event arbitration is elected by CITY, such controversy or claim shall be submitted to one arbitrator selected from the National Panel of The American Arbitration Association.

20.2 **Operations During Dispute.**



20.2.1 In the event that a dispute, if any, arises between CITY and CONTRACTOR relating to this Agreement, performance or compensation hereunder, CONTRACTOR shall continue to render service in full compliance with all terms and conditions of this Agreement as interpreted by CITY regardless of such dispute.

20.2.2 CONTRACTOR expressly recognizes the paramount right and duty of CITY to provide adequate maintenance of CITY's Property, and further agrees, in consideration for the execution of this Agreement, that in the event of such a dispute, if any, it will not seek injunctive relief in any court, but will negotiate with CITY for an adjustment on the matter or matters in dispute and, upon failure of said negotiations to resolve the dispute, may present the matter to a court of competent jurisdiction in an appropriate suit therefore instituted by it or by CITY.

ARTICLE 21

PUBLIC RECORDS

21.1 The City of Pembroke Pines is public agency subject to Chapter 119, Florida Statutes. The CONTRACTOR shall comply with Florida's Public Records Law. Specifically, the CONTRACTOR shall:

21.1.1 Keep and maintain public records required by the CITY to perform the service;

21.1.2 Upon request from the CITY's custodian of public records, provide the CITY with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in chapter 119, Fla. Stat., or as otherwise provided by law;

21.1.3 Ensure that public records that are exempt or that are confidential and exempt from public record disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and, following completion of the contract, CONTRACTOR shall destroy all copies of such confidential and exempt records remaining in its possession after the CONTRACTOR transfers the records in its possession to the CITY; and

21.1.4 Upon completion of the contract, CONTRACTOR shall transfer to the CITY, at no cost to the CITY, all public records in CONTRACTOR's possession. All records stored electronically by the CONTRACTOR must be provided to the CITY, upon request from the CITY's custodian of public records, in a format that is compatible with the information technology systems of the CITY.

21.2 The failure of Contractor to comply with the provisions set forth in this Article shall constitute a Default and Breach of this Agreement and the CITY shall enforce the Default in accordance with the provisions set forth in **Article 18**.

IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC



**RECORDS RELATING TO THIS CONTRACT, CONTACT THE
CUSTODIAN OF PUBLIC RECORDS AT**

**CITY CLERK
601 CITY CENTER WAY, 4th FLOOR
PEMBROKE PINES, FL 33025
(954) 450-1050
mgraham@ppines.com**

**ARTICLE 22
MISCELLANEOUS**

22.1 **Ownership of Documents.** Reports, surveys, studies, and other data provided in connection with this Agreement are and shall remain the property of CITY, whether or not the project for which they are made is completed.

22.2 **Legal Representation.** It is acknowledged that each party to this agreement had the opportunity to be represented by counsel in the preparation of this Agreement, and accordingly, the rule that a contract shall be interpreted strictly against the party preparing same shall not apply herein due to the joint contributions of both parties.

22.3 **Records.** CONTRACTOR shall keep such records and accounts and require any and all subcontractors to keep records and accounts as may be necessary in order to record complete and correct entries as to personnel hours charged to this engagement, and any expenses for which CONTRACTOR expects to be reimbursed. Such books and records will be available at all reasonable times for examination and audit by CITY and shall be kept for a period of ten (10) years after the completion of all work to be performed pursuant to this Agreement. Incomplete or incorrect entries in such books and records will be grounds for disallowance by CITY of any fees or expenses based upon such entries.

22.4 **Assignments; Amendments.** This Agreement, and any interests herein, shall not be assigned, transferred or otherwise encumbered, under any circumstances, by CONTRACTOR without the prior written consent of CITY. For purposes of this Agreement, any change of ownership of CONTRACTOR shall constitute an assignment which requires CITY approval. However, this Agreement shall run to the benefit of CITY and its successors and assigns.

22.5 **No Contingent Fees.** CONTRACTOR warrants that it has not employed or retained any company or person, other than a bona fide employee working solely for CONTRACTOR to solicit or secure this Agreement, and that it has not paid or agreed to pay any person, company, corporation, individual or firm, other than a bona fide employee working solely for CONTRACTOR any fee, commission, percentage, gift, or other consideration contingent upon or resulting from the award or making of this Agreement. For the breach or violation of this provision, CITY shall have the right to terminate the Agreement without liability at its discretion, to deduct from the contract price, or otherwise recover the full amount of such fee, commission, percentage, gift or consideration.



22.6 **Notice.** Whenever any party desires to give notice unto any other party, it must be given by written notice, sent by certified United States mail, with return receipt requested, addressed to the party for whom it is intended and the remaining party, at the places last specified, and the places for giving of notice shall remain such until they shall have been changed by written notice in compliance with the provisions of this section. For the present, CONTRACTOR and CITY designate the following as the respective places for giving of notice:

CITY Charles F. Dodge, City Manager
City of Pembroke Pines
601 City Center Way
Pembroke Pines, Florida 33025
Telephone No. (954) 450-1040

Copy To: Samuel S. Goren, City Attorney
Goren, Cherof, Doody & Ezrol, P.A.
3099 East Commercial Boulevard, Suite 200
Fort Lauderdale, Florida 33308
Telephone No. (954) 771-4500
Facsimile No. (954) 771-4923

Contractor «Vendor_Contact_Title»
«Vendor_Name»
«Vendor_Address_Line_1»
«Vendor_Address_Line_2»
E-mail: «Vendor_Email»
Telephone No: «Vendor_Phone_Number»
Cell phone No: «Vendor_Cell_Number»
Facsimile No: «Vendor_Fax_Number»

22.7 **Binding Authority.** Each person signing this Agreement on behalf of either party individually warrants that he or she has full legal power to execute this Agreement on behalf of the party for whom he or she is signing, and to bind and obligate such party with respect to all provisions contained in this Agreement.

22.8 **Headings.** Headings herein are for the convenience of reference only and shall not be considered in any interpretation of this Agreement.

22.9 **Exhibits.** Each Exhibit referred to in this Agreement forms an essential part of this Agreement. The exhibits if not physically attached should be treated as part of this Agreement and are incorporated herein by reference.

22.10 **Severability.** If any provision of this Agreement or application thereof to any person or situation shall to any extent, be held invalid or unenforceable, the remainder of this Agreement, and the application of such provisions to persons or situations other than those as to which it shall have



been held invalid or unenforceable, shall not be affected thereby, and shall continue in full force and effect, and be enforced to the fullest extent permitted by law.

22.11 **Extent of Agreement.** This Agreement represents the entire and integrated agreement between CITY and CONTRACTOR and supersedes all prior negotiations, representations or agreements, either written or oral.

22.12 **Waiver.** Failure of CITY to insist upon strict performance of any provision or condition of this Agreement, or to execute any right therein contained, shall not be constructed as a waiver or relinquishment for the future of any such provision, condition, or right, but the same shall remain in full force and effect.

22.13 **Attorney's Fees.** In the event that either party brings suit for enforcement of this Agreement, each party shall bear its own attorney's fees and court costs, except as otherwise provided under the indemnification provisions set forth herein above.

22.14 **Protection of City Property.** At all times during the performance of this Agreement, CONTRACTOR shall protect CITY's property from all damage whatsoever on account of the work being carried on under this Agreement.

22.15 **Counterparts and Execution.** This Agreement may be executed in multiple originals or counterparts, each of which shall be deemed to be an original and together shall constitute one and the same agreement. Execution and delivery of this Agreement by the Parties shall be legally binding, valid and effective upon delivery of the executed documents to the other party through facsimile transmission, email, or other electronic delivery.

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HAS BEEN INTENTIONALLY LEFT BLANK

REFERENCES FORM

Provide specific examples of similar contracts. References should be should be capable of explaining and confirming your firm's capacity to successfully complete the scope of work outlined herein. **This form should be duplicated for each reference and any additional information that would be helpful can be attached.**

Reference Contact Information:

Name of Firm, City, County or Agency:

Address:

City/State/Zip:

Contact Name:

Title:

E-Mail Address:

Telephone:

Fax:

Project Information:

Name and location of the project:

Nature of the firm's responsibility on the project:

Project duration:

Completion (Anticipated) Date:

Size of project:

Cost of project:

Work for which staff was responsible:

Contract Type:

The results/deliverables of the project:

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City/State/Zip:

Contact Name: Title:

E-Mail Address:

Telephone: Fax:

Project Information:

Name and location of the project:

Nature of the firm's responsibility on the project:

Project duration: Completion (Anticipated) Date:

Size of project: Cost of project:

Work for which staff was responsible:

Contract Type:

The results/deliverables of the project:



Mandatory Pre-Bid/Site Visit Confirmation Form

The scanned form, signed by both the Contractor and City Representatives must be uploaded in order for the bid to be considered complete.

_____, who is a representative of
(Printed name of Contractor’s representative)

_____ PERSONALLY came and appeared
(Contractor’s Company)

before me and affirms that they have completed the mandatory pre-bid/site visit on this the

_____ day of _____, 20_____ as required by:

Solicitation #: _____

Solicitation Title: _____

(Contractor Representative’s Printed Name)

(City Representative’s Printed Name)

(Contractor Representative’s Signature)

(City Representative’s Signature)

(Contractor’s Company)

(City Representative’s Department)

(Contractor’s Phone Number)

(City Representative’s Phone Number)

(Date)

(Date)

The City requires all questions on the “ the BidSync website. Such request must be received by the “Question Due Date,” questions received after the “Question Due Date” shall not be answered. Interpretations or clarifications in response to such questions will be issued via BidSync. The issuance of a response via BidSync is considered an Addendum and shall be the only official method whereby such an interpretation or clarification will be made.



City of Pembroke Pines



FINAL/PARTIAL RELEASE OF LIEN

KNOW ALL MEN BY THESE PRESENTS:

That the undersigned, for and in consideration of the payment of the sum of \$ [Payment Amount] and other valuable consideration, paid by **City of Pembroke Pines**, receipt of which is hereby acknowledge, hereby releases and quit claims to the said [Contractor Name] its successors and assigns, and

City of Pembroke Pines

The owner, all liens, lien rights, claims and demands of any kind whatsoever, which the undersigned now has or might have against the building on premises legally described as:

[Description]
PO #: [PO #]

Invoice #: [Invoice #]

On account of labor performed and/or material furnished for the construction of any improvements thereon. That all labor and materials used by the undersigned in the erection of said improvements have been fully paid for:

Witnesses:

Print Name

Print Name

STATE OF FLORIDA)

) ss:

COUNTY OF BROWARD)

ON THIS _____ day of _____, 20____, before me, the undersigned notary public, personally appeared [Contractor's Representative] as [Job Title] of [Name of Contractor], personally known to me, or who has produced

_____ as identification, and is the person who subscribed to the foregoing instrument and who acknowledged that (s)he executed the same and that (s)he was duly authorized to do so.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

NOTARY PUBLIC

Print or Type Name

My Commission Expires:



VENDOR DRUG-FREE WORKPLACE CERTIFICATION FORM

SECTION 1 GENERAL TERM

Preference may be given to vendors submitting a certification with their bid/proposal certifying they have a drug-free workplace in accordance with Section 287.087, Florida Statutes. This requirement affects all public entities of the State and becomes effective January 1, 1991. The special condition is as follows:

IDENTICAL TIE BIDS - Preference may be given to businesses with drug-free workplace programs. Whenever two or more bids that are equal with respect to price, quality, and service are received by the State or by any political subdivision for the procurement of commodities or contractual services, a bid received from a business that certifies that it has implemented a drugfree workplace program shall be given preference in the award process. Established procedures for processing tie bids will be followed if none of the tied vendors have a drug-free workplace program. In order to have a drug-free workplace program, a business shall:

1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.
2. Inform employees about the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.
3. Give each employee engaged in providing the commodities or contractual services that are under bid a copy of the statement specified in subsection (1).
4. In the statement specified in subsection (1), notify the employees that, as a condition of working on the commodities or contractual services that are under bid, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or nolo contendere to, any violation of chapter 893 or of any controlled substance law of the United States or any state, for a violation occurring in the workplace no later than five (5) days after each conviction.
5. Impose a sanction on, or require the satisfactory participation in a drug abuse assistance or rehabilitation program if such is available in the employee's community, by any employee who is so convicted.
6. Make a good faith effort to continue to maintain a drug-free workplace through implementation of this section.

SECTION 2 AFFIRMATION

Place a check mark here only if affirming bidder **complies fully** with the above requirements for a Drug-Free Workplace.

Place a check mark here only if affirming bidder **does not** meet the requirements for a Drug-Free Workplace.

Failure to complete this certification at this time (by checking either of the boxes above) shall render the vendor ineligible for Drug-Free Workplace Preference. This form must be completed by/for the proposer; the proposer WILL NOT qualify for Drug-Free Workplace Preference based on their sub-contractors' qualifications.

Authorized Signature

Authorized Signer Name

Company Name



VENDOR CERTIFICATION REGARDING
SCRUTINIZED COMPANIZED LIST

Respondent Vendor Name: _____

Vendor FEIN: _____

Vendor's Authorized Representative Name and Title: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone Number: _____

Email Address: _____

Section 287.135, Florida Statutes, prohibits agencies from contracting with companies, for goods or services of \$1 million or more, that are ineligible under Section 287.135(2), Florida Statutes. This requirement is not applicable to federally funded contracts.

As the person authorized to sign on behalf of Respondent, I hereby certify that the company identified above in the section entitled "Respondent Vendor Name" is not ineligible under Section 287.135(2), Florida Statutes. I understand that pursuant to section 287.135, Florida Statutes, the submission of a false certification may subject company to civil penalties, attorney's fees, and/or costs.

Certified By: _____,

who is authorized to sign on behalf of the above referenced company.

Authorized Signature Print Name and Title: _____

Date: _____

SECTION 01010
SUMMARY OF WORK

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes general descriptions of the Contractor use of site, location of work, description of work, work sequence, owner occupancy and work by others.

1.02 RELATED SECTIONS

- A. Section 01011 – Special Project Procedures
 B. Section 01015 – General Requirements
 C. Section 01025 – Measurement and Payment
 D. Section 01505 – Control of Work
 E. Other Sections as applicable.

1.03 REFERENCES (NOT USED)

1.04 CONTRACTOR USE OF SITE

- A. Contractors use of lands other than those depicted in the Drawings shall require written approval from the land owner and be at the Contractors risk and cost.
- B. Limit use of the site to allow:
1. Continued operation of the booster station to the maximum extent possible.
 2. Work by Others, designated by the OWNER.
 3. Inspection by jurisdictional agencies.
 4. Contractor shall accommodate owner operations.
- C. Coordinate any facility shutdown with OWNER. Service may only be interrupted after coordination with OWNER. In the event that service is disrupted, Contractor shall work continuously to restore proper operations.
- D. Nothing in this Contract shall imply that the CONTRACTOR shall have exclusive use of roadways or public and private lands for the execution of the work.

1.05 LOCATION OF WORK

- A. Academic Village Booster Station
1. The work is located inside the Academic Village Booster station located in the northeast corner of the Pembroke Pines Charter High School at 17189 Sheridan Street, Pembroke Pines, FL 33331.

01/2017

01010-1

91-0134.1

B. Holly Lakes Booster Station

1. The facility is located on the western border of the city at 21800 NW 8th Place, Pembroke Pines, FL 33029.

1.06 DESCRIPTION OF WORK

- A. The following is a general list of the work included. It is not intended to be complete. Consult the contract drawings and specifications for all contract requirements. The work of this contract comprises the following:

B. Academic Village Booster Station

1. The construction and installation of one bulk-liquid sodium hypochlorite disinfection system, interconnecting influent and effluent disinfection piping, chemical injection points, and related appurtenances (e.g., valves, fittings, and connections to existing lines).
2. The installation of field instruments, controls, and electrical components necessary to provide a complete and properly functioning system. This portion of the project shall include excavation and backfilling of areas as necessary for installation of underground piping and components.

C. Holly Lakes Booster Station

1. The construction and installation of one bulk-liquid sodium hypochlorite disinfection system, interconnecting influent and effluent disinfection piping, chemical injection points, and related appurtenances (e.g., valves, fittings, and connections to existing lines).
2. The installation of field instruments, controls, and electrical components necessary to provide a complete and properly functioning system. This portion of the project shall include excavation and backfilling of areas as necessary for installation of underground piping and components.
3. Modifications to the interconnecting pipe between Tank No. 1 and Tank No. 2 and installation of new yard piping with its related appurtenances.
4. Replacement of altitude valves with fill valves for Tank No. 1 and Tank No. 2.

1.07 WORK SEQUENCE

See Specification 01011 – Special Project Procedures.

1.08 OWNER OCCUPANCY

- A. Coordinate with Owner to minimize conflict, and to facilitate Residences and Owner's operations.
- B. Schedule the Work to accommodate this requirement.

1.09 WORK BY OTHERS

- A. The Contractor is advised that work by others may take place during the duration of the contract time. It shall be the Contractor's responsibility to coordinate and

01/2017

01010-2

91-0134.1

schedule all Work as not to delay or hinder his work or the work by others.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01/2017

01010-3

91-0134.1

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01010-4

91-0134.1

SECTION 01011

SPECIAL PROJECT PROCEDURES

PART 1 - GENERAL

1.01 GENERAL ITEMS

- A. Contractor's activities that interface with existing facilities or disrupt the operation of existing facilities must be coordinated in advance. Requests for permission to disrupt existing operations shall be submitted in writing to the Owner, Operator, and Engineer at least 72 hours in advance of performing the work.
- B. Contractor shall coordinate and sequence all the Work as it pertains to new construction, connections to existing facilities, construction of replacement facilities, abandonment of existing facilities, modification to existing facilities, and interface with construction activities by others on and around the site.
- C. Contractor shall coordinate system start-up and testing of modifications to existing facilities and new facilities constructed by Contractor.
- D. Contractor shall notify all agencies, utility companies, and any other entities affected by the Work in writing, with copy to the Owner, a minimum of 48 hours prior to performing said activity.
- E. Contractor shall notify the Engineer, Operator, and the Owner in writing 48 hours prior to performing any material, leak, pressure, or similar type testing.
- F. All materials and equipment removed from service as part of this project are to be salvaged or otherwise legally disposed of by the Contractor.

1.02 RELATED REQUIREMENTS

- A. Section 01015 – General Requirements
- B. Section 01531 – Protection of Existing Property
- C. Other Sections as applicable.

1.03 SITE ACCESS

- A. Access within the Booster Stations shall be via the existing roadways and shall be limited to work related to the facilities only. Access to and throughout the interior of the Booster Stations must remain unobstructed for daily operations.
- B. Owner reserves the right to shift or otherwise modify access points if needed to maintain facilities operation.
- C. The Contractor shall coordinate the delivery of materials and equipment with the other contractors to minimize disruption to their operations and avoid damage to

01/2017

01011-1

91-0134.1

their work. Damage by Contractor to work performed by others shall be repaired to design conditions by the Contractor at the Contractor's expense.

- D. Damage to the roadways, gates, fences, etc. by Contractor shall be repaired by Contractor at Contractor's expense.

1.04 UTILITIES

- A. Coordinate the activities of all utility companies (as applicable) with equipment/ facilities located within the construction area with the Contractor's work including the work of the Contractor's subcontractors.

1.05 SAFETYPROGRAM

- A. The Contractor is advised that there are chemicals (i.e. sodium hypochlorite) on site. The Contractor's personnel and Contractor's subcontractors' personnel will or may at times be working adjacent to these chemical hazards. Accordingly, the Contractor shall comply with the following requirements:

1. Assure that each employee is trained in the work practices necessary to safely perform their job function near toxic and hazardous chemicals. Obtain explicit written permission from the Owner prior to conducting work near the existing sodium hypochlorite facilities.
2. Assure that Contractor's employees are instructed in the known fire, explosion, and release hazards related to toxic chemicals and the process system being worked on.
3. Document the safety training that Contractor's employees have received and maintain a record containing the identity of the employee, the date of training, and the procedure to verify that the employee understood the training.
4. Assure that Contractor's employees follow the Owner's written safety rules and procedures when working around toxic chemicals.
5. Advise the Owner of any unique hazards presented by the Contractor's work, or of any hazards discovered by the Contractor or Contractor's employees.
6. Prior to start-up of all new process systems, both chemical and non-chemical, Contractor shall conduct a pre-startup safety review for each process. Safety review shall confirm that the process equipment meets the Specifications and that written safety, operating, maintenance, and emergency procedures exist for the new equipment and that required operator training has been provided to Owner's operating staff.

1.06 CONTRACTOR STAGING AND STORAGE AREA

- A. To accommodate construction for the project with the least amount of disruption to continued operation to the facility, the Contractor shall:

01/2017

01011-2

91-0134.1

1. Identify a staging area and request for Owner's written approval.
2. Store materials in the designated staging area.
3. Coordinate delivery of materials to be stored in said area with facility operating staff and accommodate the impacts to other site activities.
4. When necessary, if materials and/or equipment require additional space, Contractor shall inform Engineer and obtain permission from Owner to expand boundaries of staging area should it be possible.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 FACTORS INFLUENCING THE SEQUENCE OF WORK

- A. To assist Contractor with planning and scheduling the Work, the following guidance is provided to advise contractor of certain constraints, limitations, and sequencing that must be considered for the Work to proceed in an orderly and timely manner.
- B. Only those general aspects of the facility and operation that were apparent during design have been identified herein. Contractor shall consider these items; the Completion Milestone requirements as defined in the Construction Contract; typical coordination between new and existing facilities; typical coordination between and within new facilities; new information and situations identified during the project; start up activities; and any/all other necessary aspects into the construction sequence and schedule for this project.

3.02 GENERAL

- A. Work will be performed first at the Holly Lakes Booster Station followed by the Academic Village Booster Station. Contractor can perform work at both stations with approval from OWNER and if the work will not interfere with the operations of the booster station. Only one booster station can be out of service at a time.
- B. Contractor's activities that interface with existing facilities or disrupt the operation of existing facilities must be coordinated in advance. Requests for permission to disrupt existing operations shall be submitted in writing to the Owner and Engineer at least 72 hours in advance of performing the work. Contractor is responsible for minimizing the disruptions to the Booster Stations to the maximum extent possible.
- C. Except for certain sequencing identified herein, connections to existing facilities, and start up activities, a large portion of construction for the Contract can proceed relatively independent of the existing facility or other work.

01/2017

01011-3

91-0134.1

3.03 SITE WORK

- A. Following the excavation, preparation and attainment of the required soil conditions must be accomplished prior to construction activities related to the concrete slab.
- B. Testing and verification of required soil compaction density is critical. In accordance with required specifications, test results must be provided to Engineer and Owner.

3.04 TEMPORARY SODIUM HYPOCHLORITE SYSTEM

- A. Contractor shall install a temporary sodium hypochlorite injection system to maintain the existing sodium hypochlorite dosage requirements of the booster stations. The temporary sodium hypochlorite injection system shall consist of:
 - 1. Chemical compatible totes (number as needed).
 - 2. L-Bracket Berm, as manufactured by Ready Containment LLC, Palmetto, FL or Engineer approved equal, capable of holding 110% of the totes total volume.
 - 3. Temporary metering pumps (existing metering pumps can be re-used with written approval by operations staff).
 - 4. The temporary system shall be located such that it will not be disrupted during the erection of the permanent disinfection system.

3.05 ACADEMIC VILLAGE BOOSTER STATION

- A. During execution of the work, the Academic Village Booster Station must remain fully operational at all times.
- B. Subject to limitations described herein, work that can be accomplished independent of the Booster Station operations includes overall project mobilization/set up; submittals; preliminary site exploration/investigation; and portions of site electrical.
- C. Demolition of this site includes:
 - 1. Existing sodium hypochlorite containment structure
 - 2. Existing sodium hypochlorite disinfection equipment
 - 3. Double containment pipe for ammonia injection
- D. Containment Dike and Equipment
 - 1. Minimum disruption to the Booster Station must be considered when constructing the containment dike. Also, Contractor is responsible to submit to the Owner and execute the stormwater pollution prevention plan.

01/2017

01011-4

91-0134.1

2. Installation of the new sodium hypochlorite tank and chemical skid system will require coordination with Booster Station operators as this activity may require movement restrictions.
3. Construction of additional sodium hypochlorite piping can be conducted as a function of equipment placement. This includes piping from chemical skid discharge to injection point and installation of the open-bottom utility vault for future ammonia injection.
4. Installation and testing of instrumentation needed to operate and control the sodium hypochlorite system. Instrumentation includes but is not limited to ultrasonic tank level, chlorine analyzer, tank fill panel, flow and chlorine residual display panel, and modifications to existing PLC panel as needed.

3.06 HOLLYLAKES BOOSTER STATION

- A. Subject to limitations described herein, work that can be accomplished independent of the Booster Station operations includes overall project mobilization/set up; submittals; preliminary site exploration/investigation; demolition; structural work; and portions of site electrical.
- B. Demolition of this site includes:
 1. Existing chlorine gas piping as shown on plans.
 2. Existing temporary sodium hypochlorite disinfection equipment.
 3. Existing storage tank interconnect piping as shown on plans.
 4. Two (2) altitude valves.
 5. Existing PLC panels as shown on plans.
- C. Yard Piping
 1. All connections with existing yard piping must be coordinated with Owner and Booster Station operations staff.
 2. To facilitate installation of the tie-in yard piping components, the Booster Pump Station must be shutdown. Installation of these components is an important first step as they set the follow-on alignment of corresponding yard piping common header and cross-connect piping between the storage tanks and high service pumps. In addition, the open-bottom utility vaults (for chemical injection) should be installed during this shut down.
 3. The aforementioned construction must be sequenced such that the temporary sodium hypochlorite system can be placed in operation as soon as possible. Yard piping must pass disinfection tests before putting the temporary disinfection system in service.
- D. Containment Dike and Equipment

01/2017

01011-5

91-0134.1

1. Minimum disruption to the Booster Station must be considered when constructing the containment dike. Also, Contractor is responsible to submit to the Owner and execute the stormwater pollution prevention plan.
2. Installation of the new sodium hypochlorite tank and chemical skid system will require coordination with Booster Station operators as this activity may require movement restrictions during heavy lifting at the Facility.
3. Construction of additional sodium hypochlorite piping can be conducted as a function of equipment placement. This includes piping from chemical skid discharge to injection point.
4. Installation and testing of instrumentation needed to operate and control the sodium hypochlorite system. Instrumentation includes but is not limited to ultrasonic tank level, chlorine analyzer, tank fill panel, flow and chlorine residual display panel, electronic valve controllers, UL Listed Control Panel, and modifications to existing PLC panel as needed.

3.07 ELECTRICAL AND INSTRUMENTATION

- A. As previously stated, portions of the electrical work can proceed independent of other project activities.
- B. For that electrical and system integration activity requiring work interdependencies, Contractor and Sub-contractors must coordinate with Owner and Facility operations staff so as to minimize disruption to continued operations.
- C. When and if necessary, Contractor will provide a means for operations staff to monitor and control the booster stations during integration with specific SCADA system terminals.

END OF SECTION

01/2017

01011-6

91-0134.1

SECTION 01012

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section includes administrative and procedural requirements for determining Work completed and ready for payment under a Lump Sum Bid where the Contractors approved Schedule of Values is utilized in Applications for Payment.

1.02 RELATED SECTIONS

- A. Section 01011 – Special Project Procedures
- B. Section 01370 – Schedule of Values
- C. Other Sections as applicable.

1.03 REFERENCES

- A. Manual of Uniform Traffic Control Devices (MUTCD)
- B. FDOT Standard Specification for Road and Bridge Construction (Standard Specifications)
- C. FDOT Design Standards for Design, Construction, Maintenance and Utility Operations in the State Highway System (Standard Indexes)
- D. Broward County Public Works and Transportation Department, Highway Construction and Engineering Division Minimum Standards

1.04 GENERAL REQUIREMENTS

- A. Prices shall include all costs required for the completed, in-place construction of the specified unit of work. This may include but not be limited to, materials and delivery; cost of installation; incidentals; labor including social security, insurance, and other required fringe benefits; workman's compensation insurance; bond premiums; rental of equipment and machinery; taxes; testing; surveys; incidental expenses; and supervision.
- B. Installation, acceptance, and payment shall be in accordance with the REFERENCES.
- C. The Owner reserves the right to reject the Contractor's measurement of completed work that involves use of established unit prices, and to have this work measured by an independent surveyor acceptable to the Contractor at the Owner's expense.
- D. Contract Sum adjustments will be by Change Order on basis of net accumulative change for each unit price category.

01/2017

01012-1

91-0134.1

1. Except as otherwise specified, unit prices shall apply to both deductive and additive variations of quantities.
 2. Lump sum and unit prices in the Agreement shall remain in effect until date of final completion of the entire Work.
- E. Partial payment for material and equipment properly stored and protected will be made in accordance with requirements of the General Conditions.
- F. Abbreviations:
1. Acre - AC
 2. Allowance - AL
 3. Cubic Yard - CY
 4. Each - EA
 5. Furnish and Install - F & I
 6. Gallons - GA
 7. Gross Mile - GM
 8. Linear Feet - LF
 9. Lump Sum - LS
 10. Million Gallons - MG
 11. Net Mile - NM
 12. Square Foot - SF
 13. Square Yard - SY
 14. Ton - TN

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 MEASUREMENT AND PAYMENT

- A. Payment shall constitute full compensation and will be made as indicated in the General Conditions.
- B. The quantity approved for payment shall be either:
 1. Percentage of the Lump Sum Price - A percentage of the Lump Sum Price equivalent to the percentage of the project completion as determined by the Engineer as of the date of the pay request submitted. The percent completion of the project shall be based on the percent of the total project actually constructed and not on the percent of the Contract price completed.
 2. Measured Quantities - The actual quantities in-place and accepted as measured by the Engineer on the date of the pay request submitted in the units specified in the bid form or schedule of values.

01/2017

01012-2

91-0134.1

3.02 PROTECTION

- A. Where pavement, pipes, valves, appurtenances, trees, shrubbery, fences, other property or structures are in proximity to the WORK, adequate protection shall be provided. Such protection is considered incidental to construction and shall not be assigned to any pay item.

3.03 RESTORATION

- A. Where pavement, pipes, valves, structures, appurtenances, trees, shrubbery, fences, other property or structures not designated as pay items, have been damaged, removed or disturbed by the Contractor, whether deliberately or through failure to carry out the requirements of the Contract Documents, state laws, municipal ordinances or the specific direction of the Engineer, or through failure to employ usual and reasonable safeguards, such property and surface structures shall be replaced or repaired at the expense of the Contractor to a condition equal to that before work began within a time frame approved by the Engineer. Such restoration is considered incidental to construction and shall not be assigned to any pay item.

3.04 GENERAL REQUIREMENTS - BID ITEM NO. 1.01

- A. Payment shall be made as a percentage of the Lump Sum Price.
- B. The lump sum price shall include temporary facilities, the cost of bonds, insurance, licenses and other miscellaneous administrative costs not specifically identified in the costs of other work or any other pre-construction expenses necessary for the start of the Work, excluding the cost for construction material.

3.05 MOBILIZATION AND DEMOBILIZATION - BID ITEM NO. 1.02

- A. Payment shall be made as a percentage of the Lump Sum Price.
- B. The Lump Sum Price shall include compensation for all labor, materials, equipment and all other incidentals required for all temporary facilities, transportation, communications, office, maintenance, and any other pre- or post-construction expenses necessary for the start or cessation of the Work at both the Academic Village and the Holly Lakes Booster Stations, not specifically identified in the costs of other work.
- C. The lump sum price shall exclude the cost for construction material and installation.
- D. No further payment shall be made for remobilization unless all of the work is suspended by the Engineer for a period in excess of three months and through no fault to the Contractor.
- E. The lump sum price shall not exceed five percent (5%) of the contract price.

3.06 TESTING AND SURVEY - BID ITEM NO. 1.03

- A. Payment shall be made based as a percentage of the Lump Sum Price.

01/2017

01012-3

91-0134.1

- B. The Lump Sum Price shall include full compensation to perform all calculations and field work required, in order to establish all horizontal and vertical controls, set all stakes needed, such as grade stakes, offset stakes, reference point stakes, slopes stakes, and other reference marks or points necessary to provide lines and grades for construction and as-building of all roadway, utility construction and miscellaneous items. Payment for this item also shall include all field testing and laboratory work including reports as required by the plans and specifications.

3.07 PREVENTION, CONTROL, AND ABATEMENT OF EROSION AND WATER POLLUTION - BID ITEM NO. 1.04

- A. Payment shall be made as a percentage of the Lump Sum Price.
- B. The Lump Sum Price shall include full compensation for all equipment, materials, supplies, and labor necessary to prepare, obtain permit approval from the governing agency, and implement the prevention, control, and abatement of erosion and water pollution. Work shall include but not be limited to mulching, sand bagging, slope drains, sediment basins, berms, baled hay or straw, silt fences and staked turbidity barriers, rock bags, artificial coverings and other items relating to the construction/removal and routine maintenance, including mowing, or the prevention, control and abatement of erosion and water pollution plan.

3.08 TRENCH SAFETY ACT COMPLIANCE- BID ITEM NO. 1.05

- A. Payment shall be made as a percentage of the Lump Sum Price.
- B. The Lump Sum Price shall include furnishing and installing adequate trench safety measures, any special shoring measures for trench safety act compliance for the project shall be made at the Contract Lump Sum price bid for this item.
- C. Payment item for Trench Safety, Shoring, and Security Fencing shall not exceed one percent (1%) of the contract price.
- D. Refer to section 02221.

3.09 SITE WORK - BID ITEM NO. 2.01 AND NO. 3.01

- A. Payment shall be made at the Lump Sum Price named in the Proposal.
- B. Payment for site excavation, dewatering, dewatering permit acquisition, site filling, site grading and all other costs to the Contractor not specifically identified in the costs of other work under the Contract. Price shall constitute full compensation for the complete preparation, installation, and successful testing of the soil conditions to facilitate construction of the concrete foundation in support of the chemical storage tank and related items; including but not limited to: furnishing, installation, preparation, and soil density compaction verification, site excavation, site filling, site grading, dewatering, dewatering permit acquisition, backfill and compaction, coordination with any other utility/agency, preparation of as-built drawings, pavement restoration, and all other site restoration work. Contractor shall achieve and verify successful attainment of soil compaction pressure to 2000 psf over area designated for secondary containment structure foundation installation.

01/2017

01012-4

91-0134.1

- C. All work shall be constructed as shown on the plans and specifications, and any required work for the satisfactory completion of the project not included in a separate bid item shall be considered as part of the site work and shall be included in this bid item. Site work shall be complete and satisfactorily tested to the Owner and the Engineer, and ready for service, all in accordance with the Contract Documents.
- D. Full payment to be made at the completion of this bid item.

3.10 STRUCTURAL WORK - BID ITEM NO. 2.02 AND NO. 3.02

- A. Payment shall be made at the Lump Sum Price named in the Proposal.
- B. Payment for concrete structures, foundations, pipe supports, tank pads, HSS columns, canopy metal work, and all other costs to the Contractor not specifically identified in the costs of other work under the Contract. Price shall constitute full compensation for the complete installation, successful testing and operation of the structures and related items; including but not limited to: excavation, dewatering, dewatering permit acquisition, backfill and compaction, construction of the reinforced concrete secondary containment dike structures, construction of metal canopy, chemical storage tank concrete pads, handrails, pipe supports, surface preparation and application of proper protective coating, preparation of as-built drawings and all other related structural work. Containment dike structural work shall be complete and satisfactorily tested to the Owner and the Engineer, and ready for service, all in accordance with the Contract Documents.

3.11 MECHANICAL WORK – BID ITEM NO. 2.03 AND NO. 3.03

- A. Payment shall be made at the Lump Sum Price named in the Proposal.
- B. Payment for the furnishing and installation of the chemical storage tanks, chemical metering pump skids, injection vaults, bag filters, safety showers, water storage tank fill valves, piping, valves, fittings, pipe supports, temporary bracing of existing adjacent structures, disposal of surplus and demolished materials, location of existing underground utilities, coordination with any other utility/agency, preparation of as-built drawings, and all other costs to the Contractor associated with the mechanical work that is not specifically identified in the costs of other work under the Contract.
- C. Price shall constitute full compensation for the complete installation, successful testing and operation of this work; including but not limited to: furnishing and installation of chemical storage tanks, chemical metering pump skids, injection vaults, bag filters, safety showers, water storage tank fill valves, piping, valves, fittings, pipe supports and all appurtenances. Appurtenances include but are not limited to: tank ladder, tank restraint system, and reverse float indicator. Mechanical Work to be constructed as shown on plans and specifications and any required work for the satisfactory completion of the project not included in a separate bid item shall be considered as part of the Mechanical Work and shall be included in this bid item.
- D. All Mechanical Work shall be complete, energized, and satisfactorily tested to the Owner and the Engineer, and ready for service, all in accordance with the Contract Documents.

01/2017

01012-5

91-0134.1

3.12 ELECTRICAL WORK – BID ITEM NO. 2.04 AND 3.04

- A. Payment for this item shall be made at the lump sum price named in the proposal.
- B. Payment for all electrical work associated with the complete installation of the sodium hypochlorite injection system work including that, which is not specifically identified in the costs of other work under the Contract.
- C. Price shall constitute full compensation for the complete installation, successful testing and operation of this work; including but not limited to: furnishing and installation of electrical components, service connections, coordination with any other utility/ agency, and preparation of as-built drawings. All Electrical work to be constructed as shown on the plans and specifications, and any required work for the satisfactory completion of the project not included in a separate bid item shall be considered as part of the Electrical Work and shall be included in this bid item.
- D. Electrical Work shall be complete, energized, and satisfactorily tested to the Owner and the Engineer, and ready for service, all in accordance with the Contract Documents.

3.13 INSTRUMENTATION & CONTROLS WORK – BID ITEM NO. 2.05 AND 3.05

- A. Payment for this item shall be made at the lump sum price named in the proposal. The system shall include hardware, software, and communications. Hardware shall be all control panels, pressure transducers, chlorine analyzers, ammonia analyzers, electronic valve controllers, ultrasonic tank levels, and other items required to perform the sodium hypochlorite injection operations. Software shall be all that is required to facilitate the sodium hypochlorite system local and remote indication, local and remote control, using a combination of touchscreens, push buttons, switches, and other devices. Communication shall include all communication between the local booster station and the Pembroke Pines Water Treatment Plant Control Station.

3.14 PERMITTING ALLOWANCE – BID ITEM NO. 4.01

- A. Payment for Permitting Allowance shall be made at the amount that will be determined at the time of permitting by the Contractor.
- B. Any difference between the payment and the permitting allowance shall become a credit or debit change order to the Contract with approval from the Engineer.

END OF SECTION

01/2017

01012-6

91-0134.1

SECTION 01015

GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section provides for miscellaneous provisions applicable to the Work.

1.02 RELATED SECTIONS

- A. Section 01011 – Special Project Procedures
- B. Section 01090 - References
- C. Section 01310 – Construction Schedules
- D. Section 01340 – Shop Drawings, Working Drawings and Samples
- E. Section 01530 –Existing Utilities
- F. Section 01720 – Project Record Documents
- G. Other Sections as applicable.

1.03 TERMINOLOGY

- A. Throughout the Contract Documents, the following definitions apply:
 1. Owner - The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
 2. Work - The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

1.04 SAFETY

- A. All work shall be done in a safe manner and in strict compliance with all requirements of the Federal Occupational Safety and Health Act (OSHA), The Florida Trench Safety Act and all other State and local safety and health regulations.
- B. The Contractor shall comply promptly with such safety regulations as may be prescribed by the Owner or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by, or unsafe practices on the part of, his employees. In the event of the Contractor's failure to comply, the Owner may take the necessary measures to correct the conditions or practices

01/2017

01015-1

91-0134.1

complained of, and all costs thereof will be deducted from any monies due. Failure of the Owner to direct the correction of unsafe conditions or practices shall not relieve the Contractor of his responsibilities.

- C. The Contractor shall provide, erect and maintain as necessary, strong and suitable barricades, danger signs and warning lights for the protection of the public.

1.05 APPLICABLE CODES

- A. The Contractor shall comply with the applicable standards codes and specifications governing the Contract Documents whether City, County, State or Federal. The Contractor is obligated to notify the Owner and Engineer of any deficiency contained in the Contract Documents immediately upon discovery. Where conflicts exist in such, the more stringent shall govern.

1.06 APPLICABLE PERMITS AND LICENSES

- A. The Contractor shall abide by all permit conditions, whether, general, specific, limited or otherwise. A copy of all applicable permits and licenses, with the exception of City permits obtained by the Contractor, are attached hereto and made a part of the Contract Documents.

1.07 PUBLIC BID DISCLOSURE ACT 218.80 FS

- A. All the local governmental entity permits or fees are to be disclosed, including, but not limited to, all license fees, permit fees, impact fees, or inspection fees, payable by the contractor to the unit of government that issued the bidding documents or other governmental agency,
- B. The following permits are required for this project: City of Pembroke Building Department. The cost for these permits is accounted for in the Permitting Allowance found in the Bid Form.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION RESPONSIBILITIES

- A. Upon receipt of the Notice To Proceed, the Contractor shall arrange for a Pre-Construction meeting. The meeting shall be held with a minimum of one weeks' notice and shall include the Engineer, the Owner and Owner's designated Representatives.

3.02 TEMPORARY UTILITIES

- A. The Contractor shall be responsible to arrange for and supply all temporary utilities including, but not limited to, water, sewer and electricity.

01/2017

01015-2

91-0134.1

- B. The cost of temporary utilities shall be considered incidental to the cost of the Work and is therefore included in the Bid.

3.03 UNDERGROUND LOCATING SERVICE

- A. Prior to underground construction, the Contractor is required by the Underground Facility Damage Prevention and Safety Act, Chapter 556 FS to contact Sunshine 811, for the location of underground utilities.

3.04 HURRICANE PREPAREDNESS PLAN

- A. Should the performance of the Work occur during Hurricane Season, within thirty days of the date of Notice to Proceed, the Contractor shall submit to the Engineer and Owner a Hurricane Preparedness Plan. The plan should outline the necessary measures that the Contractor proposes to perform at no additional cost to the Owner in case of a hurricane warning. The plan shall detail these measures with specific action items defining responsible personnel.

3.05 INCLEMENT WEATHER

- A. In the event of inclement weather, or whenever Engineer shall direct; Contractor will cause Subcontractors to protect carefully the Work and materials against damage or injury from the weather. If, in the opinion of the Engineer, any portion of Work or materials shall have been damaged or injured by reason of failure on the part of Contractor or any Subcontractor to so protect the Work, such Work and materials shall be removed and replaced at the expense of the Contractor.

3.06 PRESERVATION AND RESTORATION

- A. Contractor shall be responsible for the preservation and protection of property adjacent to the work site against damage or injury as a result of his operations under this project. Any damage or injury occurring on account of any act, omission or neglect on the part of the Contractor shall be restored in a proper and satisfactory manner or replaced by and at the expense of the Contractor to an equal or superior condition than previously existed.

3.07 PROTECTION OF WORK AND MATERIAL

- A. During the progress of the work and up to the date of final payment, the Contractor shall be solely responsible for the care and protection of all work and materials covered by the Contract.
- B. All work and materials shall be protected against damage, injury or loss from any cause whatsoever, and the Contractor shall make good any such damage or loss at his own expense. Protection measures shall be subject to the approval of the Owner and Engineer.

3.08 CONTRACTOR USE OF PREMISES

- A. Contractor shall have limited use of the premises for construction operations, including limited use of the site. The Contractor's use of the premises is further

01/2017

01015-3

91-0134.1

limited to the Owner's right to perform construction operations with its own forces or to employ separate Contractors on portions of the project.

- B. The Contractor shall be responsible for coordinating his daily activities in conjunction with any Contractors presently working within the vicinity of this project.
- C. Confine operations to areas within rights-of-way and easements.
- D. Keep existing driveways and entrances serving the premises clear and available to the Owner, Residents and the Owner's employees at all times.
 - 1. Do not use these areas for parking or storage of materials.
 - 2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

3.09 ENVIRONMENTAL PROTECTION

- A. Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result.
 - 1. adjustment of existing utilities
- B. The Contractor shall raise or lower all manholes, valve boxes, etc. to finished grade. The cost of these adjustments shall be considered incidental to the cost of the Work and is therefore included in the Bid.

3.10 EXISTING IRRIGATION

- A. All existing irrigation systems within the area of the Work shall be restored to original condition or better and adjusted to finished grade. The cost of repairs and/ or adjustment to existing irrigation shall be considered incidental to the cost of the Work and is therefore included in the Bid.

3.11 DEWATERING

- A. In accordance with SFWMD criteria contained in 40E-2.061 F.A.C., a dewatering permit is not required provided the following provisions are met:
 - 1. Maximum daily pumpage is less than 5 million gallons (MG) and a maximum total project pumpage of less than 100 MG over a one year period;
 - 2. All discharge shall remain on the project site;
 - 3. No dewatering shall occur to a depth below elevation 0.0 feet NGVD within 1,000 feet of saline water, except when dewatering water with a chloride concentration of greater than 1,000 milligrams per liter;
 - 4. No dewatering shall occur within 100 feet of a wastewater treatment plant rapid-rate land application system permitted under Part IV of Chapter 62-610, F.A.C.;

01/2017

01015-4

91-0134.1

5. No dewatering shall occur within 1,000 feet of a known landfill or contamination; and,
 6. No dewatering shall occur within 1,000 feet of a freshwater wetland unless dewatering activities are completed within 60 days.
 7. All dewatering operations are subject to the Permit Conditions in Section 5.0 of the SFWMD APPLICANT'S HANDBOOK FOR WATER USE PERMIT APPLICATIONS (07-16-2014), including responsibility for mitigating any harm that may occur as a result of the dewatering to existing legal uses, off-site land uses, or natural resources.
- B. The Contractor shall apply for a dewatering permit through the SFWMD if any of the above conditions cannot be met.
- C. The Contractor shall apply for a dewatering permit through the BCEPGMD if the project is in proximity to a known environmentally contaminated site.

3.12 DEMOLITION

- A. Limits of demolition which may be shown in the Contract Documents are general in nature. Actual limits of demolition shall be as determined by the field conditions in conformance with the requirements of the Work.
- B. All sidewalks within the limits of construction which are not ADA compliant (cross-slopes which exceed 2% and/or running slopes which exceed 5% and/or changes in level of ¼" or greater) shall be demolished and reconstructed to meet these requirements.
- C. When sidewalk tie-ins exist outside the limits of construction which are not ADA compliant, the Contractor shall replace those sections as directed by the Owner.

END OF SECTION

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01015-5

91-0134.1

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01/2017

01015-6

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SECTION 01021

OWNER CONTINGENCY ALLOWANCES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section provides for administrative procedures for the Contractors utilization of monetary amounts for Owner contingency allowances when contained in the Contract Price or Total Base Bid.
- B. The Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- C. The Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. All Owner contingency allowances which remain unused, in whole or in part, remain the property of the Owner.

1.02 RELATED SECTIONS

- A. Section 1 - Instructions
- B. Section 01012 – Measurement and Payment
- C. Section 01152 – Application for Payment
- D. Section 01310 - Construction Schedules
- E. Section 01340 – Shop Drawings, Working Drawings and Samples
- F. Other Sections as Applicable

1.03 SCHEDULE OF ALLOWANCES

- A. Refer to Section 1 - Instructions.

1.04 PROCEDURES FOR ADMINISTRATION OF ALLOWANCES.

- A. Funds will only be drawn from Owner contingency allowances by Change Order.
- B. Costs shall be as represented in the Unit Price Schedule or Unit Price Bid Form.
- C. Payment shall be as represented in Section 01012 – Measurement for Payment.

01/2017

01021-1

91-0134.1

1.05 COSTS INCLUDED IN ALLOWANCES

- A. Cost of materials to Contractor, less applicable trade discounts.
- B. Delivery to site, products handling at site, including unloading, uncrating, and storage.
- C. Applicable taxes unless covered by Owner Furnished Equipment agreement.
- D. Protection of products from elements and from damage.
- E. All labor, insurance, payroll, bonding, equipment rental, expenses for the installation and finishing necessary for a complete working system or product.
- F. Other expenses required to complete installation.
- G. Contractor field and home office overhead and profit.

1.06 CONTRACTOR RESPONSIBILITIES

- A. Promptly notify Engineer of any reasonable objections from supplier.
- B. On notification of selection, execute purchase agreement with designated supplier.
- C. Arrange for process shop drawings, product data, and samples.
- D. Arrange for delivery. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
- E. Install, adjust, and finish products.
- F. Provide warranties for products and installation.

1.07 CORRELATION WITH CONTRACTOR SUBMITTALS

- A. Schedule shop drawings, product data, samples, and delivery dates, in Progress Schedule for products selected under allowances.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01/2017

01021-2

91-0134.1

SECTION 01045
CUTTING AND PATCHING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Contractor shall be responsible for all cutting, fitting and patching required to complete the work or to:
1. Make its several parts fit together properly.
 2. Uncover portions of the Work to provide for installation of ill-timed work.
 3. Remove and replace defective work.
 4. Remove and replace work not conforming to requirements of Contract Documents.
 5. Remove samples of installed work as specified for testing.
 6. Investigate subsurface conditions or utilities.

1.02 RELATED SECTIONS

- A. Section 01010 - Summary of Work
- B. Section 01012 – Measurement for Payment
- C. Section 01015 – General Requirements
- D. Other Sections as applicable.

1.03 SUBMITTALS

- A. Submit a written request to the Engineer in advance of executing any cutting or alteration which affects:
1. Work of the Owner or any separate contractor.
 2. Structural value or integrity of any element of the Project.
 3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
 4. Efficiency, operational life, maintenance or safety of operational elements.
 5. Visual qualities of sight-exposed elements.
- B. Request shall include:
1. Identification of the Project.
 2. Description of affected work.

01/2017

01045-1

91-0134.1

3. The necessity for cutting, alteration or excavation.
 4. Effect on work of Owner or any separate contractor, or on structural or weatherproof integrity of Project.
 5. Description of proposed work:
 - a. Scope of cutting, patching, alteration, or excavation.
 - b. Trades who will execute the work.
 - c. Products proposed to be used.
 - d. Extent of refinishing to be redone.
 6. Alternatives to cutting and patching.
 7. Cost proposal, when applicable.
 8. Written permission of any separate contractor whose work will be affected.
- C. Submit written notice to the Engineer designating the date and the time work will be uncovered.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Comply with specifications and standards for each specific project involved.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Inspect existing conditions of Project, including elements subject to damage or to movement during cutting or patching.
- B. After uncovering work, inspect conditions affecting installation of Products, or performance of work.
- C. Report unsatisfactory or questionable conditions to the Engineer in writing; do not proceed with work until the Engineer has provided further instructions.

3.02 PREPARATION

- A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work.
- B. Provide devices and methods to protect other portions of Project from damage.
- C. Provide protection from elements for that portion of the Project which may be exposed by cutting and patching work, and maintain excavations free from water.

01/2017

01045-2

91-0134.1

3.03 PERFORMANCE

- A. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.
- B. Execute cutting methods which will prevent settlement or damage to other work.
- C. Employ original Installer or Fabricator to perform cutting and patching for:
 - 1. Weather-exposed or moisture-resistant surfaces.
 - 2. Sight-exposed finished surfaces.
- D. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.
- E. Restore work which has been cut or removed; install new products to provide completed Work in accord with requirements of Contract Documents.
- F. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
 - 1. For continuous surfaces, refinish to nearest intersection.
 - 2. For an assembly, refinish entire unit.

END OF SECTION

01/2017

01045-3

91-0134.1

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01/2017

01045-4

91-0134.1

SECTION 01046

MODIFICATIONS TO EXISTING STRUCTURES, PIPING, AND EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish all labor, materials, equipment and incidentals required to modify, alter and convert existing structures as shown or specified and as required for the installation of new mechanical equipment, piping and appurtenances. Existing piping and equipment shall be removed, salvaged, abandoned or dismantled as necessary for the performance of the Work.

1.02 RELATED SECTIONS

- A. Section 01011 – Special Project Procedures
- B. Section 01045 – Cutting and Patching
- C. Section 01310 – Construction Scheduling
- D. Other Sections as applicable.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

- A. The Contractor shall cut, repair, reuse, excavate, demolish, or otherwise remove parts of the existing structures or appurtenances, as indicated on the Drawings or specified herein or necessary for the performance of the Work.
- B. The above work shall include the cutting of grooves and chases in existing masonry to permit the proper bonding of new masonry to old, repainting of existing masonry, the drilling of holes into bolts, or other appurtenances, and the cutting of holes in masonry for the installation of pipe, conduits, and other appurtenances. The work shall include all necessary cutting and bending of reinforcing steel, structural steel, or miscellaneous metal work found embedded in the existing structures.
- C. Blasting with explosives will not be permitted to complete any work under this Contract.
- D. Care shall be taken not to damage any part of existing buildings, foundations and exterior structures both below and above ground.
- E. No existing structure, equipment, or appurtenance shall be shifted, cut, removed, or

01/2017

01046-1

91-0134.1

otherwise altered except with the express approval of and to the extent approved by the Engineer.

- F. When removing materials or portions of existing structures and when making openings in walls and partitions, the Contractor shall take all precautions and use all necessary barriers and other protective devices so as not to damage the structures or contents by falling or flying debris and not to damage the structures from excavation or undermining of existing structural supports, beams, footings, columns or any structural member.
- G. Materials and equipment removed in the course of making alterations and additions shall remain the property of the Owner, except that items not salvageable, as determined by the Engineer and the Owner shall become the property of the Contractor to be disposed of by him off the site of the work at his own place of disposal. The Contractor shall assist the Owner in loading and hauling of salvageable materials within the City limits of the project.
- H. All work of altering existing structures shall be done at such time and in such manner as will comply with the approved time schedule. So far as possible before any part of the work is started, all tools, equipment, and materials shall be assembled and made ready so that the work can be completed without delay.
- I. All workmanship and new materials involved in constructing the alterations shall conform to the General Specifications for the classes of work insofar as such specifications are applicable.
- J. All cutting of existing masonry or other material to provide suitable bonding to new work shall be done in a manner to meet the requirements of the respective section of these specifications covering the new work. When not covered, the work shall be carried on in the manner and to extent directed by the Engineer.
- K. Where holes in existing masonry are required to be sealed, unless otherwise herein specified, they shall be sealed with cement mortar or concrete. The sides of the openings shall be provided with keyed joints and shall be suitably roughened to furnish a good bond and make a watertight joint. All loose or unsound material adjacent to the opening shall be removed and, if necessary, replaced with new material. The method of placing the mortar seal shall provide a suitable means of releasing entrapped air.
- L. Surfaces of seals visible in the completed work shall be made to match as nearly as possible the adjacent surfaces.
- M. Non-shrink grout shall be used for setting wall castings, sleeves, leveling pump bases, doweling anchors into existing concrete and elsewhere as shown.
- N. Operating equipment shall be thoroughly cleaned and then lubricated and greased for protection during prolonged storage.
- O. The Contractor shall provide flumes, hoses, piping, etc. to divert or provide suitable plugs, bulkheads or other means to hold back the flow of wastewater, water or other

01/2017

01046-2

91-0134.1

liquids, all as required in the performance of the work under this Contract.

3.02 SALVAGE

- A. Any existing equipment or material, including but not limited to, motors, electrical components or controls, pipes, fittings, couplings, etc., which is removed or replaced as a result of construction under this project may be designated as salvage by the Engineer or Owner, and, if so, shall be removed or excavated, if necessary, and delivered to the Owner at a location directed by the Owner. Any equipment or material not worthy of salvaging, as directed by the Owner, shall be disposed of by the Contractor at a suitable location.

3.03 CONNECTING TO EXISTING PIPING AND EQUIPMENT

- A. The Contractor shall verify exact location, material, alignment, joint, etc. of existing piping and equipment prior to making the connections called out in the Drawings. The verifications shall be performed with adequate time to correct any potential alignment or other problems prior to the actual time of connection.
- B. The Contractor shall dismantle and remove all existing equipment, piping and other appurtenances required, he shall cut existing pipelines for the purpose of making connections thereto. Anchor bolts for equipment and structural steel removed shall be cut off one inch below the concrete surface. Surface shall be finished as specified in Division 3.
- C. At the time that a new connection is made to an existing pipeline, additional new piping, extending to and including the most convenient new valve, shall be installed.
- D. Where necessary or required for the purpose of making connections, the Contractor shall cut existing pipe lines in a manner to provide an approved joint. Where required, he shall weld beads, flanges or provide Dresser Couplings, all as specified and required.

END OF SECTION

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01046-3

91-0134.1

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01/2017

01046-4

91-0134.1

SECTION 01050

FIELD ENGINEERING AND SURVEYING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Provide and pay for field Engineering and surveying services required for Project as follows:
1. Surveying work required for the lay-out and execution of Work.
 2. Surveying work required to identify and maintain existing control points, bench marks and property line corners.
 3. Surveying work required to verify existing utility locations.
 4. Surveying work as required to create Project Record Documents.
 5. Civil, structural, or other professional Engineering services specified, or required to execute the Contractor's construction methods.
 6. Testing, sampling, calibrating and training services specified, or required to execute the Contractor's construction methods including soils, concrete, material, etc.

1.02 RELATED SECTIONS

- A. Section 01410 – Materials and Installation Testing
- B. Section 01720 - Project Record Documents
- C. Other Sections as applicable.

1.03 QUALIFICATIONS OF PROFESSIONAL

- A. Florida Registered Professional Surveyor and Mapper, acceptable to the Owner and the Engineer.
- B. Florida Registered Professional Engineer(s) of the specialty required for on the Project, acceptable to the Owner and the Engineer.

1.04 SURVEY REFERENCE POINTS

- A. Horizontal and vertical control points for the Project are to be established by the Engineer and provided to the Contractor.
- B. Locate and protect control points prior to starting work, and preserve all permanent reference points during construction.
1. Make no changes or relocations without prior written notice to the Engineer.

01/2017

01050-1

91-0134.1

2. Report to the Engineer when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
3. Require surveyor to replace project control points which may be lost or destroyed.
 - a. Establish replacements based on original survey control.

1.05 PROJECT SURVEY REQUIREMENTS

- A. Establish a minimum of two temporary bench marks on site, referenced to data by survey control points.
 1. Record locations, with horizontal and vertical data, on Project Record Documents.
- B. Establish lines and levels, locate and lay out, by instrumentation and similar appropriate means:
 1. Site Improvements
 - a. Line and grade of pipe and structure installation; top of pipe, invert, slope, etc.
 - b. Grading for fill and topsoil placement, roadway sub-base and base installation.
 2. Controlling lines and levels required for all trades.
- C. From time to time, verify layouts by same methods.

1.06 RECORDS

- A. Maintain a complete, accurate log of all control and survey work as it progresses in accordance with Section 01720.

1.07 SUBMITTALS

- A. Submit name and address of Professional Surveyor and Mapper or Professional Engineer to the Engineer.
- B. On request of the Engineer, submit documentation to verify accuracy of field Engineering work.
- C. Submit certificate signed by registered surveyor certifying that elevations and locations of improvements are in conformance, or non-conformance, with Contract Documents.
- D. Submit Project Record Documents in accordance with Section 01720.

01/2017

01050-2

91-0134.1

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01/2017

01050-3

91-0134.1

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01/2017

01050-4

91-0134.1

SECTION 01090

REFERENCES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. **Applicable Publications:** Whenever in these specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the Work is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the drawings shall be waived because of any provision of, or omission from, said standards or requirements.
- B. **Specialists, Assignments:** In certain instances, specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These assignments shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the WORK; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. The final responsibility for fulfillment of the entire set of contract requirements remains with the Contractor.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of other requirements of the specifications, all work specified herein shall conform to or exceed the requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of these Specifications nor the applicable codes.
- B. References herein to "Building Code" or "Code" shall mean the Florida Building Code. The latest edition of the code as approved and used at the local agency having jurisdiction, shall apply to the WORK herein, including, all addenda, modifications, amendments, or other lawful changes thereto.
- C. In case of conflicts between codes, reference standards, drawings and other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the Engineer for clarifications and directions prior to ordering or providing any materials or labor. The Contractor shall bid the most stringent requirements.
- D. **Applicable Standards:** The Contractor shall construct all Work in accordance with

01/2017

01090-1

91-0134.1

the requirements of the Contract Documents, building codes and referenced standards specified herein.

- E. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations, including all changes and amendments thereto.
- F. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

1.03 ABBREVIATION

- A. Wherever in these specifications references are made to the standards, specifications, or other published data of the various national, regional, or local organizations, such organizations may be referred to by their acronyms or abbreviation only. As a guide to the user of these specifications, the following acronyms and abbreviations which may appear in these specifications shall have the meanings indicated herein.

1.04 ABBREVIATIONS AND ACRONYMS

- A. Abbreviations and acronyms contained in the Contract Documents may include, but not be limited to, the following:

AAMA	Architectural Aluminum Manufacturer's Association
AAR	Association of American Railroads
AASHTO	American Association of the State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
ACPPA	American Concrete Pressure Pipe Association
AFBMA	Anti-Friction Bearing Manufacturer's Association, Inc.
AGA	American Gas Association
AGC	Associated General Contractors
AGMA	American Gear Manufacturer's Association
AHAM	Association of Home Appliance Manufacturers
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association
ANS	American Nuclear Society
ANSI	American National Standards Institute, Inc.
APA	American Plywood Association
API	American Petroleum Institute
APWA	American Public Works Association
AREA	American Railway Engineering Association
ASA	Acoustical Society of America

01/2017

01090-2

91-0134.1

ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASLE	American Society of Lubricating Engineers
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASQC	American Society for Quality Control
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BBC	Basic Building Code, Building Officials and Code Administrators International
BHMA	Builders Hardware Manufacturers Association
CBM	Certified Ballast Manufacturers
CEMA	Conveyors Equipment Manufacturers Association
CGA	Compressed Gas Association
CLPCA	California Lathing and Plastering Contractors Association
CLFMI	Chain Link Fence Manufacturers Institute
CMA	Concrete Masonry Association
CRSI	Concrete Reinforcing Steel Institute
CSI	Construction Specifications Institute
DCDMA	Diamond Core Drill Manufacturers Association
DIPRA	Ductile Iron Pipe Research Association
EIA	Electronic Industries Association
ETL	Electrical Test Laboratories
HI	Hydraulic Institute
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society
IME	Institute of Makers of Explosives
IP	Institute of Petroleum (London)
IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers
MBMA	Metal Building Manufacturers Association
MPTA	Mechanical Power Transmission Association
MTI	Marine Testing Institute
NAAM	National Association of Architectural Metal Manufacturers
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
NCCLS	National Committee for Clinical Laboratory Standards
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association

01/2017

01090-3

91-0134.1

NFPA	National Forest Products Association
NGLI	National Grease Lubricating Institute
NMA	National Microfilm Association
NRCA	National Roofing Contractors Association
NWMA	National Woodwork Manufacturers Association
NWWA	National Water Well Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Precast Concrete Institute
PDI	Plumbing and Drainage Institute
RIS	Redwood Inspection Service
RVIA	Recreational Vehicle Industry Association
RWMA	Resistance Welder Manufacturers Association
SAE	Society of Automotive Engineers
SAMA	Scientific Apparatus Makers Association
SBC	Southern Building Code Congress International, Inc. (SBCCI)
SIS	Swedish Standards Association
SII	Steel Joist Institute
SMA	Screen Manufacturers Association
SPR	Simplified Practice Recommendation
SSBC	Southern Standard Building Code, Southern Building Code Congress
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
TAPPI	Technical Association of the Pulp and Paper Industry
TFI	The Fertilizer Institute
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
USGS	United States Geological Survey
WCLIB	West Coast Lumber Inspection Bureau
WCRSI	Western Concrete Reinforcing Steel Institute
WIC	Woodwork Institute of California
WPCF	Water Pollution Control Federation
WRI	Wire Reinforcement Institute, Inc.
WWPA	Western Wood Products Association

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01/2017

01090-4

91-0134.1

SECTION 01152

APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Submit Applications for Payment to the Engineer in accordance with the schedule established by Conditions of the Agreement between Owner and Contractor and the Contract Documents.

1.02 RELATED SECTIONS

- A. Section 01050 - Field Engineering
- B. Section 01310 - Construction Schedules
- C. Section 01370 - Schedule of Values
- D. Section 01700 - Contract Close Out
- E. Section 01720 - Project Record Documents

1.03 FORMAT AND DATA REQUIRED

- A. Submit applications typed on forms provided by the Owner (or forms provided by Contractor and agreed to by Owner), Application for Payment, with itemized data typed on 8 1/2 inch x 14 inch white paper and continuation sheets.
- B. Payment forms shall show significant detail to substantiate request. Additional detail may be required by the Engineer.

1.04 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

- A. Application Form:
 1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.
 2. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.
 3. Execute certification with signature of a responsible officer of Contract firm.
- B. Continuation Sheets:
 1. Fill in total list of scheduled component items of work, with item number and scheduled dollar value for each item.
 2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored.

01/2017

01152-1

91-0134.1

a. Round off values to nearest dollar, or as specified.

3. List each Change Order Number, and description, as for an original component item or work.

1.05 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

A. When the Owner or the Engineer requires substantiating data, Contractor shall submit suitable information, with a cover letter identifying:

1. Project
2. Application number and date
3. Detailed list of enclosures
4. For stored products:
 - a. Item number and identification as shown on application.
 - b. Description of specific material.
 - c. Copy of material invoice.
 - d. Address of location where item is stored.
 - e. Photographs of item (if requested).

B. Submit one copy of data cover letter for each copy of application.

C. As a prerequisite for payment, Contractor is to submit the following:

1. "Surety Acknowledgment of Payment Request" letter showing amount of progress payment which the Contractor is requesting,
2. updated record drawings for review by the Engineer,
3. updated construction schedule for review by the Engineer,
4. construction photographs.

1.06 PREPARATION OF APPLICATION FOR FINAL PAYMENT

A. Fill in Application form as specified for progress payments.

B. Provide FINAL COMPLETION documentation for the final statement of accounting as specified in Section 01700 - Contract Closeout.

C. Submit final record drawings.

1.07 SUBMITTAL PROCEDURE

A. Submit Applications for Payment to the Engineer at the times stipulated in the Agreement.

B. Number: Five copies of each Application.

C. When the Engineer finds Application properly completed and correct, he will transmit certificate of payment to Owner, with copy to Contractor.

01/2017

01152-2

91-0134.1

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01/2017

01152-3

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01152-4

91-0134.1

SECTION 01200
PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall schedule and administer preconstruction meetings, periodic progress meetings, and specially called meetings throughout the progress of work. The Contractor shall:
1. Prepare agenda for meetings.
 2. Make physical arrangements for meetings.
 3. Preside at meetings.
 4. Record in writing the minutes; include significant proceedings and decisions and submit to Engineer for approval prior to distribution.
 5. Record the meeting with an audio recording device.
 6. Reproduce and distribute copies of minutes within five working days after each meeting:
 - a. To participants in the meeting.
 - b. To parties affected by decisions made at the meeting.
- B. Representatives of contractor, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
- C. The Contractor shall attend meetings to assure that work is executed consistent with Contract Documents and construction schedules.

1.02 RELATED SECTIONS

- A. Section 01310 - Construction Schedules.
- B. Section 01340 - Shop Drawings, Working Drawings, and Samples.
- C. Section 01720 - Project Record Documents.
- D. Other Sections as applicable.

1.03 PRECONSTRUCTION MEETING

- A. Schedule a preconstruction meeting no later than 15 days after date of Notice to Proceed.
- B. Location: A central site, convenient for all parties designated by the Owner.
- C. Attendance:

01/2017

01200-1

91-0134.1

1. Owner's Representative.
2. Engineer and his Professional Consultants.
3. Resident Project Representative.
4. Contractor's Superintendent.
5. Major Subcontractors.
6. Major Suppliers.
7. Utilities.
8. Others as appropriate.

D. Suggested Agenda:

1. Distribution and discussion of:
 - a. List of major subcontractors and suppliers.
 - b. Projected Construction Schedule.
2. Critical work sequencing/ critical path scheduling.
3. Major equipment deliveries and priorities.
4. Project Coordination.
 - a. Designation of responsible personnel.
5. Procedures and processing of:
 - a. Field decisions.
 - b. Proposal requests.
 - c. Submittals.
 - d. Change Orders.
 - e. Applications for Payments.
6. Adequacy of Distribution of Contract Documents.
7. Procedures for maintaining Record Documents.
8. Use of Premises:
 - a. Office, Work and Storage Areas.
 - b. Owner's Requirements.
9. Construction facilities, controls and construction aids.
10. Temporary Utilities.

1.04 PROGRESS MEETINGS

- A. Schedule regular periodic meetings. The progress meetings will be held as required by progress of the work or as required by the Engineer or the Owner.
- B. Hold called meetings as required by progress of the work.
- C. Location of the meetings: Project field office of the Contractor or Engineer.

01/2017

01200-2

91-0134.1

- D. Attendance:
1. Engineer, and his professional consultants as needed.
 2. Subcontractors as appropriate to the agenda.
 3. Suppliers as appropriate to the agenda.
 4. Others as appropriate.
- E. Suggested Agenda:
1. Review, approval of minutes of previous meeting.
 2. Review of work progress since previous meeting.
 3. Field observations, problems and conflicts.
 4. Problems which impede Construction Schedule.
 5. Review of off site fabrication, delivery schedule.
 6. Corrective measures and procedures to regain projected schedule.
 7. Revisions to Construction Schedule.
 8. Progress, schedule, during succeeding work period.
 9. Coordination of schedules.
 10. Review submittal schedules; expedite as required.
 11. Maintenance of quality standards.
 12. Pending changes and substitutions.
 13. Review proposed changes for:
 - a. Effect on Construction Schedule and on a completion date.
 - b. Effect on other contracts of the Project.
 14. Other business.
 15. Construction schedule.
 16. Critical/ long lead items.
- F. The Contractor is to attend progress meetings and is to study previous meeting minutes and current agenda items, in order to be prepared to discuss pertinent topics such as deliveries of materials and equipment, progress of work, etc.
- G. The Contractor is to provide a current submittal log at each progress meeting in accordance with Section 01340.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01/2017

01200-3

91-0134.1

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01/2017

01200-4

91-0134.1

SECTION 01310

CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Promptly after Award of the Contract and within ten days after the effective date of the Agreement, prepare and submit to the Engineer an estimated construction progress schedules for the work, with sub-schedules of related activities which are essential to its progress.
- B. Submit revised progress schedules on a monthly basis.
- C. No partial payments shall be approved by the Engineer until there is an approved up to date construction progress schedule on hand.
- D. The Contractor shall designate an authorized representative of his firm who shall be responsible for development and maintenance of the schedule and of progress and payment reports. This representative of the Contractor shall have direct project control and complete authority to act on behalf of the Contractor's schedule.

1.02 RELATED SECTIONS

- A. Section 01010 - Summary of Work
- B. Section 01152 - Applications for Payment
- C. Section 01200 - Project Meetings
- D. Section 01340 - Shop Drawings, Working Drawings and Samples
- E. Other Sections as applicable.

1.03 FORM OF SCHEDULES

- A. Prepare schedules for submittal each month with pay request. The form of the schedule is to be Microsoft Project or approved equal. The Schedule is to indicate work completed to date and additions to or deletions from the schedule.
 - 1. Provide separate horizontal bar for each trade or operation within each structure or item.
 - 2. Horizontal time scale: In weeks from start of construction and identify the first work day of each month.
 - 3. Scale and spacing: To allow space for notations and future revisions.
- B. Format of listings: The chronological order of the start of each item of work for each structure.

01/2017

01310-1

91-0134.1

- C. Identification of listings: By major specification section numbers as applicable and structure.

1.04 CONTENT OF SCHEDULES

A. Construction Progress Schedule:

1. Show the complete sequence of construction by activity.
2. Show the dates for the beginning of, and completion of, each major element of construction in no more than a two-week increment scale. Specifically list, but not limited to:
 - a. Receiving Materials
 - b. Pipeline Installations
 - c. Testing
 - d. Restoration
 - e. Startup
 - f. Record Drawings
 - g. Permit Close-out
 - h. Punch List
 - i. Owner Activities, Including Inspections
3. Show projected percentage of completion for each item, as of the first of each month.
4. Show projected dollar cash flow requirements for each month of construction.
5. Use of float suppression techniques such as preferential sequencing or logic, special lead/ lag logic restraints, and extended activity times are prohibited, and use of float time disclosed or implied by use of alternate float-suppression techniques shall be shared to proportionate benefit of the Owner and Contractor.
6. Pursuant to above float-sharing requirement, no time extensions will be granted nor delay damages paid until a delay occurs which (i) impacts Project's critical path, (ii) consumes available float or contingency time, and (iii) extends work beyond contract completion date.
7. If the Contractor provides an accepted schedule with an early completion date, the Owner reserves the right to reduce the duration of the work to match the early completion date by issuing a deductive Change Order at no change in Contract Price.

B. Submittal Schedule for Shop Drawings and Samples in accordance with Section 01340. Must show:

1. The dates for Contractor's submittals.
2. The dates' submittals will be required for owner furnished products, if applicable.
3. The dates approved submittals will be required from the Engineer.

01/2017

01310-2

91-0134.1

C. A list of all long lead items (equipment, materials, etc.).

1.05 PROGRESS REVISIONS

A. Indicate progress of each activity to date of submission.

B. Show changes occurring since previous submission of schedule:

1. Major changes in scope.
2. Activities modified since previous submission.
3. Revised projections of progress and completion.
4. Other identifiable changes.

C. Provide a narrative report as needed to define:

1. Problem areas, anticipated delays, and the impact on the schedule.
2. Corrective action recommended, and its effect.
3. The effect of changes on schedules of other prime contractors.

1.06 SUBMISSIONS

A. Submit initial schedules to the Engineer within 10 days after the effective date of the Agreement.

1. The Engineer will review schedules and return review copy within 21 days after receipt.
2. If required, resubmit within 7 days after return of review copy.

B. Submit a minimum of five (5) copies of revised monthly progress schedules with that month's application for payment.

1.07 DISTRIBUTION

A. Distribute copies of reviewed schedules to:

1. Owner (Two copies)
2. Engineer (Two copies)
3. Job Site File (One copy)
4. Subcontractors (As needed)
5. Other Concerned Parties (As needed)

B. Instruct recipients to report promptly to the Contractor, in writing, any problems anticipated by the projections shown in the schedule.

01/2017

01310-3

91-0134.1

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01/2017

01310-4

91-0134.1

SECTION 01340

SHOP DRAWINGS, WORKING DRAWINGS AND SAMPLES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The contractor shall submit to the Engineer for review, such working drawings, shop drawings, test reports and data on materials and equipment (hereinafter in this article called data), and material samples (hereinafter in this article called samples) as are required for the proper control of work, including but not limited to those working drawings, shop drawings, data and samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.
- B. The Contractor shall submit five (5) copies of shop drawings or other data to the Engineer.
- C. Within thirty (30) calendar days after the effective date of the Agreement, the Contractor shall submit to the Engineer a complete list of preliminary data for which Shop Drawings are to be submitted. Included in this list shall be the names of all proposed manufacturers furnishing specific items. Review of this list by the Engineer shall in no way expressed or implied relieve the Contractor from submitting complete Shop Drawings and providing materials, equipment, etc., fully in accordance with the Specifications. This procedure is required in order to expedite final review of Shop Drawings.
- D. The contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the Owner and Engineer. This log should include the following items:
1. Submittal-Description and Number assigned.
 2. Date to Engineer.
 3. Date returned to Contractor (from Engineer).
 4. Status of Submittal (Approved/ Resubmit/ Rejected).
 5. Date of Resubmittal and Return (as applicable).
 6. Date material released (for fabrication).
 7. Projected date of fabrication.
 8. Projected date of delivery to site.
 9. Status of O & M submittal.

1.02 RELATED SECTIONS

- A. Section 01310 - Construction Schedules
- B. Section 01720 - Project Record Documents

01/2017

01340-1

91-0134.1

C. Section 01730 - Operating and Maintenance Data

D. Other Sections as applicable.

1.03 CONTRACTOR'S RESPONSIBILITY

- A. It is the duty of the Contractor to check all drawings, data and samples prepared by or for him before submitting them to the Engineer for review. Each and every copy of the Drawings and data shall bear Contractor's stamp will be returned to the Contractor for conformance with this requirement. Shop drawings shall indicate any deviations in the submittal from requirements of the Contract Documents.
- B. Determine and verify:
1. Field measurements
 2. Field construction criteria
 3. Catalog numbers and similar data
 4. Conformance and Specifications
- C. The Contractor shall furnish the Engineer a schedule of Shop Drawing submittals fixing the respective dates for the submission of shop and working drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment. This schedule shall indicate those that are critical to the progress schedule.
- D. Designate in the construction schedule, or in a separate coordinated schedule, the dates for submission and the dates that reviewed Shop Drawings, Working Drawings and Samples will be needed.
- E. The Contractor shall not begin any of the work covered by a drawing, data, or a sample returned for correction until a revision or correction thereof has been reviewed and returned to him, approved by the Engineer.
- F. The Contractor shall submit to the Engineer all shop drawings, working drawings and samples sufficiently in advance of construction requirements and shall account for Engineers Shop Drawing review time accordingly.
- G. The Contractor shall submit two (2) copies of descriptive or product data submittals to complement shop drawings for the Engineer plus the number of copies which the Contractor requires. The Engineer will retain two (2) sets. All blueprint shop drawings shall be submitted with one (1) set of reproducible and four (4) sets of print. The Engineer will review the drawings and return to the Contractor the set of marked-up drawings with appropriate review comments.
- H. The Contractor shall be responsible for and bear all cost of damages which may result from the ordering of any material or from proceeding with any part of work prior to the review and Approval by Engineer of the necessary Shop Drawings.

01/2017

01340-2

91-0134.1

1.04 ENGINEER'S REVIEW OF SHOP DRAWINGS

- A. The Engineer's review of drawings, data and samples submitted by the Contractor will cover only general conformity to the Specifications, external connections, and dimensions which affect the installation. The Engineer's review and exception if any, will not constitute an approval of dimensions, quantities, and details of the material, equipment, device, or item shown.
- B. The review of drawings and schedules will be general, and shall not be construed:
 - 1. as permitting any departure from the Contract requirements;
 - 2. as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;
 - 3. as approving departures from details furnished by the Engineer, except as otherwise provided herein.
- C. If the drawings or schedule as submitted describe variations and/or show a departure from the Contract requirements which Engineers finds to be in the interest of the Owner and to be minor as not to involve a change in the Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.
- D. When reviewed by the Engineer, each of the Shop Drawings will be identified as having received such review being so stamped and dated. Shop Drawings stamped "REJECTED" and with required corrections shown will be returned to the Contractor for correction and resubmittal.
- E. Resubmittals will be handled in the same manner as the first submittals. On resubmittals, the Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, to revisions other than the corrections requested by the Engineer on previous submissions. The Contractor shall make any corrections required by the Engineer.
- F. If the Contractor considers any correction indicated on the drawings to constitute a change to the Contract Drawings or Specifications, the Contractor shall give written notice thereof to the Engineer.
- G. The Engineer will review one submittal and one re-submittal after which cost of review will be borne by the Contractor. The cost of Engineering shall be equal to the Engineer's charges to the Owner under the terms of the Engineer's agreement with the Owner.
- H. When the Shop Drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.
- I. No partial submittals will be reviewed. Submittals not complete will be returned to the Contractor, and will not be considered "Rejected" until resubmitted.

01/2017

01340-3

91-0134.1

- J. The Engineer shall return Shop Drawing submittals to the Contractor within twenty-one (21) days calendar days from the date the Engineer receives them.

1.05 SHOP DRAWINGS

- A. When used in the Contract Documents, the term "Shop Drawings" shall be considered to mean Contractor's plans for material and equipment which become an integral part of the Project. These drawings shall be complete and detailed. Shop Drawings shall consist of fabrication, erection and setting drawings and schedule drawings, manufacturer's scale drawings, and wiring and control diagrams. Cuts, catalogs, pamphlets, descriptive literature, and performance and test data, shall be considered only as supportive to required Shop Drawings as defined above.
- B. Drawings and schedules shall be checked and coordinated with work of all trades involved, before they are submitted for review by the Engineer and shall bear the Contractor's stamp of approval as evidence of such checking and coordination. Drawings or schedules submitted without this stamp of approval shall be returned to the Contractor for resubmission.
- C. Each Shop Drawing, shall have a blank area 3 1/2 inches by 3 1/2 inches, located adjacent to the title block. The title block shall display the following:
1. Number and title of the drawing.
 2. Date of drawing or revision.
 3. Name of project building or facility.
 4. Name of contractor and subcontractor submitting drawing.
 5. Clear identification of contents and location of work.
 6. Specification title and number.
- D. If drawings show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the Contractor fails to describe such variations he shall not be relieved of the responsibility for executing the work in accordance with the Contract, even though such drawings have been reviewed.
- E. Data on materials and equipment include, without limitation, materials and equipment lists, catalog data sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish and all other pertinent data.
- F. For all mechanical and electrical equipment furnished, the Contractor shall provide a list including the equipment name, address and telephone number of the manufacturer's representative and service company so that service and spare parts can be readily obtained. In addition, a maintenance and lubrication schedule for each piece of equipment shall be submitted along with each shop drawing submittal.
- G. All manufacturers or equipment supplier who proposes to furnish equipment or

01/2017

01340-4

91-0134.1

products under Divisions 11, 12, 13, 14, 15 and 16 shall submit an installation list to the Engineer along with the required shop drawings. The installation list shall include at least five installations where identical equipment has been installed and has been in operation for a period of at least five (5) years.

- H. Only the Engineer will utilize the color "red" in marking Shop Drawing submittals.
- I. Before final payment is made, the Contractor shall furnish to Engineer two (2) sets of record shop drawings all clearly revised, complete and up to date showing the permanent construction as actually made for all reinforcing and structural steel, miscellaneous metals, process and mechanical equipment, piping, electrical system and instrumentation system.

1.06 WORKING DRAWINGS

- A. When used in the Contract Documents, the term "working drawings" shall be considered to mean the Contractor's plans for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, forming and false-work; for underpinning; and for such other work as may be required for construction, but does not become an integral part of the project.
- B. Copies of working drawings as noted in subparagraph 1.06A above, shall be submitted to the Engineer where required by the Contract Documents or requested by the Engineer, and shall be submitted at least thirty (30) calendar days (unless otherwise specified by the Engineer) in advance of their being required for work.
- C. Working drawings shall be signed by a Registered Professional Engineer, currently licensed to practice in the State of Florida and shall convey, or be accompanied by, calculation or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, working drawings must have been reviewed without specific exceptions by the Engineer, which review will be for general conformance and will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. The Contractor assumes all risks of error; the Owner and Engineer shall have no responsibility therefore.

1.07 SAMPLES

- A. The Contractor shall furnish, for the approval of the Engineer, samples required by the Contract Documents or requested by the Engineer. Samples shall be delivered to the Engineer as specified or directed. The Contractor shall prepay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in work until approved by the Engineer.
- B. Samples shall be of sufficient size and quantity to clearly illustrate:
 1. Functional characteristics of the product, with integrally related parts and attachment devices.
 2. Full range of color, texture and pattern.

01/2017

01340-5

91-0134.1

3. A minimum of two samples of each item shall be submitted.
- C. Each sample shall have a label indicating
1. Name of Project
 2. Name of Contractor and Subcontractor
 3. Material or Equipment Represented
 4. Place of Origin
 5. Name of Producer and Brand (if any)
 6. Location in Project
(Samples of finished materials shall have additional marking that will identify them under the finished schedules.)
- D. The Contractor shall prepare a transmittal letter in triplicate for each shipment of samples containing the information required in subparagraph 1.07B above. He shall enclose a copy of this letter with the shipment and send a copy of this letter to the Engineer. Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.
- E. Approved samples not destroyed in testing shall be sent to the Engineer or stored at the site of the work. Approved samples of the hardware in good condition will be marked for identification and may be used in the work. Materials and equipment incorporated in work shall match the approved samples. Samples which failed testing or were not approved will be returned to the Contractor at his expense, if so requested at time of submission.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01/2017

01340-6

91-0134.1

DOCUMENT 01370

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Submit to the Engineer a Schedule of Values allocated to the various portions of the Work, within 10 days after the effective date of the Agreement.
- B. Upon request of the Engineer, support the values with data which will substantiate their correctness.
- C. Once approved, the Schedule of Values shall be used as the basis for the Contractor's Applications for Payment.

1.02 RELATED SECTIONS

- A. Section 01152 - Applications for Payment
- B. Other Sections as applicable.

1.03 FORM AND CONTENT OF SCHEDULE OF VALUES

- A. Present schedule on an 8-1/2 inch x 11 inch white paper; Contractor's standard forms and automated printout will be considered for approval by the Engineer upon Contractor's request. Identify schedule with:
 - 1. Title of Project and location
 - 2. Engineer and Project number
 - 3. Name and Address of Contractor
 - 4. Contract designation
 - 5. Date of submission
- B. Schedule shall list the installed value of the component parts to include individual equipment, piping, electrical, paving, of the Work (as required) in sufficient detail to serve as a basis for computing values for progress payments during construction and for additions and deletions to the Work.
- C. For the various portions of the Work:
 - 1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.
- D. The sum of all values listed in the schedule shall equal the total Contract Sum.
- E. Schedules are subject to Engineer's approval wherein additional line item detail may be required.

01/2017

01370-1

91-0134.1

PART 2 - PRODUCTS (NOT USED)

PART 3 - PRODUCTS (NOT USED)

END OF SECTION

01/2017

01370-2

91-0134.1

SECTION 01400
QUALITY CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section describes the Contractors minimum responsibilities in meeting the quality requirements of the Contract Documents.

1.02 RELATED SECTIONS

- A. Section 01050 – Field Engineering
- B. Section 01410 – Materials and Installation Testing
- C. Section 02200 – Earthwork
- D. Other Sections as applicable.

1.03 OBSERVATION AT PLACE OF MANUFACTURE

- A. Unless otherwise specified, all products, materials, and time and equipment shall be subject to observation by the Owner and the Engineer at the place of manufacture.
- B. The presence of the Owner and/or the Engineer at the place of manufacture however, shall not relieve the Contractor of the responsibility for furnishing products, materials, and equipment which comply with all requirements of the Contract Documents. Compliance is a duty of the Contractor.
- C. The Contractor shall advise the Owner and Engineer promptly upon placing orders for materials and equipment so that arrangements may be made, if desired, for observation before shipment from the place of manufacture.
- D. The Engineer may require the Contractor to provide statements or certificates from the manufacturers and fabricators that the materials and equipment provided by them are manufactured or fabricated in full accordance with the standard specifications for quality and workmanship indicated in the Contractor Documents. All costs of this testing and providing statements and certificates shall be a subsidiary obligation of the Contractor, and no extra charge to the Owner shall be allowed on account of such testing and certification.

1.04 SAMPLING AND TESTING

- A. Unless otherwise specified, all sampling and testing shall be in accordance with the methods prescribed in the current standards of the ASTM, as applicable to the class and nature of the article or materials considered.

01/2017

01400-1

91-0134.1

- B. The Owner and the Engineer reserve the right to use any generally accepted system of sampling and testing which will insure the quality of the workmanship is in full accord with the Contract Documents.
- C. Any waiver by the Owner or Engineer of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the specified testing or other quality assurance requirements as originally specified, and whether or not such guarantee is accompanied by a performance bond to assure execution of any necessary corrective or remedial Work, shall not be construed as a waiver of any requirements.
- D. The Owner and Engineer reserve the right to make independent investigations and tests at any time
- E. Failure of any portion of the Work to meet any of the requirements of the Contract Document shall be reasonable cause for the Owner or Engineer to require the removal or correction and reconstruction of any such Work at the cost of the Contractor.

1.05 SITE INVESTIGATION AND CONTROL

- A. The Contractor shall verify all dimensions in the field and shall check field conditions continuously during construction. The Contractor shall be solely responsible for any inaccuracies built into the Work due to its failure to comply with this requirement.
- B. The Contractor shall inspect related and appurtenant work, and shall report in writing to the Owner and Engineer any conditions that will prevent proper completion of the Work. Failure to report any such conditions shall constitute acceptance of all site conditions, and any required removal, repair, or replacement caused by unsuitable conditions shall be performed by the Contractor at its cost.

1.06 OBSERVATION AND TESTING

- A. The work or actions of the testing laboratory shall in no way relieve the Contractor of its obligations under the Contract. The laboratory testing work will include such observations and testing required by the Owner or Engineer. The testing laboratory will have no authority to change the requirements of the Contract Documents, nor perform, accept or approve any of the Contractor's Work.
- B. The Contractor shall allow the Owner and Engineer ample time and opportunity for field observation and testing materials and equipment to be used in the Work.
- C. The Contractor shall at all times furnish the Owner and the Engineer facilities, including labor, and allow proper time for inspecting and testing materials, equipment, and workmanship.
- D. The Contractor must anticipate that possible delays may occur in the execution of its work due to the necessity of materials and equipment being inspected and accepted for use.

01/2017

01400-2

91-0134.1

- E. The Contractor shall furnish, at its own expense, all samples of materials required by the Owner or Engineer for testing, and shall make its own arrangements for providing water, electric power, or fuel for the various observations and tests of structures and equipment.

1.07 RIGHT OF REJECTION

- A. The Owner and Engineer, shall have the right, at all times and places, to reject any articles or materials to be furnished hereunder which, in any respect, fail to meet the requirements of the Design Criteria Package, regardless of whether the defects in such articles or materials are detected at the point of manufacture or after completion of the Work at the site.
- B. If the Owner or its representative, through an oversight or otherwise, has accepted materials or work which is defective or which is contrary to the Contract Documents, such materials, no matter in what stage or condition of manufacture, delivery, or erection, may be subsequently rejected.
- C. The Contractor shall promptly remove rejected articles or materials from the site of the Work after notification of rejection. All costs of removal and replacement of rejected articles or materials as specified herein shall be borne by the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 BUOYANCY

- A. The CONTRACTOR shall be completely responsible for any tanks, pipelines, manholes, foundations or similar improvements that may become buoyant during the construction operations due to groundwater levels. Should there be any possibility of buoyancy, the Contractor shall take the necessary steps to prevent damage due to floating or flooding, and shall repair or replace said improvements at no additional cost.

3.02 DEVIATION FROM SPECIFICATIONS

- A. If any part of a submittal deviates from the plans and specifications, it is up to the Contractor to indicate such deviation—in writing—to the Engineer, for determination as to acceptance of the deviation. If no deviation is submitted, it is assumed that the Contractor has fully and completely followed the plans and specifications, and that any discrepancy discovered during construction shall be corrected completely at the expense of the Contractor.

3.03 AMERICANS WITH DISABILITIES ACT (ADA)

- A. The Contractor shall make every effort to ensure all concrete work including, but not limited to accessible sidewalks, routes, ramps and curb ramps is compliant with the ADA and Florida Building Code Accessibility.

01/2017

01400-3

91-0134.1

- B. Prior to and during concrete placement, the contractor shall verify the formwork for compliance. Any and all concrete work which is not compliant shall be removed and replaced at no cost to the Owner.

END OF SECTION

01/2017

01400-4

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SECTION 01410

MATERIALS AND INSTALLATION TESTING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Contractor shall employ and pay for the services of an independent testing laboratory, approved by the Engineer, to perform materials and installation testing of the type and frequency specified in the Contract Documents including, but not limited to, Geotechnical Testing Services and concrete testing.
- B. Geotechnical Testing Services shall include, but not be limited to, periodic site inspections, soil proctor tests, soil classification tests and soil densities or compaction tests.
- C. The Engineer may, at any time, elect to have materials and equipment tested for conformity with the Contract Documents.
- D. Contractor shall include cost of testing in the Contract Price.
- E. Piping pressure test and bacteriological testing shall be in accordance with the applicable Section.

1.02 RELATED SECTIONS

- A. Section 01050 – Field Engineering
- B. Section 02200 – Earthwork
- C. Section 03300 – Cast-In-Place Concrete
- D. Other Sections as applicable.

1.03 REFERENCES

- A. FDOT Design Standards.
- B. FDOT Standard Specifications for Road and Bridge Construction.
- C. Broward County Traffic Engineering Division (BCTED) Minimum Standards and the BCTED Pavement Markings & Signs Detail Sheet.

1.04 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:
 - 1. Release, revoke, alter or enlarge on requirements of Contract Documents

01/2017

01410-1

91-0134.1

2. Approve or accept any portion of the Work
3. Perform any duties of the Contractor

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CONTRACTOR'S RESPONSIBILITIES

- A. Provide all testing required by the Contract Documents as well as laws, ordinances, rules, regulations, orders, or approvals of public authorities.
- B. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the Work of the Contract.
- C. Cooperate with laboratory personnel, and provide access to Work and to Manufacturer's operations.
- D. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.
- E. Provide to the laboratory the preliminary design mix proposed to be used for concrete and other materials mixes which require control by the testing laboratory.
- F. Furnish incidental labor and facilities:
 1. To provide access to Work to be tested
 2. To obtain and handle samples at the Project site or at the source of the product to be tested
 3. To facilitate inspections and tests
 4. For storage and curing of test samples
- G. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
 1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence.
- H. Employ and pay for the services of the same or a separate, equally qualified independent testing laboratory to perform additional inspections, sampling, and testing required for the Contractor's convenience.
- I. If the Owner requests tests in addition to those specified in the contract, and if the test results indicate the material or equipment complies with the Contract Documents, the Owner shall pay for the cost of the testing laboratory. If the tests and any subsequent retests indicate the materials and equipment fail to meet the requirements of the Contract Documents, the Contractor may pay for the laboratory

01/2017

01410-2

91-0134.1

costs directly to the testing firm or the total of such costs shall be deducted from any payments due the Contractor.

- J. The Contractor shall pay costs for additional trips to the project by the agency when scheduled times for tests and inspections are canceled and agency is not notified sufficiently in advance of cancellation to avoid the trip.

3.02 TESTING

- A. The following types of tests and test frequencies are required. Copies of all reports are to be sent to the Engineer immediately upon availability
1. Density tests for trench backfill at a minimum rate of three (1) tests per 6" lift per 100 feet of trench, unless otherwise directed by the Engineer.
 2. Density tests for subgrade compaction at a minimum rate of three (3) tests per 100 feet of roadway, unless otherwise directed by the Engineer.
 3. Density tests for limerock base at a minimum rate of three (3) tests per day on each course of completed compacted base, unless otherwise directed by the Engineer.
 4. Density tests for roadway crossings at the rate of one test per lane per lift of compacted material, beginning one foot above the normal water table.
- B. If in the opinion of the Engineer, suitable compaction has not been achieved around structures, density tests may be required.
- C. Concrete compressive strength at the rate of three (3) cylinders per the lesser of 50 cubic yards or per day.
- D. Should the above test results indicate deficiencies, the Engineer may order additional tests at the Contractor's expense, and all reworked areas shall be retested at the Contractor's expense.
- E. Testing in the County or State right-of-way shall meet the requirements of the Florida Department of Transportation.

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SECTION 01505

CONTROL OF WORK

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish personnel and equipment which will be efficient, appropriate and a quantity large enough to secure a satisfactory quality of work and a rate of progress which will insure the completion of the work within the time stipulated. If at any time such personnel appear to the Engineer to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character or increase the personnel and equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress required.

1.02 RELATED SECTIONS

- A. Section 01010 – Summary of Work
- B. Section 01011 – Special Project Procedures
- C. Section 01015 – General Requirements
- D. Other Sections as applicable.

1.03 PIPE LOCATIONS

- A. Pipeline shall be located substantially as indicated on the Drawings, but the Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons.

1.04 OBSTRUCTIONS

- A. The attention of the Contractor is drawn to the fact that during digging at the Project site, the possibility exists of the Contractor encountering various water, sewer, gas, telephone, electrical, or other lines not shown on the Drawings. The Contractor shall exercise extreme care before and during digging to locate and flag these lines so as to avoid damage to the existing lines. Should damage occur to an existing line, The Contractor shall repair the line at no cost to the Owner.
- B. The Contractor shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.

01/2017

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91-0134.1

- C. The Contractor shall verify the exact locations and depths of all utilities shown and the Contractor shall make exploratory excavations of all utilities that may interfere with the work. All such exploratory excavations shall be performed as soon as practicable after award of the contract and, in any event, a sufficient time in advance of construction to avoid possible delays to the Contractor's work. When such exploratory excavations show the utility location as shown to be in error, the Contractor shall so notify the Engineer.
- D. The number of exploratory excavations required shall be that number which is sufficient to determine the alignment and grade of the utility. Test pits shall be dug at the Contractor's expense, as directed.
- E. The Contractor shall protect all Underground Utilities and other improvements which may be impaired during construction operations. It shall be the Contractor's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The Contractor shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.
- F. In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon request of the Contractor, be notified by the Owner to move such property within a specified reasonable time. When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the Engineer a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.
- G. Where the proper completion of the work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is indicated, the Contractor shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the Engineer and the owner of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.
- H. Existing utility lines that are indicated or the locations of which are made known to the Contractor prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired or replaced by the Contractor at the Contractor's expense. Sewer laterals are included.
- I. All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility or improvement owner before being concealed by backfill or other work.
- J. All power, telephone or the communication cable ducts, gas and water mains, irrigation lines, sewer lines, storm drain lines, poles, and overhead power and

01/2017

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91-0134.1

communication wires and any other cables encountered along the line of the work shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the Engineer are made with the owner of said pipelines, duct, main, irrigation line, sewer, storm drain, pole, or wire or cable. The Contractor shall be responsible for and shall repair all damage due to its operations, and the provisions of this Section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.

1.05 OPEN EXCAVATIONS

- A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access to private property during construction shall be removed when no longer required. The length of open trench will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as limiting the length of open trench or prohibiting stacking excavated material in the street, and requiring that the trenches shall not remain open overnight.
- B. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be well lighted at night.

1.06 TEST PITS

- A. Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled by the Contractor at his cost at the direction of the Engineer. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Engineers.

1.07 UTILITY CROSSINGS

- A. It is intended that wherever existing utilities such as service lines must be crossed, deflection of the pipe within recommended limits and cover shall be used to satisfactorily clear the obstruction unless otherwise indicated on the Drawings. However, when in the opinion of the Engineer or the Owner this procedure is not feasible he may direct the use of fittings.

1.08 SANITATION

- A. Toilet Facilities - Fixed or portable chemical toilets shall be provided wherever needed for the use of employees. Toilets at construction job sites shall conform to the requirements of Part 1926 of the OSHA Standards for Construction.

01/2017

01505-3

91-0134.1

- B. Sanitary and Other Organic Wastes - The Contractor shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of away from the site in a manner satisfactory to the Engineer and in accordance with all laws and regulations pertaining thereto.

1.09 RELOCATIONS

- A. The Contractor shall be responsible for the relocation of structures, including but not limited to light poles, signs, sign poles, fences, piping, conduits and drains that interfere with the positioning of the work as set out on the Drawings. The cost of all such relocations shall be included in the bid for the project and shall not result in any additional cost to the Owner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 COOPERATION WITHIN THIS CONTRACT

- A. All firms or persons authorized to perform any work under this Contract shall cooperate with the General Contractor and his subcontractors or trades, and shall assist in incorporating the work of other trades where necessary or required.
- B. Cutting and patching, drilling and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the Engineer.

3.02 PROTECTION OF CONSTRUCTION AND EQUIPMENT

- A. All newly constructed work shall be carefully protected from injury in any way. No wheeling or walking or placing of heavy loads on it shall be allowed and all portions injured shall be reconstructed by the Contractor at his own expense.
- B. Further, the Contractor shall take all necessary precaution to prevent damage to any structure due to water pressure during and after construction and until such structure is accepted and taken over by the Owner.

3.03 PRIVATE LAND

- A. The Contractor shall not enter or occupy private land outside of easements, except by written permission of the land owner.

3.04 RESTORATION

- A. Temporary restoration shall be completed within five days of pipe installation. Temporary restoration shall include all driveways, sidewalks and roadways. They shall be swept clean and be maintained free of dirt and dust. All areas disturbed by

01/2017

01505-4

91-0134.1

the construction activities shall be restored to proper grade, cleaned up, including the removal of debris, trash, and deleterious materials. All construction materials, supplies, or equipment, including piles of debris shall be removed from the area. All temporarily restored areas shall be maintained by the Contractor. These areas shall be kept clean and neat, free of dust and dirt, until final restoration operations are completed. The Contractor is responsible to utilize dust abatement operations in the temporarily restored areas as required, to the satisfaction of the Engineer.

- B. Wherever sidewalks or private roads have been removed for purposes of construction, the Contractor shall place suitable temporary sidewalks or roadways promptly after backfilling and shall maintain them in satisfactory condition for the period of time fixed by the authorities having jurisdiction over the affected portions before proceeding with the final restoration or, if no such period of times is so fixed, the Contractor shall maintain said temporary sidewalks or roadways until the final restoration thereof has been made.
- C. Final restoration shall be completed within thirty days of pipe acceptance. Final restoration shall include the completion of all required pavement replacement of roadways, driveways, curbs, gutters, sidewalks and other existing improvements disturbed by the construction; final grading, placement of sod, pavement marking, etc., all complete and finished, acceptable to the Engineer.
- D. In order to obtain a satisfactory junction with adjacent surfaces, the Contractor shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with the adjacent undisturbed pavement.
- E. The Contractor shall test an installed section of pipeline within five calendar days from completion of the pipeline. A section of pipe is defined as a pipe section which can be isolated by valves for appurtenances is satisfactorily completed, the Contractor shall provide the Engineer with a "Schedule of Existing Facilities Restoration" which will be reviewed and be acceptable to the Engineer. The schedule shall show the existing facilities to be restored and schedule of beginning and completion dates for each item of restoration. The work for completing the final restoration of existing facilities for a tested section of work shall be completed within 30 days of acceptance of the pipeline testing.

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SECTION 01510
TEMPORARY UTILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish, install and maintain temporary utilities required for construction, remove on completion of work.
- B. Pay all fees associated with temporary utilities including water consumption charges.

1.02 RELATED SECTIONS

- A. Section 01010: Summary of Work
- B. Other Sections as applicable.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with National Electric Code.
- B. Comply with Federal, State and Local codes and regulations and with utility company requirements.
- C. Comply with County Health Department and Environmental Regulations.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.02 TEMPORARY ELECTRICITY AND LIGHTING

- A. Arrange with utility company, provide service required for power and lighting, and pay all costs for service and for power used in the construction, testing and trial operation prior to final acceptance of the work by the Owner.
- B. Install circuit and branch wiring, with the area distribution boxes located so that power and lighting is available throughout the construction by the use of construction type power cords.
- C. Provide adequate artificial lighting for all areas of work when natural light is not adequate to work, and all areas accessible to the public.

01/2017

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2.03 TEMPORARY WATER

- A. Arrange with the water utility provider to provide water for construction purposes.
- B. Install branch piping with taps located so that water is available throughout the construction by the use of hoses.
- C. Install at each and every connection to the Owner water supply a backflow preventer meeting the requirements of ANSI A40.6 and AWWA C511. Contractor shall be required to meter and pay for all water used.

2.04 TEMPORARY SANITARY FACILITIES

- A. Provide sanitary facilities in compliance with laws and regulations.
- B. Service, clean and maintain facilities and enclosures.

PART 3 - EXECUTION

3.01 GENERAL

- A. Maintain and operate systems to assure continuous service.
- B. Modify and extend systems as work progress requires.

3.02 REMOVAL

- A. Completely remove temporary materials and equipment when their use is no longer required.
- B. Clean and repair damage caused by temporary installations or use of temporary facilities.
- C. Restore permanent facilities used for temporary services to specified condition.

END OF SECTION

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SECTION 01530
EXISTING UTILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section provides for specifications related to construction in the vicinity of existing utilities.

1.02 RELATED SECTIONS

- A. Section 01010 – Summary of Work
 B. Section 01011 – Special Project Procedures
 C. Section 01015 – General Requirements
 D. Other Sections as applicable.

1.03 CONTRACTOR RESPONSIBILITIES

- A. The term existing utilities shall be deemed to refer to both publicly-owned and privately-owned utilities including, but not limited to, electric power and lighting, telephone, water, gas, storm drains, process lines, sanitary sewers and all appurtenant structures.
- B. Prior to underground construction, the Contractor is required by the Underground Facility Damage Prevention and Safety Act, Chapter 556 FS to contact Sunshine 811, for the location of underground utilities.
- C. Where existing utilities and structures are indicated in the Contract Documents, it shall be understood that all of the existing utilities and structures affecting the work may not be shown and that the locations of those shown are approximate only. It shall be the responsibility of the Contractor to ascertain the actual extent and exact location of existing utilities and structures. In every instance, the Contractor shall notify the proper authority having jurisdiction and obtain all necessary directions and approvals before performing any work in the vicinity of existing utilities.

1.04 NOTIFICATION OF UTILITY OWNER

- A. Prior to any excavation in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadway and state highway rights-of-way the Contractor shall notify the respective authorities representing the owners or agencies responsible for such facilities not less than three days nor more than seven days prior to excavation so that a representative may be present during such

01/2017

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excavation.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 TEMPORARY CONNECTIONS

- A. The work shall be carried out in a manner to prevent disruption of existing services and to avoid damage to the existing utilities. Temporary connections shall be provided, as required, to insure no interruption of existing services. Any damage resulting from the work of this Contract shall be promptly repaired by the Contractor at his own expense in a manner approved by the Engineer and further subject to the requirements of any authority having jurisdiction. Where it is required by the authority having jurisdiction that they perform their own repairs or have them done by others, the Contractor shall be responsible for all costs thereof.

3.02 UTILITY SUPPORT

- A. Where excavations by the Contractor require any utility lines or appurtenant structures to be temporarily supported and otherwise protected during the construction work, such support and protection shall be provided by the Contractor. All such work shall be performed in a manner satisfactory to the respective authority having jurisdiction over such work.

3.03 UTILITY CROSSINGS

- A. It is intended that wherever existing utilities such as water, chemical, electrical, or other service lines must be crossed, deflection of the pipe within limits recommended by the pipe manufacturer and the required minimum cover shall be used to satisfactorily clear the obstruction unless otherwise indicated on the Drawings. However, when, in the opinion of the Owner or Engineer, this procedure is not feasible the Engineer may direct the use of fittings for a utility crossing as detailed on the Drawings. All existing utilities shall be pothole located prior to construction of conflicting piping.

3.04 ADVANCE INVESTIGATIONS

- A. The Contractor shall be responsible for uncovering and exposing existing utilities sufficiently in advance of pipe laying operations to confirm elevation, size, material and clearance separation(s). If, upon excavation, an existing utility is found to be in conflict with the proposed construction or be of a size or material different from what is shown on the plans, the Contractor shall immediately notify the Engineer, who will in turn prepare a recommendation. Failure of the Contractor to perform the advance investigation shall not relieve it of any claims for delay or damages.

3.05 UNFORESEEN UTILITIES

- A. The attention of the Contractor is drawn to the fact that during excavation, the

01/2017

01530-2

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possibility exists of encountering water, sewer, petroleum, gas, telephone, electrical, or other utilities not shown on the Drawings. The Contractor is responsible for obtaining utility locations from the utility owners or utility locating company. The Contractor shall exercise extreme care before and during digging to locate and flag these lines so as to avoid damage to the existing lines. Should damage occur to an existing line, the Contractor shall repair the line at the no cost to the Owner.

3.06 CONNECTIONS TO EXISTING SYSTEMS

- A. The Contractor shall perform all work necessary to locate, excavate, and prepare for connections to the terminus of the existing mains all as shown on the Drawings or where directed by the Owner. The cost of this work and the cost for the actual connection to the existing mains shall be included in the bid price as a separate item and shall not result in any additional cost to the Owner.

3.07 MAINTENANCE OF EXISTING STORM WATER FACILITIES OPERATION

- A. The Contractor shall take notice that existing storm water pump station is operated in the construction area. It is the responsibility of the Contractor to contact the Owner's utility operator and ascertain the extent of any specific service area.
- B. The Contractor shall fully cooperate at all times with the Owner in order to maintain the operation of the existing facilities with the least amount of interference and interruption possible. Continuous service, public health, and safety considerations shall exceed all others and the Contractor's schedule, plans, and work shall at all times be subject to alteration and revision, if necessary, for the above considerations.
- C. The Engineer and Owner reserve the right to require the Contractor to work 24 hours per day in all cases where, in their opinion, interference with operation of the system may result.
- D. In no case will the Contractor be permitted to interfere with the existing system until all materials, supplies, equipment, tools, and incidentals necessary to complete the interfering portion of the work are on the site, or a temporary by-pass system is effectively in place. All existing utilities shall be pothole located prior to construction of conflicting piping.
- E. The Contractor shall provide emergency storm drainage pumping as specified in the Contract Documents.

3.08 RESTORATION OF PAVEMENT

- A. General: All paved areas including concrete, asphaltic concrete, berms cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents. All pavements which are subject to partial removal shall be neatly saw-cut in straight lines.

01/2017

01530-3

91-0134.1

- B. Temporary Resurfacing: Wherever required by the public authorities having jurisdiction, the CONTRACTOR shall place temporary surfacing promptly after backfilling and shall maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration of improvements.
- C. Permanent Resurfacing: In order to obtain a satisfactory junction with adjacent surfaces, the CONTRACTOR shall saw-cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement.

END OF SECTION

01/2017

01530-4

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SECTION 01531

PROTECTION OF EXISTING PROPERTY

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall be responsible for the preservation and protection of property adjacent to the work site against damage or injury as a result of his operations under this project. Any damage or injury occurring on account of any act, omission or neglect on the part of the Contractor shall be restored in a proper and satisfactory manner or replaced by and at the expense of the Contractor to an equal or superior condition than previously existed.
- B. In the event of any claims for damage or alleged damage to property as a result of work, the Contractor shall be responsible for all costs in connection with the settlement of or defense against such claims. Prior to commencement of work in the vicinity of property adjacent to the work site, the Contractor, at his own expense, shall take such surveys as may be necessary to establish the existing condition of the property. Before final payment can be made, the Contractor shall furnish satisfactory evidence that all claims for damage have been legally settled or sufficient funds to cover such claims have been placed in escrow, or that an adequate bond to cover such claims has been obtained.

1.02 RELATED SECTIONS

- A. Section 01011 – Special Project Procedures
- B. Section 01015 – General Requirements
- C. Other Sections as applicable.

1.03 TREES AND LANDSCAPING PROTECTION

- A. General: The Contractor shall exercise all necessary precautions so as not to damage or destroy any trees or landscaping in or near the project site, and shall not trim or remove any trees or landscaping unless such trees or landscaping have been approved for trimming or removal by the jurisdictional agency or owner. All existing trees or landscaping which are damaged during construction shall be replaced by the Contractor or a certified tree/landscaping company to the satisfaction of the owner.
- B. Replacement: The Contractor shall immediately notify the jurisdictional agency or owner if any tree or landscaping is damaged by the Contractor's operations. If, in the opinion of the jurisdictional agency or owner, the damage is such that replacement is necessary, the Contractor shall replace the tree or landscaping at its own expense. The tree or landscaping shall be of a like size and variety as the tree or landscaping damaged, or, if of a smaller size, the Contractor shall pay any

01/2017

01531-1

91-0134.1

compensatory payment.

- C. All permit fees associated with the removal and replacement of trees and landscaping damaged or destroyed shall be the responsibility of the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01/2017

01531-2

91-0134.1

SECTION 01540

SECURITY

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section provides for requirements of security, entry control, personnel identification and miscellaneous restrictions.

1.02 RELATED SECTIONS

- A. Section 01010 - Summary of Work
- B. Other Sections as applicable.

1.03 SECURITY PROGRAM

- A. Protect Work, existing premises and Owner's operations from theft, vandalism and unauthorized entry.
- B. Initiate program in coordination with Owner's existing security system at job mobilization.
- C. Maintain program throughout construction period until Owner occupancy as directed by Engineer.

1.04 ENTRY CONTROL

- A. Restrict entrance of persons and vehicles into project site and existing facilities.
- B. Allow entrance only to authorized persons with proper identification.
- C. Maintain log of workmen and visitors, make available to Owner on request.
- D. Coordinate access of Owner's personnel to site in coordination with Owner's security forces.

1.05 PERSONNEL IDENTIFICATION

- A. All personnel shall wear clothing bearing the company information of which they are employed.
- B. Provide additional security as required by the Owner.
- C. Become familiar with Owner and Engineer representatives and restrict access to job site to these representatives.

01/2017

01540-1

91-0134.1

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01/2017

01540-2

91-0134.1

SECTION 01550
SITE ACCESS AND STORAGE

PART 1 - GENERAL

1.01 GENERAL

- A. This section provides general specifications for the contractors' mobilization, demobilization, access to the site and limitations on storage or lay-down area.

1.02 RELATED SECTIONS

- A. Section 01011 – Special Project Procedures
- B. Section 01015 – General Requirements
- C. Section 01505 – Control of Work
- D. Other Sections as applicable.

1.03 REFERENCES

- A. FDOT Standard Specifications for Road and Bridge Construction
- B. FDOT Design Standards
- C. Broward County Traffic Engineering Division (BCTED) Minimum Standards
- D. Standards and Specifications of the allocable local municipality
- E. The requirements of the Owner

1.04 HIGHWAY LIMITATIONS

- A. The Contractor shall make his own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to the site of the work.

1.05 CONTRACTOR'S WORK AND STORAGE AREA

- A. Contractor's work and storage area plan shall be submitted for Owners approval no later than 30 days after NTP.
 - 1. Owner approval of the work area and storage plan is required prior to commencement.
 - 2. The limits of the Contractor's staging area and other applicable restrictions shall be subject to the local municipality.

01/2017

01550-1

91-0134.1

- B. The Contractor shall make his own arrangements and pay for any necessary off-site storage or shop areas necessary for the proper execution of the work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

- A. The Contractor shall set up construction facilities in a neat and orderly manner within designated areas and shall confine operations to work and storage areas.

3.02 RESTORATION

- A. All areas disturbed by the construction activities shall be restored to proper grade, cleaned up, including the removal of debris, trash, and deleterious materials.
- B. Temporary restoration shall include all driveways, sidewalks and roadways. They shall be swept clean and be maintained free of dirt and dust
- C. All construction materials, supplies, or equipment, including piles of debris shall be removed from the area.
- D. All temporarily restored areas shall be maintained by the Contractor. These areas shall be kept clean and neat, free of dust and dirt, until final restoration operations are completed.
- E. Temporary restoration shall be completed within five days of pipe installation or as specified.
- F. The Contractor is responsible to utilize dust abatement operations in the temporarily restored areas as required, to the satisfaction of the Engineer.
- G. Final restoration shall be completed within thirty days of pipe acceptance. Final restoration shall include the completion of all required pavement replacement of roadways, driveways, curbs, gutters, sidewalks and other existing improvements disturbed by the construction; final grading, placement of sod, pavement marking, etc., all complete and finished, acceptable to the Engineer.
- H. In order to obtain a satisfactory junction with adjacent surfaces, the Contractor shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with the adjacent undisturbed pavement.

01/2017

01550-2

91-0134.1

3.03 DEMOBILIZATION

- A. At the completion of Work the Contractor shall remove its personnel, equipment, and temporary facilities from the site in a timely manner. The Contractor shall also be responsible for transporting all unused materials belonging to the Owner to a place of storage on site designated by the Owner and for removing from the site and disposing of all other materials and debris resulting from the construction. It shall then return all areas used for its activities to a condition as recorded in the pre-construction video or better.

END OF SECTION

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SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Material and equipment incorporated into the Work.
1. Conform to applicable specifications and standards.
 2. Comply with size, make, and type and qualify specified, or as specifically approved in writing by the Engineer.
 3. Manufactured and Fabricated Products.
 - a. Design, fabricate, and assemble in accord with the best Engineering and shop practices.
 - b. Manufacture like part of duplicate units to standard sizes and gauges, to be interchangeable.
 - c. Two or more items of the same kind shall be identical, by the same manufacturer.
 - d. Products shall be suitable for service conditions.
 - e. Equipment capacities, sizes, and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
 4. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

1.02 RELATED SECTIONS

- A. Section 01011 - Special Project Procedures
- B. Section 01340 - Shop Drawings, Product Data, and Samples
- C. Section 01630 - Substitutions
- D. Section 01720 - Project Record Documents
- E. Other Sections as applicable.

1.03 APPROVAL OF MATERIALS

- A. Only new materials and equipment shall be incorporated in the work. All materials and equipment furnished by the Contractor shall be subject to the inspection and approval of the Engineer. No material shall be delivered to the work without prior approval of the Engineer.

01/2017

01600-1

91-0134.1

- B. Within 30 days after the effective date of the Agreement, the Contractor shall submit to the Engineer, data relating to materials and equipment he proposes to furnish for the work. Such data shall be in sufficient detail to enable the Engineer to identify the particular product and to form an opinion as to its conformity to the specifications.
- C. Facilities and labor for handling and inspection of all materials and equipment shall be furnished by the Contractor. If the Engineer requires, either prior to beginning or during progress of the work, the Contractor shall submit samples of materials for such special tests as may be necessary to demonstrate that they conform to the specifications. Such samples shall be furnished, stored, packed, and shipped as directed at the Contractor's expense. Except as otherwise noted, the Owner will make arrangements for and pay for the tests.
- D. The Contractor shall submit data and samples sufficiently early to permit work. Any delay of approval resulting from the Contractor's failure to submit samples or data promptly shall not be used as a basis of claim against the Owner or the Engineer.
- E. In order to demonstrate the proficiency of workmen or to facilitate the choice among several textures, types, finishes, and surfaces, the Contractor shall provide such samples of workmanship or finish as may be required.
- F. The materials and equipment used on the work shall correspond to the approved samples or other data.

1.04 MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION

- A. When Contract Documents require that installation of work shall comply with manufacturer's printed instruction, obtain, and distribute copies of such instructions to parties involved in the installation, including copies to the Engineer.
 - 1. Maintain one set of complete instructions at the job site during installation and until completion.
- B. Handle, install, connect, clean, condition, and adjust products in strict accord with such instructions and in conformity with specified requirements.
 - 1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for further instructions.
 - 2. Do not proceed with work without clear instructions.
- C. Perform work in accord with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

1.05 TRANSPORTATION AND HANDLING

- A. Arrange deliveries of Products in accord with construction schedules; coordinate to avoid conflict with work and conditions at the site.

01/2017

01600-2

91-0134.1

1. Deliver Products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
 2. Immediately upon delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that Products are properly protected and undamaged.
- B. Provide equipment and personnel to handle Products by methods to prevent soiling or damage to Products or packaging.

1.06 STORAGE AND PROTECTION

- A. The Contractor shall furnish a covered, weather-protected storage structure, providing a clean, dry, noncorrosive environment for all mechanical equipment, valves, electrical and instrumentation equipment, and special equipment to be incorporated into this project. Storage of equipment shall be performed to allow easy access and be in strict accordance with the "instructions for storage" of each equipment supplier and manufacturer including weather/humidity protection, connection of heaters, placing of storage lubricants in equipment, blocking, or skid storage, etc. Corroded, damaged, or deteriorated equipment and parts shall be replaced before acceptance of the project.
- B. Store Products in accord with manufacturer's instructions, with seals and labels intact and legible.
1. Store products subject to damage by the elements in weather-tight enclosures.
 2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
 3. Store fabricated products above the ground, on blocking or skids, to prevent soiling or staining. Cover products which are subject to deterioration with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
 4. Store loose granular materials in a well drained area on solid surfaces to prevent mixing with foreign matter.
- C. All materials and equipment to be incorporated in the work shall be handled and stored by the Contractor before, during, and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft or damage of any kind whatsoever to the material or equipment.
- D. Cement, sand, and lime shall be stored under a roof, off the ground, and shall be kept completely dry at all times. All structural and miscellaneous steel and reinforcing steel shall be stored off the ground, or otherwise, to prevent accumulations of dirt or grease, and to minimize rusting. Brick, block, and similar masonry products shall be handled and stored in a manner to reduce breakage, chipping, cracking, and spalling to a minimum.
- E. Moving parts shall be rotated a minimum of once weekly to insure proper lubrications, and to avoid metal-to-metal "welding". Upon installation of the

01/2017

01600-3

91-0134.1

equipment, the Contractor shall start the equipment, at least half-load, once weekly, for an adequate period of time to insure that the equipment does not deteriorate from lack of use. All materials which, in the opinion of the Engineer, have become so damaged as to be unfit for the use intended or specified, shall be promptly removed from the site of the work, and the Contractor shall receive no compensation for the damaged material or its removal.

- F. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored Products to assure that Products are maintained under specific conditions, and free from damage or deterioration.
- G. Contractor shall be responsible for protection after installation by providing substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations.
- H. The Contractor shall be responsible for all materials, equipment, and supplies sold and delivered to the Owner under this Contract, until final inspection of the work and acceptance thereof by the Owner. In the event any such material, equipment, and supplies are lost, stolen, damaged, or destroyed prior to final inspection and acceptance, the Contractor shall replace same without additional cost to the Owner.
- I. Should the Contractor fail to take proper action on storage and handling of equipment supplied under this Contract within seven days after written notice to do so has been given, the Owner retains the right to correct all deficiencies noted in previously transmitted written notice and deduct the cost associated with these corrections from the Contractor's Contract. These costs may be comprised of expenditures for labor, equipment usage, administrative, clerical, Engineering, and any other costs associated with making the necessary corrections.

a. SPECIAL TOOLS

- J. Manufacturers of equipment and machinery shall furnish any special tools (including grease guns or other lubricating devices) required for normal adjustment, operations and maintenance, together with instructions for their use. The Contractor shall preserve and deliver to the Owner these tools and instructions in good order no later than upon completion of the Contract.

1.07 STORAGE AND HANDLING OF EQUIPMENT ON SITE

- A. Because of the long period allowed for construction, special attention shall be given to the storage and handling of equipment on site. As a minimum, the procedure outlined below shall be followed.
 - 1. Equipment shall not be shipped until approved by the Engineer. The intent of this requirement is to reduce on-site storage time prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from the Engineer, unless upon arrival it is to be stored as specified in Paragraph 1.06. Operation and maintenance data, as described in Paragraph 1.08 of Section 01730 shall be submitted to the Engineer for

01/2017

01600-4

91-0134.1

review prior to shipment of equipment.

2. All equipment having moving parts, such as gears, electric motors, etc. and/or instruments, shall be stored in a temperature and humidity controlled building approved by the Engineer, until such time as the equipment is to be installed.
3. All equipment shall be stored fully lubricated with oil, grease, etc. unless otherwise instructed by the manufacturer.
4. Manufacturer's storage instructions shall be carefully studied by the Contractor and reviewed with the Engineer by him. These instructions shall be carefully followed and a written record of this kept by the Contractor.
5. Moving parts shall be rotated a minimum of once weekly to insure proper lubrication, and to avoid metal-to-metal "welding". Upon installation of the equipment, the Contractor shall start the equipment, at least half-load, once weekly for an adequate period of time to insure that the equipment does not deteriorate from lack of use.
6. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. Mechanical equipment to be used in the work, if stored for longer than ninety (90) days, shall have the bearings cleaned, flushed, and lubricated prior to testing and start up, at no extra cost to the Owner.
7. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested, and accepted in a minimum time period. As such, the manufacturer will guarantee the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

1.08 WARRANTY

- A. For all major pieces of equipment, submit a warranty from the equipment manufacturer as specified in Section 01740.

1.09 SPARE PARTS

- A. Spare parts for certain equipment provided under Division 11 through 16 have been specified in the pertinent sections of the Specifications. The Contractor shall collect and store all spare parts so required in an area to be designated by the Engineer. In addition, the Contractor shall furnish to the Engineer an inventory listing all spare parts, the equipment they are associated with, the name and address of the supplier, and the delivered cost of each item. Copies of actual invoices for each item shall be furnished with the inventory to substantiate the delivered cost.

01/2017

01600-5

91-0134.1

1.10 LUBRICANTS

- A. During testing and prior to acceptance, the Contractor shall furnish all lubricants necessary for the proper lubrication of all equipment furnished under this Contract.

1.11 GREASE, OIL AND FUEL

- A. All grease, oil, and fuel required for testing of equipment shall be furnished with the respective equipment. The Owner shall be furnished with a year's supply of required lubricants including grease and oil of the type recommended by the manufacturer with each item of the equipment supplied under Division 11 through 16.
- B. The Contractor shall be responsible for changing the oil in all drives and intermediate drives of each mechanical equipment after initial break-in of the equipment, which in no event shall be any longer than three weeks of operation.

1.12 PROTECTION AGAINST ELECTROLYSIS

- A. Where dissimilar metals are used in conjunction with each other, suitable insulation shall be provided between adjoining surfaces so as to eliminate direct contact and any resultant electrolysis. The insulation shall be bituminous impregnated felt, heavy bituminous coatings, nonmetallic separators or washers, or other acceptable materials.

1.13 FASTENERS

- A. All necessary bolts, anchor bolts, nuts, washers, plates and bolt sleeves shall be furnished by the Contractor. Bolts shall have suitable washers and, where so required, their nuts shall be hexagonal.
- B. All bolts, anchor bolts, nuts, washers, plates, and bolt sleeves shall be Type 316 stainless steel unless otherwise specifically indicated or specified.
- C. Unless otherwise specified, stud, tap, and machine bolts shall be of the best quality refined bar iron. Hexagonal nuts of the same quality of metal as the bolts shall be used.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01/2017

01600-6

91-0134.1

SECTION 01630

SUBSTITUTIONS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish and install products specified and named in their respective Specifications or on the Drawings unless substitution is allowed.
- B. For products specified only by reference standard, select product meeting that standard, by any manufacturer.
- C. For products specified by naming several products or manufacturers, select any one of those products and manufacturers names which complies with their respective Specifications.
- D. For products specified by naming only one or more products or manufacturers and stating "or equal", submit a request as for substitutions, for any product or manufacturer which is not specifically named.
- E. Requests for any substitutions not submitted in accordance with the instructions herein will be denied.

1.02 RELATED SECTIONS

- A. Section 01340 – Shop Drawings, Working Drawings and Samples
- B. Other Sections as Applicable.

1.03 PRODUCTS LIST

- A. Within 30 days after award of Contract, submit to Engineer five copies of complete list of major Products which are proposed for installation.
- B. Product selection is governed by the Contract Documents and governing regulations, not by previous project experience.
 - 1. Where a single or multiple products or manufacturers are named, provide one of the products indicated or submit a request for substitution for any product or manufacturer not named unless no substitutions are permitted.
 - 2. Where the Specifications only require compliance with performance requirements, an imposed code, standard or regulation, select a product that complies with the requirements, standards, codes or regulations specified.
 - 3. Manufacturers named in a Specification section are those manufacturers considered capable of manufacturing products conforming to the specified requirements. The naming of a particular manufacturer does not imply

01/2017

01630-1

91-0134.1

acceptance or approval of just any standard product of that manufacturer.

- C. Tabulate Products by specification section number and title.
- D. For products specified only by reference standards, list for each such Product:
 - 1. Name and address of manufacturer.
 - 2. Trade Name.
 - 3. Model or catalog designation.
 - 4. Manufacturer's data:
 - a. Reference standards.
 - b. Performance test data.

1.04 SUBSTITUTION SUBMITTAL REQUIREMENTS

- A. For convenience in designation in the Contract Documents, materials to be incorporated in the Work may be designated under a trade name or the name of a manufacturer and its catalog information. The use of alternative material which is equal in quality and of the required characteristics for the purpose intended will be permitted, subject to the following requirements:
 - 1. The burden of proof as to the quality and suitability of such alternative equipment, products, or other materials shall be upon the Contractor.
 - 2. The Engineer will be the sole judge as to the comparative quality and suitability of such alternative equipment, products, or other materials and its decisions shall be final.
 - 3. Base Bid requirements outlined in the Bid Form.
- B. The Contractor may offer any material, process, or equipment which it considers equivalent to that indicated. Unless otherwise authorized in writing by the ENGINEER, the substantiation of offers of equivalency must be submitted within 30 days after execution of the Agreement. The Contractor, at its sole expense, shall furnish data concerning items it has offered as equivalent to those specified. The Contractor shall have the material as required by the Engineer to determine that the quality, strength, physical, chemical, or other characteristics, including durability, finish, efficiency, dimensions, service, and suitability are such that the items will fulfill its intended function. Installation and use of a substitute item shall not be made until accepted by the Engineer. If a substitute offered by the Contractor is found to be not equal to the specified material, the Contractor shall furnish and install the specified material.
- C. The Contractor's attention is further directed to the requirement that failure to submit data substantiating a request for the substitution of an "or equal" item within said 30-day period after the execution of the Agreement, shall be deemed to mean that the Contractor intends to furnish one of the specific brand-named products named in the specification, and the Contractor does hereby waive all rights to offer or use substitute products in each such case. Wherever a proposed substitute product has not been submitted within said 30-day period, or wherever

01/2017

01630-2

91-0134.1

the submission of a proposed substitute product fails to meet the requirements of the specifications and an acceptable resubmittal is not received by the Engineer within said 30-day period, the Contractor shall furnish only one of the products originally-named in the Contract Documents.

- D. Within a period of 30 days after award of Contract, Engineer will consider formal requests from the Contractor for substitution of specified products.
- E. After the end of that period, the request will be considered only in case of product unavailability or other conditions beyond the control of the Contractor.
- F. Submit a separate request for each substitution. Support each request with:
 - 1. Complete data substantiating compliance of the proposed substitution with requirements stated in the Contract Documents:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature; identify:
 - 1) Product description.
 - 2) Reference standards.
 - 3) Performance and test data.
 - c. Samples, as applicable.
 - d. Name and address of similar projects on which product has been used, and the date of each installation.
 - 2. Itemized comparison of the proposed substitution with product specified; List significant variations.
 - 3. Comparison of the qualities of the proposed substitution with that specified.
 - 4. Changes required in other elements of the work because of the substitution.
 - 5. Availability of maintenance service, and source of replacement materials.
 - 6. Data relating to changes in the construction schedule.
 - 7. Any effect of the substitution on separate contracts.
 - 8. List of changes required in other work or products.
 - 9. Accurate cost data comparing proposed substitution with product specified.
 - 10. Designation of required license fees or royalties.
 - 11. Designation of availability of maintenance services, and sources of replacement materials.
 - 12. Cost data is complete and includes related costs under his Contract, but not:
 - a. Cost data comparing the proposed substitution with the product specified
 - b. Any required license fees or royalties

01/2017

01630-3

91-0134.1

c. Engineer's costs of redesign or revision of Contract Documents.

13. Substitute products shall not be ordered or installed without written acceptance of Engineer.

G. Do not imply or indicate substitutions on shop drawings or product data submittals without a separate formal request.

H. Only one request for substitution for each product will be considered. If not accepted, Contractor shall provide specified product.

1.05 SUBSTITUTIONS WILL NOT BE CONSIDERED FOR ACCEPTANCE WHEN:

A. They are indicated or implied on Shop Drawings or product data submittals without a formal request from Contractor.

B. The manufacture of the product substitution does not meet the Qualifications as stated in the specifications as determined by the Engineer.

C. They are requested directly by a subcontractor or supplier.

D. No data is provided relating to changes in construction schedule.

E. There is any effect of substitution on separate contracts.

F. Changes are required in other Work or products.

G. There is no accurate cost data comparing proposed substitution with product specified.

H. There are required license fees or royalties above and beyond the specified vendor.

I. Availability of maintenance services, sources of replacement materials does not equal that provided by the specified vendor.

J. Acceptance will require substantial revision of Contract Documents.

1.06 CONTRACTOR'S REPRESENTATION

A. A request for a substitution constitutes a representation that Contractor:

1. has investigated proposed product and has determined that it is equal to or superior in all respects to that specified.

2. will provide the same warranties or bonds for substitution as for product specified.

3. will coordinate installation of accepted substitution into the Work, and will make such changes as may be required for the Work to be complete in all respects.

4. waives claims for additional costs caused by substitution which may subsequently become apparent.

01/2017

01630-4

91-0134.1

5. ENGINEER DUTIES

- B. Review Contractor's requests for substitutions in accordance the Shop Drawing review requirements.
- C. Notify Contractor, in writing, of decision to accept or reject requested substitution.
- D. The Engineer shall be the judge of the acceptability of the proposed substitution.

1.07 SUBSTITUTION SUBMITTAL REQUIREMENTS – “NO SUBSTITUTIONS PERMITTED”

- A. Contractor may not request a substitute item or vendor/ manufacturer for which the specifications indicate “No Substitutions Permitted”.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01700
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Administrative and procedural requirements for project closeout.
 - 1. Inspection procedures.
 - 2. Project Record Document submittal.
 - 3. Final cleaning.
- B. Warranty and bond submittal.
- C. Closeout submittals, warranties and bonds required for specific products of work.

1.02 RELATED SECTIONS

- A. Section 01310 - Construction Schedules
- B. Section 01370 - Schedule of Values
- C. Section 01710 - Cleaning
- D. Section 01720 - Project Record Documents
- E. Section 01740 - Warranties and Bonds
- F. Other Sections as applicable.

1.03 SUBSTANTIAL COMPLETION

- A. Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
 - 1. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - 2. Advise Owner of pending insurance change-over requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
 - 4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
 - 5. Submit record drawings, maintenance manuals, and similar final record

01/2017

01700-1

91-0134.1

information.

6. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.

B. When the Contractor considers the Work to be substantially complete, he shall submit a written notice to the Engineer that the Work, or designated portion of the Work, is complete and ready for inspection.

C. Within a reasonable time of receipt of a request for inspection, the Engineer will either proceed with inspection or advise the Contractor of unfulfilled requirements. When the Engineer and Owner concur that the Work, or designated portion of the Work, is substantially complete, the Engineer will prepare the Certificate of Substantial Completion following inspection.

D. Should the Engineer determine that the Work is not substantially complete, he will advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Engineer will repeat inspection when requested and assured that the Work has been substantially completed.
2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.04 FINAL COMPLETION

A. When Contractor considers the Work to be complete, he shall submit written certification to the Engineer that the Work is completed and ready for final inspection. Include the following:

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
3. Submit a certified copy of the Engineer's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, the list has been endorsed and dated by the Engineer.
4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion, or when the Owner took possession of and responsibility for corresponding elements of the Work.
5. Submit consent of surety to final payment.
6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

01/2017

01700-2

91-0134.1

- B. The Engineer will inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the - Engineer.
 - 1. Upon completion of inspection, the Engineer will prepare a certificate of final acceptance, or advise the Contractor of Work that is incomplete, or of obligations that have not been fulfilled but are required for final acceptance.
 - 2. If necessary, re-inspection process will be repeated.
- C. RECORD DOCUMENT SUBMITTALS (refer to Section 01720 - Project Record Documents).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

END OF SECTION

01/2017

01700-3

91-0134.1

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01/2017

01700-4

91-0134.1

SECTION 01710

CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Execute cleaning, during progress of the Work, and at completion of the Work, as required by General Conditions.

1.02 RELATED SECTIONS

- A. Section 01010 – Summary of Work
- B. Section 01505 – Control of Work
- C. Section 01550 – Site Access and Storage
- D. Other Sections as applicable.

1.03 DISPOSAL REQUIREMENTS

- A. Do not dispose of any unsuitable fill, hazardous or organic material onsite. All such material shall be disposed of in a legal manner by the Contractor, the cost of which shall be included in the Bid.
- B. Conduct cleaning and disposal operations to comply with applicable codes, ordinances, regulations, and anti-pollution laws.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
- B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
- C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.01 DURING CONSTRUCTION

- A. The Contractor shall keep the area of the work and other areas utilized or impacted

01/2017

01710-1

91-0134.1

by construction in a neat and clean condition, free from any accumulation of rubbish. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the work site, and shall establish regular intervals of collection and disposal of such materials and waste. The Contractor shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations.

- B. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and to the particular requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.
- C. Provide on-site containers for the collection of waste materials, debris and rubbish as required.

3.02 DUST ABATEMENT

- A. The Contractor shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. Means for the control of dust shall include, but not be limited to, sweeping and water trucks. The Contractor shall be responsible for any damage resulting from any dust originating from its operations. The dust abatement measures shall be continued until the Contractor is relieved of further responsibility by the Engineer.

3.03 FINAL CLEANING

- A. Remove temporary protection and facilities installed for protection of the Work during construction.
- B. Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.
- C. Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

END OF SECTION

01/2017

01710-2

91-0134.1

DOCUMENT 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section includes the requirements for maintaining, recording and submitting Project Record Documents including, but not limited to,
 - 1. Record Drawings or As-Built Drawings
 - 2. Record Specifications and other Contract Documents
 - 3. Record Samples, Shop Drawings or Record Product Data

1.02 RELATED SECTIONS

- A. Section 01050 - Field Engineering
- B. Section 01152 – Applications for Payment
- C. Section 01340 - Shop Drawings, Working Drawings and Samples
- D. Section 01700 – Project Closeout
- E. Other Sections as applicable.

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Maintain at the site for the Owner and Engineers review one record copy of:
 - 1. Drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Change Orders and other Modifications to the Contract
 - 5. Engineer's Field Orders or Written Instructions
 - 6. Approved Shop Drawings, Working Drawings, and Samples
 - 7. Field Test Reports
 - 8. Construction Photographs
- B. Store Record Documents in the Contractor's field office apart from documents used for construction.
- C. File Record Documents in accordance with the CSI format number system utilized in the Contract Documents.

01/2017

01720-1

91-0134.1

- D. Maintain Record Documents in a clean, dry, legible condition and in good order. Do not use Record Documents for construction purposes.
- E. Make Record Documents available at all times for inspection by the Engineer.
- F. As a prerequisite for monthly progress payments, the Contractor is to exhibit the currently updated Record Documents for review by the Engineer and the Owner.

1.04 RECORDING

- A. Record Drawings:
 - 1. Maintain a clean, undamaged set of prints of Contract Drawings to serve as the project Record Drawings.
 - 2. Label each sheet "RECORD DRAWING" in neat large printed letters with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
 - 3. The Record Drawings shall be presented at the same scale as the Contract Drawings.
 - 4. The Record Drawings shall correctly and accurately show all changes from the Contract Drawings made during construction.
 - 5. All information shall be verified and certified by an independent Professional Surveyor and Mapper registered in the State of Florida.
 - 6. All vertical information shall be provided in the datum indicated in the Contract Drawings.
 - 7. Horizontal and vertical locations referenced to base-line or permanent surface improvements.
 - 8. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross reference at the corresponding location on the Record Drawings.
 - 9. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
 - 10. Mark new information that was not shown on Contract Drawings or Shop Drawings.
 - 11. Note related Change Order numbers where applicable.
 - 12. Organize Record Drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
 - 13. Do not use Record Drawings for construction purposes.
 - 14. Record information concurrently with construction progress.
- B. The Record Drawings shall be neat and legible including the following:
 - 1. Above ground piping and equipment:

01/2017

01720-2

91-0134.1

- a. All equipment locations, dimensions and elevations as indicated in the Contract Drawings.
 - b. All building and tank locations, dimensions and elevations as indicated in the Contract Drawings.
 - c. All above ground piping size, material, class, lengths, dimensions, and elevations as indicated in the Contract Drawings.
 - d. Horizontal locations of piping, fittings, valves and appurtenances.
 - e. Elevations of the top of pipe, fittings, valves and appurtenances as indicated in the Contract Drawings and at 50' maximum increments
 - f. All changes from the original design.
2. Underground pressure pipe including potable water mains sanitary sewer force mains, drainage force mains and the like:
- a. All piping size, material, class, lengths, dimensions, bury depth and elevations as indicated in the Contract Drawings.
 - b. Horizontal locations of piping, fittings, valves and appurtenances.
 - c. Elevations of the top of pipe, fittings, valves and appurtenances.
 - d. Elevations as indicated in the Contract Drawings and at 50' maximum increments
 - e. Lengths of restrained pipe.
 - f. Water service locations.
 - g. Meter sizes.
 - h. All changes from the original design.
3. Gravity sanitary sewer:
- a. All piping size, material, class, lengths, slopes, dimensions and elevations as indicated in the Contract Drawings.
 - b. Horizontal locations of manholes.
 - c. Rim, invert, and size of all manholes.
 - d. Service terminal end locations.
 - e. Wet well construction including diameter, bottom, invert and float elevations.
 - f. All changes to piping from the original design.

01/2017

01720-3

91-0134.1

4. Stormwater Drainage:
 - a. All piping size, material, class, lengths, dimensions and elevations as indicated in the Contract Drawings.
 - b. Horizontal locations of manholes and catch basins.
 - c. Rim, invert, bottom elevations and size of all manholes and catch basins.
 - d. All surface elevations indicated on the Contract Drawings including, but not limited to, swales, berms, yards, sidewalks, and the like.
 - e. Horizontal location and elevation of all storm water retention or detention areas.
 - f. All changes from the original design.
5. Limerock base:
 - a. Upon completion of all underground utilities and limerock base, and before placement of asphalt, provide the following for Engineer review:
 - 1) Finished limerock base elevations taken at the location of finished asphalt elevations as indicated in the Contract Drawings.
 - 2) Additional elevations as required by the Engineer, including, but not limited to:
 - (a) Finished limerock base at centerline, edge of median and edge of pavement.
 - (b) Back of sidewalk or right of way.
 - (c) Bottom of swale or flow line of gutter.
 - (d) Top of curb.
 - (e) High points, low points and grade breaks.
 - (f) Intersections.
6. Electrical, instrumentation and controls
 - a. Horizontal location of all electrical equipment and control cabinetry.
 - b. Elevations of the bottom of all electrical and control panels.
 - c. Horizontal location and elevation of all conduits including conduit size, route and wire size.
 - d. Horizontal location of all light poles and junction boxes.
7. Miscellaneous:
 - a. Horizontal location and elevation of all concrete slabs.
 - b. Horizontal location, size and material of all fencing.

01/2017

01720-4

91-0134.1

- c. Location size and material of all existing utilities whether indicated on the Contract Drawings or not.
 - d. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
 - e. Depths of various elements of foundation in relation to finish first floor datum.
 - f. Field changes of dimensions and details.
 - g. Details not on original contract drawings.
- C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction.
- 1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
 - 2. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation.
 - 3. Note related record drawing information and Product Data.
 - 4. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
 - 5. Changes made by field order or by Change Order.
- D. Record Product Data (Shop Drawings): Maintain one copy of each Product Data submittal.
- 1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations.
 - 2. Give particular attention to concealed products and portions of the work which cannot otherwise be readily discerned later by direct observation.
 - 3. Note related Change Orders and mark-up of record drawings and Specifications.
- E. Record Sample Submitted: Immediately prior to the date or dates of Substantial Completion, the Contractor will meet at the site with the Engineer and the Owner to determine which of the submitted Samples that have been maintained during progress of the Work are to be transmitted to the Owner for record purposes. Comply with delivery to the Owner's Sample storage area.
- F. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record-keeping and submittals in connection with

01/2017

01720-5

91-0134.1

actual performance of the Work.

1.05 SUBMITTAL

- A. Project Record Documents, demonstrating construction progress, shall be submitted with each Application for Payment.
- B. Interim Project Record Drawings shall be submitted at significant project milestones including:
 - 1. Construction of wet well or other structures.
 - 2. Construction of catch basins, manholes, pipes and appurtenances.
 - 3. As required by the Engineer.
- C. Project Record Documents, demonstrating construction completion shall be submitted with the balance of Closeout documents at the conclusion of construction including:
 - 1. Three sets of signed and sealed sets of prints.
 - 2. One compact disc copy of record drawings in AutoCAD format.
- D. Accompany submittals with transmittal letter in duplicate, containing:
 - 1. Date
 - 2. Project Title and Number
 - 3. Contractor's Name and Address
 - 4. Title and Number of each Record Document
 - 5. Signature of Contractor or his Authorized Representative

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01/2017

01720-6

91-0134.1

SECTION 01730

OPERATING AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Compile product data and related information appropriate for Owner's maintenance and operation of products furnished under Contract.
 - 1. Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of Specifications.
- B. Instruct Owner's personnel in maintenance of products and in operation of equipment and systems.

1.02 RELATED SECTIONS

- A. Section 01011 – Special Project Procedures
- B. Section 01340 – Shop Drawings, Working Drawings and Samples
- C. Section 01700 – Contract Closeout
- D. Section 01720 – Project Record Documents
- E. Section 01740 – Warranties & Bonds
- F. Other Sections as applicable.

1.03 QUALITY ASSURANCE

- A. Preparation of data shall be done by personnel:
 - 1. Trained and experienced in maintenance and operation of described products.
 - 2. Familiar with requirements of this Section.
 - 3. Skilled as technical writers to the extent required to communicate essential data.
 - 4. Skilled as draftsman competent to prepare required drawings.

1.04 FORM OF SUBMITTALS

- A. Prepare data in form of an instructional manual for use by Owner's personnel.
- B. Format
 - 1. Size: 8 1/2 inches x 11 inches

01/2017

01730-1

91-0134.1

2. Paper: 20 pound minimum, white, for typed pages.
3. Text: Manufacturer's printed data, or neatly typewritten.
4. Drawings:
 - a. Provide reinforced punched binder tab, bind in with text.
 - b. Reduce larger drawings and fold to size of text pages, but not larger than 11 inches x 17 inches.
5. Provide fly-leaf for each separate product, or each piece of operating equipment.
 - a. Provide types description of product, and major component parts of equipment.
 - b. Provide indexed tabs.
6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
 - a. Title of Project
 - b. Identity of separate structure as applicable.
 - c. Identity of general subject matter covered in this manual.

C. Binders

1. Commercial quality three-ring binders with durable and cleanable plastic covers.
2. Maximum ring diameter shall be 2 inches.
3. When multiple binders are used, correlate the data into related consistent groupings.

1.05 CONTENT OF MANUAL

A. Neatly typewritten Table of Contents for each volume, arranged in systematic order.

1. Contractor, name of responsible principal, address, and telephone number.
2. A list of each product required to be included, indexed to content of the volume.
3. List, with each product, name, address, and telephone number of:
 - a. Subcontractor of installer
 - b. Maintenance contractor, as appropriate
 - c. Identify area of responsibility of each
 - d. Local source of supply for parts and replacement.
4. Identify each product name and other identifying symbols as set forth in Contract Documents.

B. Product Data

1. Include only those sheets which are pertinent to the specific product.

01/2017

01730-2

91-0134.1

2. Annotate each sheet to:
 - a. Clearly identify specific product or part installed.
 - b. Clearly identify data applicable to installation.
 - c. Delete references to inapplicable information.
- C. Drawings
1. Supplement product data with drawings as necessary to clearly illustrate:
 - a. Relations of component parts of equipment and systems.
 - b. Control and flow diagrams.
 2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
 3. Do not use Project Record Documents as maintenance drawing.
- D. Written text, as required to supplement product data for the particular installation:
1. Organize in consistent format under separate headings for different procedures.
 2. Provide logical sequence of instructions of each procedure.
- E. Copy of each warranty, bond and service contract issued:
1. Provide information sheet for Owner's personnel, give:
 - a. Proper procedures in event of failure.
 - b. Instances which might affect validity of warranties or bonds

1.06 MANUAL FOR MATERIALS AND FINISHES

- A. Submit five copies of complete manual in final form.
- B. Content for architectural products, applied materials and finishes
1. Manufacturer's data, giving full information on products.
 - a. Catalog number, size, composition.
 - b. Color and texture designations.
 - c. Information required for re-ordering special-manufactured products.
 2. Instructions for care and maintenance.
 - a. Manufacturer's recommendation for types of cleaning agents and methods.
 - b. Cautions against cleaning agents and methods which are detrimental to product.
 - c. Recommended schedule for cleaning and maintenance.
- C. Content, for moisture-protection and weather-exposed products

01/2017

01730-3

91-0134.1

1. Manufacturer's data, giving full information on products
 - a. Applicable standards.
 - b. Chemical composition.
 - c. Details of installation.
 2. Instructions for inspection, maintenance and repair.
- D. Additional requirements for maintenance data: Respective sections of Specifications.
- E. Provide complete information for products specified.

1.07 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit five copies of complete manual in final form.
- B. Content, for each unit of equipment and system, as appropriate:
 1. Description of unit and component parts.
 - a. Function, normal operating characteristics and limiting conditions
 - b. Performance curves, Engineering data and tests
 - c. Complete nomenclature and commercial number of replaceable parts
 2. Operating procedures
 - a. Start-up, break-in, routine and normal operating instructions
 - b. Regulation, control, stopping, shut-down and emergency instructions
 - c. Summer and winter operating instructions
 - d. Special operating instructions
 3. Maintenance Procedures
 - a. Routine operations
 - b. Guide to "trouble-shooting"
 - c. Disassembly, repair and reassembly
 - d. Alignment, adjusting and checking
 4. Servicing and lubrication schedule
 - a. List of lubricants required
 5. Manufacturer's printed operating and maintenance instructions
 6. Description of sequence of operation by control manufacturer
 7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance
 - a. Predicted list of parts subject to wear
 - b. Items recommended to be stocked as spare parts

01/2017

01730-4

91-0134.1

8. As-installed control diagrams by controls manufacturer
 9. Each contractor's coordination drawings
 - a. As-installed color coded piping diagrams
 10. Charts of valve tag numbers, with location and function of each valve
 11. List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage
 12. Other data as required under pertinent sections of specifications
- C. Contents, for each electric and electronic system, as appropriate
1. Description of system and component parts
 - a. Function, normal operating characteristics, and limiting conditions
 - b. Performance curves, Engineering data and tests
 - c. Complete nomenclature and commercial number of replaceable parts
 2. Circuit directories of panel-boards
 - a. Electrical service
 - b. Controls
 3. As-installed color coded wiring diagrams
 4. Operating procedures:
 - a. Routine and normal operating instructions
 - b. Sequences required
 - c. Special operating instructions
 5. Maintenance procedures
 - a. Routine operations
 - b. Guide to "trouble-shooting"
 - c. Disassembly, repair and reassembly
 - d. Adjustment and checking
 6. Manufacturer's printed operating and maintenance instructions
 7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
 8. Other data as required under pertinent sections of specifications
- D. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.
- E. Additional requirements for operating and maintenance data: Respective sections of Specifications.
- F. Provide complete information for product specified.

01/2017

01730-5

91-0134.1

1.08 SUBMITTAL SCHEDULE

- A. Submit two copies of preliminary draft of proposed formats and outlines of contents of Operation and Maintenance Manuals within 30 days after Notice to Proceed.
 - 1. The Engineer will review the preliminary draft and return one copy with comments.
- B. Submit two copies of completed data in final form no later than 30 days following the Engineer's review of the last shop drawing and submittal specified under Section 01340.
 - 1. One copy will be returned with comments to be incorporated into final copies.
- C. Submit specified number of copies of approved data in final form directly to the offices of the Engineer, Calvin, Giordano & Associates, within 30 calendar days of product shipment to the project site and preferably within 30 days after the reviewed copy is received.
- D. Submit six copies of addendum to the operation and maintenance manuals as applicable and certificates as specified in paragraph 1.01B of Section 01011 within 30 days after final inspection and plant start-up test.
- E. Final Operation and Maintenance submittals shall be in large three-ring binders organized by specification Section and plainly marked per paragraph 1.04C.

1.09 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in operation, adjustment, and maintenance of products, equipment and systems.
- B. Operating and maintenance manual shall constitute the basis of instruction.
 - 1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

1.10 ENGINEER'S O & M CHECKLIST

- A. The Engineer will review Operation and Maintenance Manuals submittals on operating equipment for conformance with the requirements of this Section. The review will generally be based upon the O&M Review Checklist (presented on the pages at the end of this section for the benefit of the Contractor and his suppliers).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

01/2017

01730-6

91-0134.1

O & M REVIEW CHECKLIST

EQUIPMENT SUBMITTED _____ DATE OF SUBMITTAL _____

MANUFACTURER _____ DEGREE OF APPROVAL _____

SPECIFICATION SECTION _____ DRAWING NUMBER _____

- _____ Is the submittal correct for model/ series/ configuration originally submitted with shop drawings?
- _____ Is the binding correct with assigned color/ printing etc.?
(Pertains to final three volumes)
- _____ Is the submittal properly indexed?
- _____ Does the submittal pertain only to equipment being furnished?
- _____ Is the submittal easily understood and instructively arranged?
- _____ Does the submittal include start-up, shutdown and troubleshooting procedures?
- _____ Are sufficient drawings and schematics included to supplement written descriptions?
- _____ Is the listing of name plate data for each piece of supplied equipment provided and attached?
- _____ Are all submitted "C" and "D" size drawings printed on paper that is 11 inches high and folded to 8 1/2 inches wide?
- _____ Is proper and complete instruction for servicing included?
- _____ Is there a suggested operating log sheet for equipment?
- _____ Is schedule for lubrication provided?
- _____ Is there a recommended preventative maintenance schedule?
- _____ Are necessary safety precautions clearly indicated where they relate to the equipment?
- _____ Is the Area Representative information provided, i.e., Name, Address, Telephone Number?
- _____ Are specified spare parts indicated and listed?

The following are the points of rejection requiring resubmittal by Contractor:

END OF SECTION

01/2017

01730-7

91-0134.1

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01/2017

01730-8

91-0134.1

SECTION 01740

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Compile warranties and bonds as specified in the Contract Documents.
- B. Co-execute submittals when so specified.
- C. Review submittals to verify compliance with Contract Documents.
- D. Submit to the Engineer for review and transmittal to Owner.

1.02 RELATED SECTIONS

- A. Section 00100 - Instructions to Bidders
- B. Section 01011 - Special Project Procedures
- C. Section 01700 - Contract Closeout
- D. Other Sections as applicable.

1.03 SUBMITTAL REQUIREMENTS

- A. Assemble warranties, bond, service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.
- B. Number of original signed copies required: two (2) each.
- C. Table of Contents: neatly typed, in orderly sequence. Provide complete information for each item.
 - 1. Product or work item
 - 2. Firm, with name of principal, address and telephone number
 - 3. Scope
 - 4. Date of beginning of Warranty, bond or service and maintenance contract
 - 5. Duration of warranty, bond or service maintenance contract
 - 6. Provide information for Owner's personnel:
 - a. Proper procedure in case of failure
 - b. Instances which might affect the validity of warranty or bond
 - 7. Contractor, name of responsible principal, address and telephone number

01/2017

01740-1

91-0134.1

1.04 FORM OF SUBMITTALS

- A. Prepare in duplicate packets
- B. Format:
 - 1. Size 8 1/2 inches x 11 inches, punch sheets for standard 3-post binder
 - 2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:
 - a. Title of Project
 - b. Name of Contractor
- C. Binders: Commercial quality, three-post (3) binder, with durable and cleanable plastic covers and maximum post width of 2 inches.

1.05 WARRANTY SUBMITTAL REQUIREMENTS

- A. For all equipment, submit a one-year warranty from the equipment manufacturer, unless otherwise specified. The manufacturer's warranty period shall be concurrent with the Contractor's for one year commencing at the time of acceptance by the Owner.
- B. The Contractor shall be responsible for obtaining certificates for equipment warranty for all major equipment and which has a 1 HP motor or which lists for more than \$1,000. The Engineer reserves the right to request warranties for equipment not classified as major. The Contractor shall still warrant equipment not considered to be "major" in the Contractor's one-year warranty period even though certificates of warranty may not be required.
- C. In the event that the equipment manufacturer or supplier is unwilling to provide a one-year warranty commencing at the time of Owner acceptance, the Contractor shall obtain from the manufacturer a two (2) year warranty commencing at the time of equipment delivery to the job site. This two-year (2) warranty from the manufacturer shall not relieve the Contractor of the one-year warranty starting at the time of Owner acceptance of the equipment.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01/2017

01740-2

91-0134.1

SECTION 02050

DEMOLITION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Demolish structures designated in drawings.
- B. Remove materials from site.
- C. Remove foundations as applicable.
- D. Remove designated piping.
- E. Disconnect, cap, remove and identify utilities as necessary to complete the work.

1.02 RELATED SECTIONS

- A. Other Sections as applicable.

1.04 EXISTING CONDITIONS

- A. Conduct demolition to minimize interference with adjacent structures.
- B. Provide, erect, and maintain temporary barriers and security devices.
- C. Conduct operations with minimum interference to public or private thoroughfares. Maintain protected egress and access at all times.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

PART 1 - 3.01 PREPARATION

- A. Prevent movement or settlement of adjacent structures. Provide bracing and shoring.
- B. Protect existing landscaping materials, appurtenances, structures, which are not to be demolished.
- C. Disconnect, remove and cap designated utility lines within demolition areas.
- D. Mark location of disconnected utilities. Identify utilities and indicate capping locations on Project Record Documents.

3.02 EXECUTION

01/2017

02050-1

91-0134.1

- A. Demolish indicated structures and appurtenances in an orderly and careful manner, and in accordance with staging requirements.
- B. Cease operations and notify Consultant immediately if adjacent structures appear to be endangered. Do not resume operations until corrective measures have been taken.
- C. Except where noted otherwise, immediately remove demolished material from site.
- D. Remove materials to be re-installed or retained in manner to prevent damage.
- E. Remove, store, and protect for re-installation the following materials and equipment:
 - 1. Traffic signalization structures as designated by Palm Beach County or the Owner under separate construction drawings.
 - 2. Aboveground utility structures designated by Florida Power and Light, Palm Beach County, Bell South, other pertinent utility companies, or the Owner as indicated on the Drawings.
- F. Remove the following material and equipment to be retained by Owner. Deliver to Water Treatment Plant:
 - 1. Not Applicable
- G. Remove and promptly dispose of contaminated, vermin infested, or dangerous materials encountered.
- H. Do not burn or bury materials on site.
- I. Remove foundation walls and footings to a minimum two feet below finished grade.
- J. Remove concrete slabs on grade.
- K. Pump out buried tanks located within demolition area. Fill tanks with sand or fine gravel and cover with fill; remove piping.
- L. Keep work sprinkled to minimize dust. Provide hoses and watermain or hydrant connections for this purpose.
- M. Backfill areas excavated, open pits and holes caused as a result of demolition. Use backfill specified in Section 02221 entitled "Trenching, Bedding, and Backfill for Pipe".
- N. Rough grade and compact areas affected by demolition to maintain site grades and contours.
- O. Remove demolished materials from site as work progresses. Leave site in clean condition.

01/2017

02050-2

91-0134.1

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01/2017

02050-3

91-0134.1

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01/2017

02050-4

91-0134.1

SECTION 02100

SITE PREPARATION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Section covers clearing, grubbing, stripping and demucking of the construction site, complete as specified herein.
- B. Clear and demuck the area within the limits of construction as required, including drainage easements.

1.02 RELATED SECTIONS

- A. Section 02221 - Trenching, Bedding & Backfill for Pipe
- B. Other Sections as applicable.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CLEARING

- A. The surface of the ground, for the area to be cleared and grubbed shall be completely cleared of all timber, brush, stumps, roots, grass, weeds, rubbish and all other objectionable obstructions resting on or protruding through the surface of the ground. However, those trees which are designated by the Engineer shall be preserved as hereinafter specified. Clearing operations shall be conducted so as to prevent damage to existing structures and installations, and to those under construction, so as to provide for the safety of employees and others. Clearing for structures shall consist of topsoil and vegetation removal. Clearing for pipelines shall consist of vegetation removal.

3.02 GRUBBING

- A. Grubbing shall consist of the complete removal of all stumps, roots larger than 1 1/2 inches in diameter, matted roots, brush, timber, logs and any other organic or metallic debris resting on, under or protruding through the surface of the ground to a depth of 18 inches below the subgrade. All depressions excavated below the original ground surface for or by the removal of such objects, shall be refilled with suitable materials and compacted to a density conforming to the surrounding ground surface.

3.03 STRIPPING

- A. In areas so designated, top soil, not muck shall be stockpiled. Topsoil stockpiled shall be protected until it is placed as specified. Any topsoil remaining after all work is in place shall be disposed of by the Contractor.

01/2017

02100-1

91-0134.1

3.04 DEMUCKING

- A. When encountered, organic material (muck) shall be excavated and removed. This material may be stockpiled temporarily, but must be disposed of as directed by the Engineer or the Owner.

3.05 DISPOSAL OF CLEARED AND GRUBBED MATERIAL

- A. The Contractor shall dispose of all material and debris from the clearing and grubbing operation by shipping such material and debris and disposing such material to a suitable location as required by the Engineer or the governmental agencies. Disposal by deep burial will not be permitted. The cost of disposal of material (including hauling) shall be considered a subsidiary obligation of the Contractor, the cost of which shall be included in the contract prices.

3.06 PRESERVATION OF TREES

- A. Those trees which are designated by the Engineer or as shown on the drawings for preservation shall be carefully protected from damage. The Contractor shall erect such barricades, guards, and enclosures as may be considered necessary by him for the protection of the trees during all construction operations.

3.07 PRESERVATION OF DEVELOPED PRIVATE PROPERTY

- A. The Contractor shall exercise extreme care to avoid necessary disturbance of developed private property as applicable. Trees, shrubbery, gardens, lawn and other landscaping, which in the opinion of the Engineer must be removed, shall be replaced and replanted to restore the construction easement to the condition existing prior to construction.
- B. All soil preparation procedures and replanting operations shall be under the supervision of nurseryman experienced in such operations.
- C. Improvements to the land such as fences, walls, outbuildings, etc., which of necessity must be removed shall be replaced with equal quality materials and workmanship.
- D. The Contractor shall clean up the construction site across developed private property directly after construction is complete upon approval of the Engineer.

3.08 PRESERVATION OF PUBLIC PROPERTY

- A. The appropriate paragraphs of Articles 3.06 and 3.07, of these specifications shall apply to the preservation and restoration of all damaged areas of public lands, rights-of-way, easements, etc.

END OF SECTION

01/2017

02100-2

91-0134.1

SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Earthwork operations necessary to achieve the Work including, but not limited to, excavation of soil, grading, removal and replacement of unsuitable soil, fill, backfill, embankment and compaction more specifically described as follows:
1. Earthwork operations generally consists of excavation and embankment of soil materials from the existing elevations to the proposed elevations.
 2. Embankment necessary to achieve the proposed elevations may consist of in situ soils, whether classified as suitable or unsuitable, or imported suitable soil material. All imported soil material for embankment is to be included in the Contract price.
 3. Soil material categorized as sub-grade is to be imported suitable soil. The Owner reserves the right to decline imported sub-grade material should in-situ suitable material be encountered and seek a credit for imported, placed and compacted sub-grade per the Unit Price Schedule.
 4. Where unsuitable soil materials are encountered under or around sidewalks, pipes, exfiltration trenches or structural elements, the Owner reserves the right to specify removal and replacement of unsuitable soil with imported suitable soil. All imported suitable soil material for placement under or around structural elements is to be paid out of the Owners Contingency.

1.02 RELATED SECTIONS

- A. Section 02100 – Site Preparation
- B. Section 02210 – Finish Grading
- C. Other Sections as applicable.

1.03 REFERENCES

- A. FDOT Standard Specifications for Road and Bridge Construction
- B. FDOT Design Standards
- C. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- D. AASTHO M-145 - Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes

01/2017

02200-1

91-0134.1

1.04 PROJECT CONDITIONS

- A. Locate existing underground utilities in areas of work. Provide adequate means of support and protection during earthwork operations.
- B. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
- C. Do not interrupt existing utilities serving occupied facilities.
- D. Use of Explosives: If the use of explosives is necessary for the execution of the Work, and the use of explosives is allowed by local government, the Contractor shall conduct his blasting operations in conformance with these specifications and all applicable state and local codes and regulations.
 - 1. The contractor shall obtain a testing laboratory to perform pre and post blasting surveys of all nearby structures at no cost to the Owner.
- E. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

- A. Satisfactory or Suitable Soil Materials: ASTM D2487 soil classification groups GW, GP, GP-GM and SW.
- B. Unsatisfactory or Unsuitable Soil Materials: ASTM D2487 soil classification groups GM, GC, SW, SM, SC, CL, ML, OL, CH, MH, OH and PT.
- C. Satisfactory and unsatisfactory soil materials for roadway embankment, including pipe trench backfill under roadways, shall meet the requirements as defined in AASHTO M-145 soil classification groups and FDOT index 505.
- D. Satisfactory materials encountered during excavation, may be stored in segregated stockpiles for reuse. All material which, in the opinion of the Engineer, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials.
- E. Sub-base material:
 - 1. Satisfactory materials may be Select, Structural or Common fill.
- F. Select or Structural Fill or backfill:
 - 1. Select or structural fill material shall be a satisfactory soil material, well graded, consisting of a minimum of 60 percent clean medium fine grain

01/2017

02200-2

91-0134.1

sized quartz sand, free of organic, deleterious and/or compressible percent clean medium fine grain sized quartz sand, free of organic, deleterious and/or compressed material. Rock in excess of 2 inches in diameter shall not be permitted.

G. Common Fill:

1. Common fill material shall be a satisfactory soil material containing no more than 20 percent by weight finer than No. 200 mesh sieve. It shall be free from organic matter, muck, marl, and rock exceeding 2 1/2 inches in diameter.

H. Course Aggregate:

1. Course aggregate, or gravel, shall be used for rock bedding, drainage rock or as otherwise depicted in the Drawings. Unless otherwise noted, course aggregate shall consist of washed and graded crushed limerock meeting FDOT specification 901, size number 57 or approved equal.

I. Sand

1. Where specified, sand, clean sand, silica sand or other nomenclature shall refer to silica sand meeting FDOT specification 902-2.

J. Satisfactory or suitable soil materials shall free of muck, clay, rock or gravel larger than 2-1/2 inches in any dimension, debris, trash, waste, frozen materials, broken concrete, masonry, rubble, vegetable or other similar materials or deleterious matter. Materials of this nature encountered during the excavation which, in the opinion of the Engineer, is not suitable for reuse shall be stockpiled for disposal as unsuitable materials.

K. Material substitutions may be permitted if accompanied by a geotechnical engineers report substantiating the proposed substitution which is approved by the Engineer and is at no cost to the Owner.

PART 3 - EXECUTION

PART 4 - EXCAVATION

- A. The contractor shall perform trench excavations in accordance with applicable trench safety standards and is responsible to determine any safety or safety related standards that apply to the Project. The Owner and Engineer are not responsible to review and/or assess safety precautions, programs and costs, and the means, methods, techniques or technique adequacy, reasonableness of cost, sequences and procedures of any safety precaution, including, but not limited to, compliance with any and all requirements of Florida Trench Safety Act.
- B. Excavation is Unclassified, and includes excavation to sub-grade elevations indicated, regardless of character of materials and obstructions encountered.
- C. Unauthorized Excavation: Removal of materials beyond indicated sub-grade

01/2017

02200-3

91-0134.1

elevations or dimensions without specific direction. Unauthorized excavation, as well as remedial work directed by Engineer, shall be at Contractor's expense.

D. Additional Excavation:

1. Where unsuitable soil materials are encountered under or around structural elements, the Owner reserves the right to specify removal and replacement of unsuitable soil with imported suitable soil. All imported suitable soil material for placement under or around structural elements is to be paid out of the Owners Contingency.

E. Stability of Excavations:

1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction.
2. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
3. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

F. Shoring and Bracing:

1. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.
2. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

G. Dewatering:

1. The bottom of the excavations shall be firm and dry and in all respects acceptable to the Engineer.
2. Prevent surface water and sub-surface or ground water from flowing into excavations. Do not allow water to accumulate in excavations.
3. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
4. The Contractor shall obtain all dewatering permits as required from agencies having jurisdiction

H. Stockpile satisfactory excavated materials where directed, until required for embankment, backfill or fill. Place, grade and shape stockpiles for proper drainage.

I. Excavation for Trenches: Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Provide minimum 6 in. clearance on each side of pipe or conduit.

1. Excavate trenches to depth indicated or required for indicated flow lines and invert elevations.

01/2017

02200-4

91-0134.1

2. Where rock is encountered, carry excavation 6 in. below scheduled elevation and backfill with a 6 in. layer of crushed stone or gravel prior to installation of pipe.
 3. For pipes or conduit 5 in. or less, excavate to indicate depths. Hand excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.
 4. For pipes or conduit 6 in. or larger, tanks and other work indicated to receive sub-base, excavate to sub-base depth indicated, or, if not otherwise indicated, to 6 in. below bottom of work to be supported.
 5. Except as otherwise indicated, excavate for exterior water-bearing piping so top of piping is minimum 3'-6" below finished grade.
 6. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.
- J. Do not backfill trenches until tests and inspections have been made and backfilling authorized by Engineer.

4.02 COMPACTION

- A. Areas to be compacted shall be moistened and compacted by either rolling, tamping or any other approved method by the Engineer in order to obtain the desired density.
- B. Hydraulic compaction will require a geotechnical engineer's recommendation, observation and certification at the Contractors expense.
- C. The Contractor shall inspect all compacted areas prior to further construction operations to ensure that satisfactory compaction has been obtained.
- D. All sub-grade shall be compacted as indicated on the Drawings unless otherwise stated in the FDOT Standard Specifications for Road and Bridge Construction
- E. All embankment shall be compacted by proof rolling to achieve 95% of modified proctor maximum dry density as determined by ASTM D-1557 at 12" below the compacted surface.
- F. All soil beneath structures shall be compacted to achieve 98% of modified proctor maximum dry density as determined by ASTM D-1557 at 12" below the compacted surface.
- G. Hydraulic compaction shall be permitted if accompanied by a geotechnical engineers report substantiating the proposed methods. The geotechnical engineers report shall be submitted to the Engineer prior to any work and shall be at no cost to the Owner.
- H. The frequency of testing shall be as indicated on the Drawings unless otherwise stated in the FDOT Standard Specifications for Road and Bridge Construction
- I. All earthwork testing shall be at the expense of the Contractor unless otherwise

01/2017

02200-5

91-0134.1

stated in the Contract Documents.

- J. The Contractor shall instruct the testing laboratory to forward copies of all test reports to the Engineer.
- K. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

4.03 EMBANKMENT, BACKFILL AND FILL

- A. Place specified soil material in layers required to achieve proposed elevations:
 1. Place materials in layers of 8 inches loose depth for material compacted by heavy dynamic compaction equipment and 4 in. in loose depth for material compacted by hand operated tampers.
 2. Place materials in layers of 12 inches loose depth for material compacted by proof rolling equipment.
 3. Under grassed areas, use satisfactory or unsatisfactory excavated or imported soil material if approved by the Engineer.
 4. Under walks and pavements, use sub-base material, or satisfactory excavated or borrow material, or combination of both. Place shoulders along edges of sub-base course to prevent lateral movement with satisfactory excavated or borrow material.
 5. Under steps, use sub-base material.
 6. Under building slabs, use drainage fill material.
 7. Under piping and conduit, use sub-base material where sub-base is indicated under piping or conduit; shape to fit bottom 90 degrees of cylinder.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:
 1. Acceptance of construction below finish grade including waterproofing and perimeter insulation.
 2. Inspection, testing, approval, and recording locations of underground utilities.
 3. Removal of shoring and bracing, and backfilling of voids with satisfactory materials.
- C. Remove all trash, roots, vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
- D. When existing ground surface has a density less than that specified for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

01/2017

02200-6

91-0134.1

- E. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- F. Place backfill and fill materials evenly adjacent to structures, without wedging against structures or displacement of piping or conduit. Compaction equipment used within 10 ft. of buried walls and soil supported structures shall not exceed 2000 lbs.

4.04 GRADING

- A. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding and as follows:
 - 1. Finish to within not more than 0.10 ft. above or below required sub-grade elevations.
 - 2. Walks: Shape surface to line, grade and cross-section, with finish surface not more than 0.10 ft. above or below required sub-grade elevation.
 - 3. Pavements: Shape surface to line, grade and cross-section, with finish surface 1/2 in. above or below required sub-grade elevation.
 - 4. Sod: Where sod abuts pavement, sidewalks, etc., finish surface below as required to accommodate thickness of sod as not to prohibit drainage.
- B. Grading Surface of Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to 1/2 in. below required elevation.

4.05 QUALITY CONTROL

- A. Perform earthwork in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Contractor will engage soil testing and inspection service for quality control testing during earthwork operations.
- C. Allow testing service to inspect and approve sub-grades and fill layers before further construction work is performed.
- D. If in opinion of Engineer, based on testing service reports and inspection, sub-grade or fills which have been placed below specified density, provide additional compaction and testing at no additional expense to Owner.

4.06 CLEANING AND PROTECTION

- A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Remove excess excavated and waste materials, including unacceptable excavated material, trash and debris, and legally dispose of it at no cost to the Owner.

01/2017

02200-7

91-0134.1

END OF SECTION

01/2017

02200-8

91-0134.1

SECTION 02210

FINISH GRADING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Provide all labor, materials, necessary equipment or services to complete the Finish Grading work, as indicated on the Contract Documents.

1.02 RELATED SECTIONS

- A. Section 02200 - Earthwork
- B. Section 02430 - Sodding
- C. Section 02450 - Tree and Plant Protection
- D. Other Sections as applicable.

1.03 SITE INSPECTION

- A. The Contractor shall visit the site and acquaint himself with all existing conditions. The Contractor shall be responsible for his own subsurface investigations, as necessary, to satisfy requirements of this Section. All subsurface investigations shall be performed only under time schedules and arrangements approved in advance by the Engineer or Owner's Representative.

1.04 EXISTING CONTOURS

- A. The existing elevations shown on the drawings are approximate only. The contractor is responsible for grading to meet existing elevations as required.
- B. The contours and elevations established under contract will be the finished grades shown. The Contractor under this Contract shall perform the work for construction using the finished grades previously established and making whatever corrections and/or repairs to grades to make them consistent with the requirements of the drawings and specifications.

1.05 UTILITIES

- A. Before starting site operations verify that the earlier contractors have disconnected all temporary utilities which might interfere with the fine grading work.
- B. Locate all existing, active utility lines traversing the site and determine the requirements for their protection. Preserve in operating condition all active utilities adjacent to or transversing the site that are designated to remain.

01/2017

02210-1

91-0134.1

- C. Observe rules and regulations governing respective utilities in working under requirements of this section. Adequately protect utilities from damage, remove or relocate as indicated, specified or required. Remove, plug or cap inactive or abandoned utilities encountered in excavation. Record location of active utilities.

1.06 QUALITY ASSURANCE

- A. Requirements of all applicable building codes and other public agencies having jurisdiction upon the work.
- B. Primary emphasis should be given to the aesthetic appearance and functioning of berming and swales, as directed by the Engineer or Owner's Representative. The Contractor shall employ skilled personnel and any necessary equipment to ensure that finish grading is smooth, aesthetically pleasing, drains well, and is ideal for receiving sod and plant materials.
- C. As-build survey drawings of all finished grading are to be submitted to the Engineer for review prior to landscape installation or agency certifications.

PART 2 - MATERIALS

2.01 TOP SOIL

- A. Refer to Related Sections for material specifications.
- B. In areas to receive turf, rough grade shall be a minimum of 2 inches below finished grades.
- C. Rough grade fill is to be fine, compacted, satisfactory fill material, with no rocks larger than 2-inches.
- D. Both surface and subsurface, both before and after fill operations, shall be checked to confirm that percolation/compaction levels meet the needs of the proposed planting for that area.

PART 3 - EXECUTION

3.01 EXCAVATION

- A. Excavate where necessary to obtain subgrades, percolation, and surface drainage as required.
- B. All unsatisfactory soil materials are to be removed and replaced with satisfactory soil materials.
- C. Remove entirely any existing obstructions after approval by the Engineer's or Owner's Representative.
- D. Remove from site and dispose of debris and excavated material not required.

01/2017

02210-2

91-0134.1

3.02 GRADING

- A. The Contractor shall establish finished grades as shown on the Engineers grading plans, and as directed by Engineer and/or Owner's Representative, including areas where the existing grade has been disturbed by other work.
- B. Finished grading shall be smooth, aesthetically pleasing, drain well and ready to receive sod and other plant material to full satisfaction of Engineer and Owner's Representative.
- C. Finish grading accuracy is to be within 1/ 10 foot of specified elevations.
- D. Finish grading is to be performed using hand raking throughout and shall remove all objectionable material and rocks greater than 1 inch in diameter.
- E. A finish grading inspection is required prior to sod placement.

3.03 COMPACTION

- A. Compact each layer of fill in designated areas with approved equipment in accordance with Section 02200.
 - 1. In landscaped areas, compaction shall not exceed 85% of maximum density and no less than 75%.
 - 2. In landscaped areas which are sloped at 1:4 or steeper, compaction shall not exceed 90% of maximum density and no less than 85%.
- B. No backfill shall be placed against any masonry or other exposed building surface until permission has been given by the Owner's Representative, and in no case until the masonry has been in place seven days.
- C. Compaction in limited areas shall be obtained by the use of mechanical tampers or approved hand tampers. When hand tampers are used, the materials shall be deposited in layers not more than four inches thick. The hand tampers used shall be suitable for this purpose and shall have a face area of not more than 100 square inches. Special precautions shall be taken to prevent any wedging action against masonry, or other exposed building surfaces.

3.04 CORRECTION OF GRADE

- A. Bring to required grade levels areas where settlement, erosion, or other grade changes occur. Adjust grades as required to carry drainage away from buildings and to prevent ponding around the buildings and on pavements.
- B. All soil surfaces shall have sufficient percolation and surface drainage to support grasses and plant material.
- C. Contractor shall be responsible for stabilizing grades by approved methods prior to landscaping, and shall be responsible for correction of grades as mentioned above, and cleanup of any wash outs or erosion.

01/2017

02210-3

91-0134.1

END OF SECTION

01/2017

02210-4

91-0134.1

SECTION 02221

TRENCHING, BEDDING AND BACKFILL FOR PIPE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish labor, materials, equipment, and incidentals necessary to perform all excavation, backfill, fill, grading, and slope protection required to complete the piping work shown on the Drawings and specified herein. The work shall include, but not necessarily be limited to, manholes, vaults, duct conduit, pipe, roadways, paving, bedding, backfilling, fill, required borrow; grading, disposal of surplus and unsuitable materials, and all related work such as sheeting, bracing, and dewatering.

1.02 RELATED SECTIONS

- A. Section 01340 – Shop Drawings, Working Drawings and Samples
- B. Section 02100: Site Preparation
- C. Section 02200 - Earthwork
- D. Other Sections as applicable.

1.03 REFERENCES

- A. FDOT Standard Specifications for Road and Bridge Construction
- B. FDOT Design Standards
- C. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- D. AASTHO M-145 - Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes

1.04 JOB CONDITIONS

- A. The Contractor shall examine the site and review the available test borings or undertake his own soil borings prior to submitting his bid, taking into consideration all conditions that may affect his work. The Owner and Engineer will not assume responsibility for variations of sub-soil quality or conditions at locations other than places shown and at the time the available test borings were made.
- B. Existing Utilities: Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
 1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the Engineer and the Owner of such piping or utility immediately for directions.
 2. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
 3. Demolish and completely remove from site existing underground utilities

01/2017

02221-1

91-0134.1

indicated on the drawings to be removed.

- C. Protection of Persons and Property: Contractor shall barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
 - 1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

1.05 SUBMITTALS

- A. The Contractor shall furnish the Engineer, for approval, a certificate of origin and compliance with specifications for any fill material obtained from off-site sources.
- B. At the discretion of the Engineer, the Contractor shall furnish the Engineer, for approval, a representative sample of fill material obtained from on-site sources weighing approximately 50 pounds, at least ten calendar days prior to the date of anticipated use of such material.
- C. At the discretion of the Engineer, for each material obtained from off-site sources, the Contractor shall notify the Engineer of the source of the material and shall furnish the Engineer, for approval, a representative sample weighing approximately 50 pounds, at least ten calendar days prior to the date of anticipated use of such material.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Satisfactory Soil Materials: ASTM D2487 soil classification groups GW, GP, SW, and SP.
- B. Unsatisfactory Soil Materials: ASTM D2487 soil classification groups GM, GC, SM, SC, CL, ML, OL, CH, MH, OH and PT.
- C. Satisfactory and unsatisfactory roadway embankment, including pipe trench backfill under roadways, shall meet the requirements as defined in AASHTO M-145 soil classification groups and FDOT index 505.
- D. Satisfactory materials encountered during excavation, may be stored in segregated stockpiles for reuse. All material which, in the opinion of the Engineer, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials.
- E. Sub-base material:
 - 1. Refer to roadway section and/or specifications.
- F. Select or Structural Fill or backfill:
 - 1. Select or structural fill material shall be a satisfactory soil material, well graded, consisting of a minimum of 60 percent clean medium fine grain sized quartz sand, free of organic, deleterious and/or compressible percent clean medium fine grain sized quartz sand, free of organic, deleterious and/or compressed material. Rock in excess of 1 inch in diameter shall not be permitted.

01/2017

02221-2

91-0134.1

- G. Common Fill:
1. Common fill material shall be a satisfactory soil material containing no more than 20 percent by weight finer than No. 200 mesh sieve. It shall be free from organic matter, muck, marl, and rock exceeding 2 1/2 inches in diameter.
- H. Course Aggregate:
1. Course aggregate, or gravel, shall be used for rock bedding, drainage rock or as otherwise depicted in the Drawings. Unless otherwise noted, course aggregate shall consist of washed and graded crushed limerock meeting FDOT specification 901, size number 57 or approved equal.
- I. Sand
1. Where specified, sand, clean sand, silica sand or other nomenclature shall refer to silica sand meeting FDOT specification 902-2.
- J. Satisfactory soil materials shall free of muck, clay, rock or gravel larger than 2-1/2 inches in any dimension, debris, trash, waste, frozen materials, broken concrete, masonry, rubble, vegetable or other similar materials or deleterious matter. Materials of this nature encountered during the excavation which, in the opinion of the Engineer, is not suitable for reuse shall be stockpiled for disposal as unsuitable materials.
- K. Material substitutions may be permitted if accompanied by a geotechnical engineers report substantiating the proposed substitution which is approved by the Engineer and is at no cost to the Owner.

PART 3 - EXECUTION

3.01 GENERAL

- A. All excavation, backfill and grading necessary to complete the work shall be made by the Contractor and the cost thereof shall be included in the Contract price.
- B. Material shall be furnished as required from off-site sources and hauled to site.
- C. The Contractor shall take all necessary precautions to maintain the work area in a safe and workable condition.
- D. The Contractor shall protect his work at all times by flagging, marking, lighting and barricading. It shall also be the Contractor's responsibility to preserve and protect all above and underground structures, pipe lines, conduits, cables, drains, or utilities which are existing at the time he encounters them. Failure of the Drawings to show the existence of these obstructions shall not relieve the Contractor from this responsibility. The cost of repair of damage which occurs to these obstructions during or as a result of construction shall be borne by the Contractor without additional cost to the Owners.

3.02 DEWATERING

- A. The bottom of the excavations shall be firm and dry and in all respects acceptable to the Engineer.
- B. Prevent surface water and sub-surface or ground water from flowing into

01/2017

02221-3

91-0134.1

excavations. Do not allow water to accumulate in excavations.

- C. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
- D. The Contractor shall obtain all dewatering permits as required from agencies having jurisdiction

3.03 TRENCH EXCAVATION

- A. Excavation for all trenches required for the installation of pipes shall be made to the depths indicated on the Drawings. Excavate trench to provide minimum of 30-inch clear cover over the pipe bell unless otherwise noted on the Drawings. Excavate in such manner and to such widths as will give suitable room for laying the pipe within the trenches, for bracing and supporting and for pumping and drainage facilities. The trench width at the top of the pipe shall not exceed the allowable as determined by the depth of cut and indicated on the Drawings.
- B. Rock shall be removed to a minimum 8-inches clearance around the bottom and sides of all the pipe or ducts being laid.
- C. Where pipe is to be laid in limerock bedding or encased in concrete, the trench may be excavated by machinery to or just below the designated subgrade provided that the material remaining in the bottom of the trench remains undisturbed.
- D. Where the pipes or ducts are to be laid directly on the trench bottom the lower part of the trenches shall not be excavated to the trench bottom by machinery. The last of the material being excavated shall be done manually in such a manner that will give a flat bottom true to grade so that pipe can evenly and uniformly supported along its entire length on undisturbed material or bedding rock. Bell holes shall be made as required manually so that there is no bearing surface on the bells and pipes are supported along the barrel only.
- E. The bottom of the excavations shall be firm and dry and in all respects acceptable to the Engineer. Excavate any organic soil material from the bottom of the trench and replace with rock bedding, at least 6 inches thick.

3.04 TRENCH PROTECTION

- A. The contractor shall perform trench excavations in accordance with applicable trench safety standards and is responsible to determine any safety or safety related standards that apply to the Project. The Owner and Engineer are not responsible to review and/or assess safety precautions, programs and costs, and the means, methods, techniques or technique adequacy, reasonableness of cost, sequences and procedures of any safety precaution, including, but not limited to, compliance with any and all requirements of Florida Trench Safety Act.
- B. The Contractor shall construct and maintain sheeting and bracing as required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures, existing piping, and foundation material from disturbance, undermining, or other damage. Care shall be taken to prevent voids outside of the sheeting, but if voids form, they shall be immediately filled and compacted.

01/2017

02221-4

91-0134.1

- C. For pipe trench sheeting, no sheeting is to be withdrawn if driven below mid-diameter of any pipe, and no wood sheeting shall be cut off at a level lower than 1 foot above the top of any pipe unless otherwise directed by the Engineer. If during the progress of the work the Engineer decides that additional wood sheeting should be left in place, he may direct the Contractor in writing. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given by the Engineer for an alternate method of removal.
- D. All sheeting and bracing not left in place, shall be carefully removed in such a manner as not to endanger the construction or other structures, utilities, existing piping, or property. All voids left or caused by withdrawal of sheeting shall immediately be refilled with sand or rammed with tools especially adapted to that purpose, by watering or otherwise as may be directed.
- E. The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue such orders, and his failure to exercise his right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise growing out of a failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.

3.05 PIPE INTERFERENCES AND ENCASEMENT

- A. The contractor shall abide by the following schedule of criteria concerning interferences with other utilities.
 - 1. In no case shall there be less than 0.5 feet between any two pipe lines and structures.
 - 2. Class I Concrete Encasement: Wherever there is more than 0.5 foot, but not less than 1.5 foot clearance between water mains or water services, then a concrete encasement shall be provided in accordance with the typical detail as shown on the Drawings.
 - 3. Class II Concrete Encasement: Wherever there is more than 0.5 foot, but less than 1.0 foot clearance between any two pipe lines, or between pipe lines and structures, then a concrete encasement shall be provided in accordance with the typical detail as shown on the Drawings.
- B. The Engineer shall have full authority to direct the placement of the various pipes and structures in order to facilitate construction, expedite completion and to avoid conflicts.

3.06 BACKFILLING

- A. Do not backfill trenches until tests and inspections have been made and backfilling authorized by Engineer.
- B. Perform backfill in lifts and compact as specified in the Drawings.
- C. Backfilling over pipes shall begin as soon as practical after the pipe has been laid, jointed, and inspected and the trench filled with suitable compacted material to the mid-diameter of the pipe.
- D. Backfilling over ducts shall begin not less than three days after placing concrete encasement.

01/2017

02221-5

91-0134.1

- E. All backfilling shall be prosecuted expeditiously as detailed on the Drawings.
- F. Any space remaining between the pipe and sides of the trench shall be packed full by hand shovel with selected earth and thoroughly compacted with a tamper as fast as placed, up to a level of one foot above the top of pipe.
- G. The filling shall be carried up evenly on both sides with at least one man tamping for each man shoveling material into the trench.
- H. The Contractor shall take all precautions necessary to maintain the bedding in a compacted state and to prevent washing, erosion or loosening of this bed.
- I. In areas where unsuitable soil is discovered in the pipe bedding, the unsuitable soil shall be removed and stockpiled for disposal by the contractor. Suitable soils shall be substituted at a depth as directed by the Engineer. If gravel is required by the Engineer as suitable bedding, the gravel shall be wrapped in filter fabric prior to backfill operations.
- J. Gravel bedding shall not be used under any circumstances as a drain for ground water.
- K. In locations where pipes pass through building walls, the Contractor shall take the following precautions to consolidate the refill up to an elevation of at least 1 foot above the bottom of the pipes:
 1. Place structural fill in such areas for a distance of not less than 3 feet either side of the centerline of the pipe in level layers not exceeding 6-inches in depth.
 2. Wet each layer to the extent directed and thoroughly compact each layer with a power tamper to the satisfaction of the Engineer.

3.07 COMPACTION

- A. Perform compaction and compaction tests as specified in the Drawings.
- B. Hydraulic compaction shall be permitted if accompanied by a geotechnical engineers report substantiating the proposed methods. The geotechnical engineers report shall be submitted to the Engineer prior to any work and shall be at no cost to the Owner.

3.08 GRADING

- A. Grading shall be performed at such places as are indicated on the Drawings, to the lines, grades and elevations shown or as directed by the Engineer and shall be made in such manner that the requirements for formation of embankments can be followed. All unacceptable material encountered, of whatever nature within the limits indicated, shall be removed and disposed of as directed. During the process of excavation, the grade shall be maintained in such condition that it will be well drained at all times. When directed, temporary drains and drainage ditches shall be installed to intercept or divert surface water which may affect the prosecution or condition of the work.
- B. If at the time of excavation it is not possible to place any material in its proper section of the permanent structure, it shall be stockpiled in approved areas for later use. No extras will be considered for the stockpiling or double handling of excavated material.

01/2017

02221-6

91-0134.1

- C. The right is reserved to make minute adjustments or revisions in lines or grades if found necessary as the work progresses, due to discrepancies on the Drawings or in order to obtain satisfactory construction.
- D. Stones or rock fragments larger than 2 1/2 inches in their greatest dimensions will not be permitted in the top 6 inches of the subgrade line of all fills or embankments.
- E. All fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings, or as directed by the Engineer.
- F. In cut, all loose or protruding rocks on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings or as specified by the Engineer.
- G. No grading is to be done in areas where there are existing pipe lines that may be uncovered or damaged until such lines which must be maintained are relocated, or where lines are to be abandoned, all required valves are closed and drains plugged at manholes.
- H. The Contractor shall replace all pavement cut or otherwise damaged during the progress of the work as specified elsewhere herein or as shown on the Drawings.

3.09 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL

- A. All surplus and unsuitable excavated material shall be disposed of at the Contractor's cost in one of the following ways as directed by the Engineer.
 - 1. Transport to soil storage area on Owner's property and stockpile or spread as directed by the Engineer.
 - 2. Transport from Owner's property and legally dispose of. Any permit required for the hauling and disposing of this material beyond Owner's property shall be obtained prior to commencing hauling operations. Copies of all required permits shall be provided to the Engineer.
- B. Suitable excavated material may be used for fill if it meets the specifications for common fill and is approved by the Engineer. Excavated material so approved may be neatly stockpiled at the site where designated by the Engineer provided there is an area available where it will not interfere with the operation of the facility nor inconvenience traffic or adjoining property owners.

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02221-7

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02221-8

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SECTION 02223

EXCAVATION BELOW NORMAL GRADE AND GRAVEL REFILL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. If in the opinion of the Engineer, the material at or below the normal grade of the bottom of the trench (0.7 feet below the invert of the pipe) is unsuitable for foundation, it shall be removed to the depth directed by the Engineer and replaced by drain rock, as specified in Section 02221 - Trenching, Bedding, and Backfill for Pipe.
- B. It shall be the Contractor's responsibility to provide trench safety systems such as sheeting and bracing in accordance with state and local regulations.

1.02 RELATED WORK

- A. Section 02221: Trenching, Bedding and Backfill for Pipe.
- B. Other Sections as applicable.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Drain rock shall be 3/8 inch to 3/4 inch washed and graded limerock. The rock shall be graded so that 99% will pass a 3/4 inch screen and 80% will be retained on a No. 8 screen. Material meeting the Florida Department of Transportation Standard Specifications for No. 57 stone shall be acceptable.

PART 3 - EXECUTION

3.01 EXCAVATION AND DRAINAGE

- A. Whatever the nature of unstable material encountered or the groundwater conditions, trench drainage shall be complete and effective.
- B. If the Contractor excavates below grade through error or for his own convenience, or through failure to properly dewater the trench, or disturbs the subgrade before dewatering is sufficiently complete, he may be directed by the Engineer to excavate below grade as set forth in the preceding paragraph, in which case the work of excavating below grade and finishing and placing the refill shall be performed at his own expense.

3.02 REFILL

- A. If the material at the level of trench bottom consists of fine sand or sand and silt which may work into the drain rock prohibiting effective drainage, the subgrade material shall be removed to the extent directed and the excavation refilled with coarse sand, or a mixture graded from coarse sand to fine peastone, to form a filter layer preserving the voids in the gravel bed of the pipe. The composition and

01/2017

02223-1

91-0134.1

gradation of gravel shall be approved by the Engineer prior to placement. Gravel shall be placed in 6 inch layers thoroughly compacted. If directed by the Engineer, drain rock shall be used for refill of excavation below grade.

END OF SECTION

01/2017

02223-2

91-0134.1

SECTION 02430

SODDING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Provide all labor, materials, necessary equipment and services to complete the turfgrass Sodding work, as indicated on the drawings, as specified herein or both, except as for items specifically indicated as "NICITEMS".

1.02 RELATED SECTIONS

- A. Section 02200 - Earthwork
- B. Section 02210 - Finish Grading
- C. Section 02450 - Tree and Plant Protection
- D. Other Sections as applicable.

1.03 QUALITY ASSURANCE

- A. Standards: Federal Specifications (FS) 0-F-24 1c (1), Fertilizers, Mixed, Commercial.
- B. Requirements or Regulatory Agencies: Conform to the requirements of the State Department of Agriculture.

1.04 SUBMITTALS

- A. Growers Certifications:
 1. Turfgrass Sod species and location of field from which turfgrass sod is cut.
 2. Compliance with state and federal quarantine restrictions. Manufacturer's certification of fertilizer and herbicide composition.
 3. All Contractors' licenses and or certifications for the uses and or application of herbicides, pesticides and fertilizers per the State, County and governing municipality.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver turfgrass sod on pallets.
- B. Protect root system from exposure to wind or sun.
- C. Protect turfgrass sod against dehydration, contamination, and heating during transportation and delivery. Such protection shall encompass the entire period during which the turfgrass sod is in transit, being handled, or in temporary storage. Evidence of inadequate protection against drying out shall be cause for rejection.
- D. Do not deliver more turfgrass sod than can be installed within 24 hours.
- E. Keep stored turfgrass sod moist and under shade, or covered with moistened burlap.
- F. Do not break, tear, stretch, or drop turfgrass sod. The Landscape Architect may reject sod that has been damaged by poor handling.
- G. Unless otherwise authorized by Landscape Architect, the Contractor shall notify the

01/2017

02430-1

91-0134.1

Landscape Architect at least 48 hours in advance of anticipated delivery date of the turfgrass sod. A legible copy of the invoice showing species and variety of the turfgrass sod included for each shipment shall be submitted to the Landscape Architect for approval.

1.06 JOB CONDITIONS

- A. Begin installation of turfgrass sod after preceding related work is accepted.
- B. Environmental Requirements:
 - 1. Install turfgrass sod during months acceptable to the Landscape Architect.
 - 2. Do not install turfgrass sod on saturated soil.
- C. Protection: Erect signs and barriers against vehicular traffic on areas prepared for sod

1.07 GUARANTEE

- A. Guarantee turfgrass sod for period of twelve months after date of Final Approval.
- B. Replacement turfgrass sod under this guarantee shall be guaranteed for twelve months from the date of installation.
- C. Repair damage to other plants during turfgrass sod replacement at no cost to the Owner.

PART 2 - PRODUCTS

2.01 TURFGRASS SOD

- A. Turfgrass Sod Species: Refer to species indicated on approved landscape plans.
 - 1. Turfgrass Producers International Grade: Premium Grade Turfgrass Sod.
- B. All turfgrass sod shall conform to the following requirements:
 - 1. Furnish in pads that are not stretched, broken, or torn.
 - a. Turfgrass Sod pads shall be 18x24 inches in size (plus or minus 5%) with a 1-1/2 inch thickness (excluding top growth and thatch). Broken and torn or uneven ends will not be accepted.
 - 2. Uniformly mowed height when harvested:
 - a. Turfgrass Sod - 2 inches in height.
 - 3. Thatch: Maximum 1/2 inch uncompressed.
 - 4. Inspected and found free of diseases, nematodes, pests, and pest larvae, by entomologist of State of Florida Department of Agriculture.
 - 5. Weeds:
 - a. Free of horse grass, nut grass or other objectionable weeds or weed seeds.
 - 6. Uniform in green color, leaf texture, and density.

2.02 WATER

- A. Free of substances harmful to plant growth, objectionable odor or staining agents.

01/2017

02430-2

91-0134.1

2.03 FERTILIZER

- A. FS 0-F-241c(1), Grade A or B.
- B. The Chemical designation for slow release granular fertilizer with minor trace elements in addition to 12% Nitrogen, 8% Phosphorous, and 8% Potassium (Lesco or approved equal) shall have at least 50% of the nitrogen from a non-water-soluble organic source for all plantings except on lake banks.
- C. Apply and distribute by methods and rates as recommended by manufacturer.
- D. All State, County, and Municipal governmental regulations must be met including any licensing or certification requirements for uses and/ or applications.

2.04 HERBICIDES

- A. As recommended by the State of Florida Department of Agriculture.
- B. Post-emergent Herbicide: Roundup as manufactured by Monsanto Corp. or approved equal.
- C. Pre-emergent Herbicide: Ron Star or approved equal.
- D. When next to an aquatic water body, an approved aquatic herbicide or approved equal must be utilized that will meet the State, County or Municipal requirements.
- E. All State, County and municipal governmental regulations must be met including any licensing or certification requirements for uses or applications.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that excavation for turfgrass sod is 4 inches below finish grade and approved Planting/ Top Soil Mix to depth of 2 or more inches for turfgrass sod (2 inches) to meet finish grade.
- B. Water dry soil to depth of 6 inches 48 hours before turfgrass sodding.

3.02 INSTALLATION

- A. All areas to be turfgrass sodded shall receive finish grading per Section 02210.
- B. Transplant turfgrass sod within 48 hours after harvesting.
- C. Turfgrass Sod coverage must provide 100% coverage at Final Approval.
- D. Begin turfgrass sodding at bottom of slopes. When installing turfgrass sod adjacent to a water body, install turfgrass sod to the waterline.
- E. Lay first row of turfgrass sod in straight line with long dimension of pads parallel to slope contours.
- F. Butt side and end joints. Ensure that joints are tight, thereby eliminating the need to patch and/ or top-dress to eliminate gaps.
- G. Stagger end joints in adjacent rows.
- H. Do not stretch or overlap rows.
- I. Water turfgrass sod immediately after transplanting.

01/2017

02430-3

91-0134.1

- J. Top dressing for turfgrass sodded areas may be clean sand(sterilized), mined from fresh water sources. Sand mined from salt water is unacceptable. Sand shall be free from construction debris, weeds, turfgrass sod, biodegradable materials, noxious pests and diseases and other deleterious materials.

3.03 LAWN ESTABLISHMENT

- A. Maintenance of sodded areas shall begin immediately after so installation and shall continue until final approval. Maintenance shall consist of protecting, watering, weeding, cutting, fertilizing, repairing eroded area and re-sodding dead and or damaged turfgrass sod.
- B. Watering:
 - 1. Keep turfgrass sod moist during first week after planting.
 - 2. After first week, supplement rainfall to produce a total of 2 inches per day until final acceptance.
 - 3. It is the contractors' responsibility to water all plant material.
- C. Mowing:
 - 1. Maintain turfgrass sod between 2 inches and 2-1/2 inches in height. When turfgrass sod reaches 3 inches in height, mow to 2 inches in height.
 - 2. Do not cut off more than 40% of grass leaf in single mowing.
 - 3. Remove all turfgrass sod clippings throughout.
- D. Re-turfgrass sod areas which in the opinion of the Landscape Architect is required to establish a uniform stand of turfgrass sod.
- E. Weed Eradication:
 - 1. Apply specified or approved equal post-emergent herbicide per manufacture's rate and method of application to all areas to receive sod.
 - 2. Apply specified or approved equal pre-emergent herbicide before sodding and between second and third mowing, per manufacturer's rate and method of applications.
 - 3. Verify that the herbicide and applicant technique will not damage sod prior to application, and replace all damaged sod and any other landscaping due to herbicide at no cost to the owner.
- F. Fertilizer: Apply fertilizer uniformly at manufacturer's recommended rate 30 days after turfgrass sodding and at three-month intervals thereafter. Water in to avoid "burning" or damaging turfgrass sod.
- G. Establishment period shall extend until final acceptance by the Owner according to the conditions of the Contract.

3.04 CLEANING

- A. Immediately clean spills from paved and finished surface areas.
- B. Remove debris and excess materials from project site.
- C. Dispose of protective barricades and warning signs at termination of lawn establishments.

01/2017

02430-4

91-0134.1

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SECTION 02450

TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Provide all equipment and materials, and do all work necessary to protect existing trees and plants from damage as a result of the contractor's operations.

1.02 RELATED SECTIONS

- A. Section 02430 – Sodding
- B. Other Sections as applicable.

1.03 REFERENCED STANDARDS

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. International Society of Arboriculture (ISA): Guide for Establishing Values of Trees and Other Plants

1.04 SUBMITTALS

- A. Proposed methods, materials to be employed, and schedule for effecting tree and plant protection shall be submitted for approval.

1.05 DAMAGE PENALTIES

- A. If any trees or shrubs are damaged, and replacement is required, a number and diameter of trees or shrubs of the same species and variety, as specified by the Owner, shall be furnished and planted by the Contractor. The total inch diameter of the replacement trees or shrubs shall equal the diameter of the tree or shrub to be replaced. The Contractor shall not be liable for any loss or damage which occurs while the Contractor is complying with instructions given by the Owner.

PART 2 - PRODUCTS

2.01 TREE PROTECTION FENCING

- A. Tree protection fencing shall be mesh fence, 6 ft. high minimum, with 4"x4"x6' pressure treated wood posts.
- B. Posts shall be spaced 10 ft. O/C(max)

01/2017

02450-1

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- C. Fencing other than that specified above shall be subject to the approval of the Engineer.

PART 3 - EXECUTION

3.01 INSTALLATION OF FENCING

- A. Prior to the start of demolition work and clearing and grubbing operations, tree protection fencing shall be installed in accordance with the following:
 1. Fencing shall be installed at the tree protection areas as directed by the Engineer or Owner.
 2. Fencing shall be located along the cut and fill lines staked by the project surveyor and approved by the Engineer or Owner.

3.02 ROOT PRUNING

- A. Prune minimum necessary to remove injured twigs and branches, deadwood, and suckers. Pruning shall be done with regard to natural form of plant material or as directed by the Engineer or Owner.
- B. Do not prune prior to delivery to site.
- C. All cuts one inch diameter or larger made during pruning of any plant material shall be painted with commercial grade sealant as approved and directed by Owner.
- D. Pruning cuts shall be monitored to ensure proper healing and to prevent insect/disease infestation.
- E. Landscape Contractor shall perform all specialized shearing and or pruning as directed by the Owner and as shown on the drawings at no additional cost to the Owner.

3.03 CLEARING WITHIN PROTECTION AREAS

- A. Elective clearing within tree protection areas shall only be performed when and as directed by the Owner.

3.04 REMOVAL OF PROTECTION

- A. Except as otherwise indicated or requested by Owner, temporary protection devices and facilities installed during course of the work shall be removed only after all work which may injure or damage trees and plants is completed.

END OF SECTION

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SECTION 02513

ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish all labor, materials, equipment and incidentals required and place asphaltic concrete pavement in accordance with the grades and typical sections shown on the Drawings and as specified herein.

1.02 RELATED SECTIONS

- A. Section 02100: Site Preparation
- B. Other Sections as applicable.

1.03 REFERENCES

- A. The Work under this Contract shall be in strict accordance with the following codes and standards.
 1. The applicable municipality
 2. Broward County Traffic Engineering Division
 3. Florida Department of Transportation Specifications (FDOT)
 4. OSHA Safety and Health Standards for Construction.

1.04 SUBMITTALS

- A. Submit mix design for concurrence.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The limerock base shall consist of limerock as specified by the FDOT Standard Specification 200.
- B. The material used for the prime coat shall conform to FDOT Standard Specification 300.
- C. Bituminous material for tack coat shall be trackless and meet the FDOT Standard Specifications 300.
- D. The materials of the asphaltic concrete surface shall conform to applicable sections of FDOT Standard Specifications for Asphaltic Concrete with the following exception:
 1. Recycled asphalt may not be used for the final course.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All soft and yielding material and other portions of the subgrade which will not compact readily shall be removed and replaced with suitable material and the whole subgrade brought to line and grade and to a foundation of uniform compaction and

01/2017

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supporting power. The cost of removing and replacing unsuitable material shall be included in the bid for the paving.

- B. Where specified, stabilizing shall conform to FDOT Standard Specification 160.
- C. The subgrade, in both cut and fill sections, shall be compacted to a density of not less than 98 percent of the maximum dry density as determined by the AASHTO Method T-180. If shown on the Drawings, compact subgrade to a Florida Bearing Value of 75 psi. Unless the subgrade material at the time of compacting contains sufficient moisture to permit proper compaction it shall be moistened as necessary and then compacted. Subgrade material containing excess moisture shall be permitted to dry to the proper consistency before being compacted. The subgrade shall be shaped prior to making the density tests. The required density shall be maintained until the base or pavement has been laid or until the aggregate materials for the base or pavement course have been spread in place.
- D. The minimum compacted thickness of the limerock base shall be as depicted in the detail drawings applied in four-inch maximum layers of equal depth unless otherwise depicted in the Drawings. The width of the limerock base shall be wider than the pavement as depicted in the detail drawings.
- E. Before the prime coat is applied, all loose material, dust, dirt or other foreign material which might prevent bond with existing surface shall be moved to the shoulders to the full width of the base by means of revolving brooms, mechanical sweepers, blowers, supplemented by hand sweeping or other approved methods. The glazed finish shall have been removed from the base. The prime coat shall be applied by a pressure distributor so that approximately 0.1 gallons per square yard is applied uniformly and thoroughly to a clean surface.
- F. Prior to the application of the surface course, all loose material, dust, dirt and all foreign material which might prevent proper bond with the existing surface shall be removed to the full width of the repair by means of approved mechanical sweepers and supplemented by hand sweeping if required.
- G. Apply bituminous tack coat at a rate between 0.02 and 0.10 gallons per square yard. Bituminous material shall be heated as per manufacturers' recommendations.
- H. All manhole castings, valve boxes or other utility castings within the area to be surfaced shall be adjusted to the proposed surface elevation by the Contractor. The work shall be accomplished in such a manner as to leave the casting fixed permanently in its correct position.

3.02 PAVEMENT REPAIR

- A. All damage to pavement as a result of the work (construction or maintenance) under this contract shall be repaired according to the plans and specifications at the Contractor's cost. Pavement shall be repaired to match the original surface material and original grade; however, the asphalt concrete thickness shall not be less than 1 inch. The repair shall include the preparation of the subgrade, the placing and compacting of the limerock base, the preparation and priming of the base, the placing and maintaining of the surface treatment, all as specified herein and as shown on the Drawings.
- B. The width of all repairs shall extend at least 12 inches beyond the limit of the damage or as shown on the Drawings. The edge of the pavement to be left in place shall be saw cut to a true edge and should provide a clean edge to abut the repair.

01/2017

02513-2

91-0134.1

The line of the repair shall be reasonably uniform with no unnecessary irregularities.

3.03 TESTING

- A. The Contractor shall have and pay for density, soil bearing, materials and such other tests performed as it may deem necessary. The Contractor shall fully cooperate with the testing agency. Should any test indicate that any portion of the materials or workmanship does not comply with these Specifications; a retest shall be performed at the Contractor s expense. If the retest confirms the first test, that portion of the work shall be removed and replaced or reworked at no additional cost to the Owner until satisfactory compliance is attained.

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SECTION 02600

YARD PIPING

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall supply all labor, equipment, materials and incidentals necessary to install, test and disinfect (as required) all yard piping and appurtenances as shown on the Drawings and as specified herein (See Table 1).
- B. Yard piping shall include all below ground piping, including that below structures, except for plumbing. Yard piping above ground shall begin at the outside face of structures and buildings except where there is no joint at the outside face, then yard piping shall begin at the first pipe joint beyond the structure or building.
- C. This work shall include, but not be limited to the following: ductile iron pipe, copper tubing, steel pipe, PVC pipe, FRP and other plastic pipe, stainless steel pipe, valves, fittings and hydrants and all concrete thrust blocks or restrained joints required for all types of piping. All excavation, backfilling, sheeting, slope protection, drainage, concrete work, riprap, grading and all other work necessary to complete the construction, installation, disinfection, and testing of the yard piping as required.

1.02 RELATED WORK

- A. Site work is included in Division 2.
- B. Painting is included in Section 09900.
- C. DIP is included in Section 15062.
- D. PVC Pipe is included in Section 15064.
- E. Valves and appurtenances are included in Section 15100.

1.03 SUBMITTALS

- A. The Contractor shall submit as a Shop Drawing for review by the Engineer, detailed information showing the type of restrained joints proposed and the calculations for determining the total restrained point pipe length for each fitting in each pipe size in accordance with DIPRA or Uni-Bell requirements. No restrained joint shall be installed unless the Engineer has approved in writing the calculations for such joints.

1.04 INSPECTION

- A. All pipe and fittings to be installed under this contract may be inspected at the site of manufacture for compliance with these Specifications by an independent laboratory selected by the Owner. The manufacturer's cooperation shall be required in these inspections. The cost of inspection by an independent laboratory, will be borne by the Owner.

01/2017

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1.05 CONNECTION TO WORK BY OTHERS OR EXISTING LINES

- A. Lines installed under other Contracts, to which piping of this Contract must connect, the following work shall be performed:
1. Removing the temporary plug provided in the pipe installed under another Contract.
 2. Furnishing and installing piping and make proper connections.
- B. When connecting to existing pipes, the following work shall be performed.
1. Expose buried lines to confirm or determine end connection, type of restraint, pipe material and diameter.
 2. Furnish and install appropriate piping and make proper connections and restraining devices.

PART 2 - PRODUCTS- NOT USED

PART 3 - EXECUTION

3.01 DEPTH OF COVER

- A. All yard piping shall receive 30" minimum cover with approved trench and backfilling techniques with the following exceptions:
1. All PVC shall receive 36" minimum cover.
 2. Unless otherwise directed by the Engineer, or as specified on the drawings.

3.02 EXISTING UTILITIES

- A. All yard piping shall be installed using due care with regard to existing utilities. Existing utilities are shown from best available as-built data and must be pothole located by the Contractor prior to construction of any yard piping.

Reliance by the Contractor on existing utility locations shown on the drawings is not sufficient. The Contractor must locate any and all existing utilities prior to construction of any yard piping.

3.03 VALVE BOXES

- A. All valve boxes, manholes, electrical boxes etc. which are proposed or are existing and are affected by the proposed work shall be raised to the elevation of the final grading. This shall include additional materials as required on existing items.

3.04 MARKING TAPE

- A. All buried pipelines shall be covered with a detection tape, imprinted with the type of

01/ 2017

02600-2

91-0134.1

pipeline, DETECTOTape, or equal.

TABLE 02600-1
YARD PIPING MATERIALS

Line	Size	Material
Chlorine (CL) Solution	All	PVC Schedule 80 Solvent Weld
Water (WM)	Up to & including 12"	Cement-Lined DIP Pressure Class 350 Flanged Joint Above Grade Restrained Joint Below Grade
	Greater than 12"	Cement-Lined DIP Pressure Class 350 Flanged Joint Above Grade Restrained Joint Below Grade
Water Service (WS)	All	PVC Schedule 80 Solvent Weld
Sanitary Sewer (SAN)	All	PVC SDR 35 Unless Shown Otherwise

TABLE 02600-2
YARD PIPING PRESSURE TESTING

Line	Pressure Test (psi)
Chlorine (CL)	150
Water (WM) and Water Service (WS)	150
Sanitary Sewer (SAN)	Testing per Municipality

END OF SECTION

01/ 2017

02600-3

91-0134.1

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01/ 2017

02600-4

91-0134.1

SECTION 09900
PROTECTIVE COATINGS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. This Section covers the work required to provide all labor, materials, equipment and incidentals to perform all of the necessary surface preparation and painting required to complete this contract in its entirety.
- B. It is the intent of these Specifications to paint all concrete, exposed miscellaneous metal, pipe, fittings, valves, equipment and all other work required to be painted unless otherwise specified. Minor items omitted in the schedule of work shall be included in the work of this Section where they come within the general intent of the specifications as stated herein.
- C. The following surfaces or items are "NOT" required to be coated:
1. Aluminum: gratings, checkered plates, hatches, handrails, toe boards, stairways and walkways
 2. Stainless steel, brass, bronze, and aluminum other than exposed tubing
 3. Piping buried in the ground or embedded in concrete
 4. Ducts, pipes and other miscellaneous items covered with insulation or plastic coated
 5. Concealed surfaces of pipe or crawl spaces
 6. Finish hardware
 7. Nonferrous architectural metals, unless specifically noted otherwise
 8. Packing glands and other adjustable parts and nameplates of mechanical equipment
 9. Exterior concrete slabs and equipment

1.02 RELATED WORK

Individual specification sections.

1.03 ABBREVIATIONS

The abbreviations and definitions listed below, when used in this Section, shall have the following meanings:

ANSI	American National Standards Institute
ASTM	American Society of Testing Materials
AWWA	American Water Works Association
DFT	Dry Film Thickness
FPP	Fiberglass Reinforced Plastic

01/2017

09900-1

91-0134.1

HCl	Hydrochloric Acid
MDFT	Minimum Dry Film Thickness
MDFTPC	Minimum Dry Film Thickness Per Coat
mil	Thousandths of an Inch
MIL-P	Military Specification - paint
NACE	National Association of Corrosion Engineers
NSF	National Sanitary Foundation
OSHA	Occupational Safety and Health Act
SFPG	Square Feet Per Gallon
SFPGPC	Square Feet Per Gallon Per Coat
SP	Surface Preparation
SSPC	The Society for Protective Coatings

1.04 SUBMITTALS

- A. Submittals will be made with the coating system data sheet included at the end of this section.
- B. The following shall be submitted for each proposed coating system: manufacturer's specifications, surface prepared details, application procedures, technical data sheets, and dry film thickness or coverage.
- C. Unless otherwise specified, hereinafter and before any painting work is started prepare with type of paint and application specified, and on similar substrate, to which paint is to be finally applied, samples not less than 8" in size.
- D. Furnish additional samples as required until colors, finishes and textures are acceptable. Retain accepted samples to be used as the quality standard for final finishes.
- E. Before proceeding with the work under this Section, finish one complete space or item of each color scheme required showing selected colors, finishes and textures are acceptable. Retain accepted samples to be used as the quality standard for final finishes.
- F. Schedule of Painting Operations: The Contractor shall submit for review a complete schedule of painting operations 30 days from the notice to proceed.

1.05 QUALITY ASSURANCE

- A. The paint manufacturer shall provide a representative to visit the job site at intervals during surface preparation and painting as may be required for product application quality assurance and to determine compliance with manufacturer's instructions and these Specifications, and as may be necessary to resolve field problems attributable to, or associated with, the manufacturer's products furnished under this Contract.
- B. A site visit report shall be prepared and submitted by paint manufacturer's representative documenting compliance with the manufacturer's recommended applications.

01/2017

09900-2

91-0134.1

1.06 INSPECTION

- A. The Contractor shall give the Engineer a minimum of three days advance notice of the completion of any surface preparation work or start of coating application work.
- B. Before application of the prime coat and each succeeding coat, all surfaces to be painted shall be inspected by the Engineer. Any and all defects or deficiencies shall be corrected by the Contractor before application of any subsequent coating.
- C. Coating applications shall be checked for required MDFT as per these specifications. All coated surfaces failing to meet the MDFT requirements shall be rejected.
- D. For all coatings subject to immersion, full cure must be obtained for the completed system. Consult the coatings manufacturer's written instructions for these requirements. The coatings shall not be immersed for any purpose until completion of the curing cycle.
- E. Inspection by the Engineer of the waiver of inspection of any particular portion of the work shall not be construed to relieve the Contractor of his responsibility to perform the work in accordance with these specifications.

1.07 PAINT DELIVERY AND STORAGE

All materials shall be new and shall be delivered to the project site in unopened containers that plainly show, at the time of use, the designated name, date of manufacturer, color, and name of manufacturer. Paints shall be stored in a suitable protected area that is heated or cooled as required to maintain temperatures within the range recommended by the paint manufacturer.

1.08 PROJECT SITE CONDITIONS

The location of this project in Broward County, Florida requires observance and conformance with EPA Volatile Organic Compound (VOC) restrictions. EPA limits the content of VOC's in painting materials to 2.5 lb/gallon. Information regarding the VOC content of proposed paints will be required during submittals.

1.09 WARRANTY

Contractor shall warrant to the Owner and guarantee the work under this Section against defective workmanship and materials for a period of two years commencing on the date of Final Acceptance of the Work. This warranty does not alleviate the Contractor or supplier of implied or other specified or written warranties for long term product quality.

PART 2 - PRODUCTS

2.01 GENERAL

Products containing lead will not be allowed. Oil shall be pure boiled linseed oil.

2.02 PAINT MATERIALS

- A. Products shall be as manufactured by Tnemec Company, Inc., or approved equals.

01/2017

09900-3

91-0134.1

- B. The following paint products are by Tnemec Company, Inc., as applicable, and are used for the basis of establishing the desired quality expected for the project.

<u>Product Type</u>	<u>Company</u>	<u>Product Name</u>
Coal Tar Epoxy	Tnemec	Series 46H-413 Tneme-Tar
Polyamine Epoxy (Non Potable)	Tnemec	Series 104 H.S. Epoxy
Polyamide Epoxy	Tnemec	Series 66HS HB Epoxoline
Water-Based Epoxy	Tnemec	Series 27WB Typoxy
Aliphatic Urethane	Tnemec	Series 1095 EnduraShield
Cementitious Epoxy	Tnemec	Series 218 MortarClad
Modified Polyurethane	Tnemec	Series 262 ElastoShield
Styrenated Acrylate	Tnemec	Series 156 EnviroCrete

2.03 COLORS

- A. Provide as selected by the Owner.
- B. Formulate with colorants free of lead, lead compounds, or other materials which might be affected by presence of hydrogen sulfide or other gas likely to be present at the project.
- C. Proprietary identification of colors if for identification only. Any authorized manufacturer may supply matches.
- D. Pipe color shall be in accordance with Section 2.14 of the Recommended Standards for Water Works as incorporated into Rule 62-555.330, in the Florida Administrative Code (F.A.C.)

2.04 TESTING GAUGES

- A. Furnish a magnetic type dry film thickness gauge, to test coating thickness specified in mils, as manufactured by:
1. Nordson Corp., Anaheim, CA, Mikrotest
 2. Or equal
- B. Furnish an electrical holiday detector, low voltage, wet sponge type to test finish coat, except zinc primer, high-build elastomeric coatings, and galvanizing, for holidays and discontinuities as manufactured by:
1. Tinker and Rasor, San Gabriel, CA, Model M-1
 2. Or equal
- C. Furnish a high voltage holiday detector for elastomeric coatings in excess of 25 mils dry film thickness. Unit to be as recommended by the coatings manufacturer.

PART 3 - EXECUTION

3.01 PROTECTION OF SURFACES NOT TO BE PAINTED

- A. Mask or otherwise protect hardware, lighting fixtures, switch plates, aluminum

01/2017

09900-4

91-0134.1

surfaces, machined surfaces, couplings, shafts, bearings, nameplates and other surfaces not intended to painted which cannot be removed.

- B. Provide drop cloths to prevent paint materials form falling on or marring adjacent surfaces.
- C. Protect working parts of mechanical and electrical equipment from damage during surface preparation and painting processes. Openings in motors shall be masked to prevent paint and other materials from entering motors.

3.02 ENVIROMENTAL CONDITIONS

- A. Coatings shall not be applied in temperature exceeding the manufacturer's recommended maximum and minimum allowable, nor under adverse conditions such as dust, smoke-laden atmosphere, damp or humid weather.

3.03 SAFETY

- A. Coating shall be performed in strict accordance with the safety recommendations of the coating manufacturer; with the safety recommendations of the national Association of Corrosion Engineers contained in the publication, Manual for Painter Safety; Federal, state and local agencies having jurisdiction.
- B. Ultimate responsibility for safety is Contractor's.

3.04 PREPARATION OF SURFACES

- A. All surfaces to be coated shall be prepared as specified herein and shall be dry and clean before coating. Specific surface preparation shall be specified for the individual coating systems.
- B. Steel shall be blasted unless otherwise specified. Blasting shall be done with a centrifugal wheel or compressed air blasting equipment, using proper abrasives to attain an average profile depth of 1.5 mils.

Do not re-use sand or flint abrasives. Short abrasives must be thoroughly clean of contamination before re-use. Blow dust and grit from surface with clean, dry air. Coat within 8 hours or before rust contamination occurs.

- C. All concrete shall have cured for 28 days.

3.05 COATING SYSTEM INDEX

The following is a general index to the coating system description described herein:

System No.	Title
1	Exterior of New Concrete
2	Interior of New Valve Vaults, Air Release Structures
3	Exposed Metal – Mild Environment
4	PVC Pipe – Interior and Exterior
5	Interior Chemical Secondary Containment

01/2017

09900-5

91-0134.1

6 Exterior of Above Grade Concrete

3.06 COATINGSYSTEMS

- A. System No. 1 Exterior of New- Concrete Containment Structures, Valve Vault
- Surface Preparation: All curing oils, form oils, laitance, soluble salts and loose concrete must be removed. Concrete must be dry and thoroughly clean before coatings.
- Prime Coat: None required.
- Top Coat: Coal tar epoxy at 8.0 mils DFT per coat.
- MDFT: 16 mils DFT for two-coat system. Allow minimum of 24 hours drying time between coats.
- Color: First Coat – Black
Second Coat – Black.
- B. System No. 2 – Interior of New Valve Vaults
- Surface Preparation: Concrete: remove all curing oils, form oils, laitance, soluble salts and loose concrete in accordance with SSPC-SP13 (Surface Preparation of Concrete).
- Filler/ Surfer: Concrete substrate surface with cracks and/ or voids greater than ½" in depth or width or areas where underlying aggregate has been exposed shall be patched with filler and surfacer. Material shall be applied in accordance with the manufacturer's application instructions.
- Prime Coat: Series 104 HS Epoxy 6.0 to 8.0 mils DFT.
- Intermediate Coat: Series 104 HS Epoxy 6.0 to 8.0 mils DFT.
- Top Coat: Series 104 HS Epoxy 6.0 to 8.0 mils DFT.
- MDFT: Minimum 18 mils of DFT for three-coat Epoxy system. Time between coats and method of application shall be as per manufacturer's written instructions.
- Color: First Coat – Gray 33GR
Intermediate Coat – Beige 44BR
Finish Coat - Gray 33GR
- C. System No. 3 – Exposed Metal – Mild Environment
- Surface Preparation: Abrasive blast clean to an SSPC-SP6 (commercial last clean).
- Prime Coat: Series 66HS Polyamide epoxy at 5.0 to 7.0 mils DFT.
- Intermediate Coat: Series 66HS Polyamide epoxy at 4.0 to 6.0 mils DFT.
- Top Coat: Series 1095 High build acrylic polyurethane at 3.0 to 4.0 mils DFT.
- MDFT: 12.0 mils DFT for three-coat system.
- Color: As selected by Owner from manufacturer's standard available colors.
- D. System No. 4 – PVC Pipe Interior and Exterior

01/2017

09900-6

91-0134.1

Surface Preparation: Surface to be scarified, clean and dry
 Prime Coat: Series 66HS Polyamide epoxy at 4.0 to 6.0 mils DFT.
 Top Coat: Series 1095 High build acrylic polyurethane at 3.0 to 4.0 mils DFT.
 MDFT: 7.0 mils DFT for two-coat system.

E. System No. 5 – Interior Chemical Secondary Containment

Surface Preparation: Abrasive Blast to remove all curing oils, form oils, laitance, soluble salts and loose concrete in accordance with SSPC-SP13 (Surface Preparation of Concrete).

Resurfacer (Vertical Surfaces): Apply Tnemec Series 218 MortarClad at 1/16”.

Cant Cove: Apply Tnemec Series 218 MortarClad mixed with clean aggregate to create a minimum one inch cant cove base on all horizontal-vertical corners to eliminate all 90 degrees angles.

Prime Coat: Series 27WB Waterbased Epoxy at 4.0 – 6.0 mils DFT.
 Finish Coat(s): Series 262 ElastoShield at 50.0 – 60.0 mils DFT.
 MDFT: 54.0 mils DFT for two-coat system w/o resurfacer.

F. System No. 6 – Exterior of Above Grade Concrete

Surface Preparation: Concrete: All curing oils, form oils, laitance, soluble salts and loose concrete must be removed. Concrete must be dry and thoroughly clean before coatings.

Prime Coat: Series 156 Acrylate at 4.0 – 6.0 mils DFT.
 Top Coat: Series 156 Acrylate at 4.0 – 6.0 mils DFT.
 MDFT: Minimum 8.0 mils of DFT for two-coat Acrylate system. Time between coats and method of application shall be as per manufacturer’s written instructions.

Color: As selected by Owner from manufacturer’s standard available colors.

3.07 UNIDENTIFIED SURFACES

Any surfaces not specifically named in the schedule and not specifically accepted shall be prepared, primed and coated in the manner and with material consistent with these Specifications. The Engineer shall select which of the manufacturer’s products, whether the type is indicated herein or not, shall be used for such unnamed surfaces. The painting shall be done within the scope of the contract.

01/2017

09900-7

91-0134.1

3.08 WORKMANSHIP

- A. On metal surfaces apply each coat of paint at the rate specified by the manufacturer to achieve the minimum dry mil thickness required. If material has thickened or must be diluted for application by spray gun, the coating shall built up to the same film thickness achieved with undiluted material. One gallon of paint as originally furnished by the manufacturer shall not cover a greater area when applied by spray gun than when applied unthinned by the application of an additional coat(s). On masonry, application rates will vary according to surface texture; however, in no case shall the manufacturer's stated coverage rate be exceeded. On porous surfaces, it shall be the painter's responsibility to achieve a protective and decorative finish either by decreasing the coverage rate or applying additional coats of paint.
- B. All safety equipment shall be painted in accordance with OSHA Standards as approved.
- C. Materials shall be mixed in proper containers of adequate capacity. All materials shall be thoroughly stirred before use and shall be kept stirred while using. No unauthorized thinners or other materials shall be added to any paint.
- D. Only skilled painters shall be used on the work and specialists shall be employed where required.
- E. Steel members, metal castings, mechanical and electrical equipment and other metals which are shop primed before deliver at the site will not require a prime coat on the job. All piping and other bare metals to be painted shall receive one coat of primer before exposure to the weather, and this prime coat shall be the first coat as specified in the painting schedule.
- F. Finish surfaces shall not show brush marks or other irregularities. Undercoats shall be thoroughly and uniformly sanded with No. 00 sandpaper or equal to remove defects and provide a smooth, even surface.
- G. Before final acceptance of the work, all damaged surfaces of coating shall be cleaned and repainted as directed by the Engineer.

3.09 APPLICATION SCHEDULE

- A. System No. 1 – Exterior of New Concrete – This system shall be used on the exterior of all new pre-cast concrete valve vaults, manholes, and constructed wetwell.
- B. System No. 2 – Interior of New Valve Vaults– This system shall be used in the interior of all new concrete valve vaults. Pre-cast concrete shall be coated prior to installation. Coating shall extend through the pre-cast joints.
- C. System No 3 – Exposed Metal – Mild Environment – This system shall be used on all metal surfaces exposed to weather including equipment, conduits, piping, exposed metal frames and elsewhere as scheduled. Galvanized and stainless steel piping and aluminum hatches do not require painting.

01/2017

09900-8

91-0134.1

- D. System No. 4 – PVC Interior and Exterior – This system shall be used for interior or exterior of PVC piping.
- E. System No. 5 - Interior Chemical Secondary Containment – This system shall be used to line the interior of the sodium hypochlorite secondary containment structure.
- F. System No. 6 – Exterior of Above Grade Concrete – This system shall be used on the exterior of the secondary containment structure.

3.10 CLEANUP

- A. It shall be the responsibility of the Contractor to collect and dispose of property, all waste materials from the site in accordance with all requirements of the Federal, state, and local environment protection agencies.
- B. At completion of the work, remove all paint where it has been spilled, splashed, splattered, sprayed, or smeared on all surfaces, including glass, light fixtures, hardware, equipments, painted and unpainted surfaces.
- C. After completion of all paintings, the Contractor shall remove from the job site all painting equipment, surplus materials and debris resulting from this work.

3.11 MANUFACTURER'S SERVICE

Furnish paint manufacturer representative to visit job site at intervals during surface preparation and painting as may be required for product application quality assurance, and to determine compliance with manufacturer's instructions and these specifications, and as may be necessary to resolve field problems attributable to, or associated with, manufacturer's products furnished under this Contract.

3.12 COATING SYSTEM DATA SHEET

To be included with submittal. See form on next page.

END OF SECTION

01/2017

09900-9

91-0134.1

COATING SYSTEM DATA SHEET
(to be included with submittal)

Coating System Number (From Spec): _____

Coating System Title (From Spec): _____

Coating Supplier Name & Address: _____

Local Representative Name & Address: _____

Manufacturer Representative Authorized to
 Certify Proper Installation Name & Address: _____

Surface Preparation: _____

Coating Material (Generic)	Product Number/ Name (Proprietary)	Coats/ Minimum Coverage	Color

Notes:

01/2017

09900-10

91-0134.1

SECTION 11261

CHEMICAL FEED SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The work under this section includes the furnishing of all labor, materials, equipment, documentation, training and startup services for the manufacture and installation of skid mounted chemical metering systems suitable for the application of chemicals as listed under the Service Conditions and as depicted in the Drawings and specified herein. Individual chemical characteristics and chemical feed skid requirements are as summarized in Tables 1 and 2, respectively.

1.02 WORK INCLUDED

- A. The equipment under this section includes (1) chemical metering skids and accessories for Holly Lakes Booster Pump Station, (2) chemical metering pumps and accessories for Academic Village Booster Pump Station, and (3) spare parts.
- B. Execution of work under this section shall include (1) installation, (2) testing, (3) documentation, and (4) field service.

1.03 RELATED SECTIONS

- A. Section 01600: Materials and Equipment.
- B. Section 15064: General Purpose PVC Pipes and Fittings
- C. Other sections as applicable.

1.04 REFERENCES

- A. NSF/ ANSI Standard 61, AWWA – Drinking Water System Components

1.05 QUALITY ASSURANCE

- A. Acceptable Manufacturers
 - 1. A single manufacturer, who shall demonstrate previous experience in the design and fabrication of skid-mounted chemical metering systems, shall provide the products of this section. The manufacturer must have a service center with trained direct company employed technicians authorized to make repairs to all components of the chemical feed system located within the State of Florida. This supplier shall be responsible for providing all equipment, accessories, spare parts, documentation and installation supervision required for a complete and operational chemical feed system.
 - 2. The pump skids shall be a regularly marketed product of the manufacturer who must have a physical plant, technical and design staff, and production personnel to complete the work as specified. Systems assembled by second party fabricators, integrators, equipment distributors/representatives, contractors or manufacturers not normally engaged in chemical metering skid design and manufacturing shall not be acceptable. The chemical metering skids shall be assembled and tested by the manufacturer prior to delivery.

01/2017

11261-1

91-0134.1

3. The design and fabrication of the chemical metering skids shall comply with the following criteria:
 - a. Systems shall be designed completely in 3D CAD prior to fabrication.
 - b. The metering skid shall be fabricated from white ½" PVC Type 1 sheet that is thermally welded resulting in a unitary piece of construction. Rotationally molded or skeletal frame skid construction is not acceptable.
 - c. The PVC sheet shall be precision cut on state of the art CNC equipment using information from the project specific CAD drawings for each system. Hand cut (non-CNC) sheet construction is not acceptable.
 - d. All piping shall be fabricated to CAD based production drawings that detail all pipe nipples, fittings, valves, metering accessories, clamp locations, etc. These drawings shall become a permanent part of the production file maintained by the manufacturer so that all or any portion of the piping can be pre-fabricated by the manufacturer and replaced in the field without any pipe cutting, gluing, welding etc. required. Hand built or reverse engineered piping assembly not based on CAD drawings is not acceptable.
 - e. All power and control wiring as indicated on the P&I drawings shall terminate in a NEMA 4X terminal junction box (TJB) providing the site electrical contractor with a single point termination for each system. Any devices installed within the metering skid boundary that require power or interface connection to remote systems shall be pre-wired to the TJB by the manufacturer.
 - f. The manufacturer, prior to delivery, shall hydraulically and electrically test each system. Testing shall be documented and include verification of pump performance and response to remote systems using simulation equipment as required. A copy of the shop test report shall be included in the final O&M's for the project.
 - g. Hydraulic test pressure shall be performed at 100 psi.
4. The manufacturer shall supply fifteen separate references with contact names and phone numbers, where substantially similar installations for the equipment as specified has been in satisfactory operation for a minimum of five years.
5. The manufacturer shall have a minimum of 5 years' experience with a successful record of manufacturing and servicing of systems as specified herein.
6. The manufacturer shall have a proven track record of after market sales and service support on its equipment. A proposal for professional maintenance of the equipment by a factory technician shall be provided in the submittals.

1.06 SUBMITTALS GENERAL

- A. Submit shop drawing and product data for the equipment provided. Include detailed schematic of equipment, piping, controls, etc.

01/2017

11261-2

91-0134.1

- B. Submit a list of the manufacturers recommended spare parts, special tools and lubricants. List shall include local source for supply of all parts and professional service.
- C. Submit upon request, a cross-sectional sample of pipe joining practices for inspection. Only those manufacturers providing acceptable samples will be considered.
- D. Submit fifteen (15) separate references where similar chemical metering systems have been in successful operation for a minimum of 2 years.
- E. Submit a copy of proposed manufacturer's guarantee and local parts/ service center information.

1.07 SECTION SPECIFIC SUBMITTALS

- A. The information requested in this section is required in order to determine that the manufacturer has the ability and resources to provide equipment that meets the design, fabrication and quality standards as set forth herein. Any submittals that do not include this information shall be returned as "Rejected".
- B. In addition to the general submittals as specified herein and elsewhere, the following CAD drawings shall be provided as a part of the submittal package in a section labeled SHOP DRAWINGS for each chemical metering system included in this section. These drawings shall be produced "in-house" by the system manufacturer for the specific equipment to be provided for this project. Marked up copies of general product information is not acceptable.
 - 1. P&I Diagram – The PID shall indicate the following:
 - a. All process piping, valves, pumps and accessories installed within the skid boundary including pipe sizes, materials and piping inlet and outlet information.
 - b. All skid mounted electrical/ instrumentation switches, controls, indicators etc. including voltage and current ratings for any devices that require a power source.
 - c. All controls, indicators, inputs, outputs and surge protection devices included in the local skid mounted NEMA 4X terminal junction box.
 - d. All controls, indicators, inputs, outputs and surge protection devices included for any remote mounted control or interface panels being provided.
 - 2. Detail Layout Drawing – The detail drawings shall include the following:
 - a. Top, front, side and isometric views for the proposed metering systems.
 - b. Top, front and side views shall include accurate overall dimensions and location and dimensions for all piping connections.
 - c. Isometric view shall include callouts indicating all skid mounted components and piping connections.
 - d. A table shall be provided with the quantity, part number, description, P/ M kit (if applicable) and recommended maintenance

01/2017

11261-3

91-0134.1

- interval for all major equipment items and metering accessories.
3. Terminal box drawing – The terminal box drawings shall include:
 - a. Detail drawing of terminal box back panel layout including all panel mounted components terminals, etc. including details for all field connections.
 - b. The back panel drawing shall include a table with quantity, part numbers and descriptions for all devices.
 - c. Detail drawing of terminal box door layout including all panel-mounted components (lamps, switches, nameplates, etc.).
 - d. The front panel drawing shall include a table with quantity, part numbers and descriptions for all devices.
- C. In addition to the general submittals as specified herein and elsewhere, the following information shall be provided as a part of the submittal package in a section labeled DOCUMENTATION, SPARE PARTS AND SERVICE.
1. Factory Certificates
 - a. Copy of manufacturers in-house and field testing certificates.
 - b. Copy of manufacturer's installation inspection certificate.
 2. Spare Parts and Maintenance
 - a. Spare Parts List including:
 - 1) Contact information for manufacturer.
 - 2) Contact information for local service and support.
 - 3) Table of spare parts provided as per specifications.
 - 4) Information for any required lubricants.
 - b. Maintenance Proposal including:
 - 1) Price for factory technician to perform normal preventive (P/M) maintenance including all normal parts, jobsite labor and travel charges. Proposal shall include schedule of services and shall be valid for 1 year.
 - 2) Price for all P/M kits and parts required for normal service. Proposal shall be valid for 1 year.
- D. In addition to hard copies as specified elsewhere, a copy of the complete approved submittal shall be provided in PDF electronic format with bookmarks and index for easy navigation.

PART 2 - PRODUCTS

2.01 GENERAL

- A. The chemical feed systems shall be completely self-contained and designed to safely feed metered amounts of sodium hypochlorite. Each chemical metering skid shall include chemical metering pumps, accessories, controls and options as indicated in Table 2 at the end of this section. The chemical metering skids will be completely assembled and tested under simulated field conditions using water prior to delivery

01/2017

11261-4

91-0134.1

to the job site. Manufacturer shall provide 2 weeks' notice prior to testing of system to allow engineer and/ or owner to make arrangements to witness the testing.

2.02 SERVICE CONDITIONS

- A. This project includes chemical metering systems designed for the following chemicals:

Table 1: Chemical Characteristics

Chemical	Concentration	Specific Gravity	Temperature (Deg F)
Sodium Hypochlorite	12%	1.1 - 1.2	Ambient

2.03 CHEMICAL METERING SKIDS

- A. The entirety of chemical feed system shall be furnished by Blue Planet Environmental Systems, Inc. or Engineer approved equal.

B. Chemical Metering Skids General Description

- The chemical metering skids shall be constructed from white PVC sheet with a minimum trade thickness of 1/2". The design of the skid shall include gussets and supports as required for all components and shall be self-supporting. All components of the chemical metering system shall be contained within the skid. The skid shall incorporate spill containment capability and feature a 1/2" FPT connection for containment drain piping. The skids shall be manufactured using continuous welding technology; bolted construction is not acceptable. Pedestals shall be provided to elevate the metering pumps above the skid base. The pedestals shall be bolted to the skid base with non-metallic bolts to allow for future pump/piping modifications. Pedestal height shall be adjusted such that the pump's influent does not exceed 15 inches from the top of the slab.
- For semi-outdoor placement, the pump skid shall be enclosed on the top and sides with white PVC sheet with a minimum trade thickness of 1/2". The enclosure design of the skid shall include gussets and supports as required for all components and shall be self-supporting. All components of the chemical metering system shall be contained within the enclosure with the exception of the NEMA 4X terminal junction box, which shall be attached to the outside. The enclosure shall provide adequate passive ventilation to reduce heat build up and include a vapor tight interior LED light with a local light switch mounted on the skid. The enclosure shall include sliding by-pass style acrylic doors that are lift off removable for unrestricted access. The acrylic doors shall be tinted to reduce sunlight exposure.
- For each chemical metering pump the piping system shall include (1) suction line strainer; (1) pressure relief valve; (1) pulsation dampener; (1) diaphragm protected pressure gauge; (1) back-pressure/ anti-siphon valve; (1) flushing inlet; (1) flushing outlet and all required piping, valves and supports. Piping shall include isolation valves and unions for all serviceable components. The chemical supply piping shall feature a calibration column designed for independent use with any of the metering pumps while other pumps on the system are in active service. The discharge piping shall provide outlets as indicated in Table 2. The pump connections shall be

01/2017

11261-5

91-0134.1

designed with replaceable pipe sections on the suction and discharge via union or flange so that pump replacement or upgrade can be accomplished without cutting into skid piping.

4. The piping shall be attached to the chemical metering skid with a non-metallic corrosion resistant support system. All support channels shall be welded to the skid, bolted supports are not acceptable. The straps shall be removable and reusable to allow for servicing of the system. All inlet/ outlet connections, valves and pump accessories shall be clearly labeled on the skid for easy identification.
5. A NEMA 4X FRP terminal junction box (TJB) with hinged cover shall be provided on the skid back panel for termination of all field wiring. All internal wiring to the skid shall be factory pre-wired before shipping to the site. The inside cover of the terminal box shall include a wiring diagram detailing the function of all terminals with terminal number assigned to each point. A power disconnect switch/ circuit breaker shall be provided in the terminal junction box. Surge protection shall be provided locally in the skid mounted terminal junction box. Protection shall be provided for the main power supply as well as all analog input and output signals. Surge protection devices shall be as manufactured by EDCO Inc. of Florida or approved equal. Only one external 120VAC, 1-phase power will be needed for the TJB and skid supplier shall be pre-wired all lighting circuit, and power circuit to the metering pumps in the skid. Refer to Instrumentation drawings for remote signals requirements. The NEMA 4X TJB shall provide the following I/O at a minimum:
 - a. Terminals for 120VAC power (local heavy duty surge protection included).
 - b. 15A Breaker for Main AC Power.
 - c. On/ Off Switch for Enclosure Lighting
 - d. Auto-Manual Selector Switch for each pump.
 - e. DI = Run Command for each pump.
 - f. AI = Speed Command for each pump (local surge protection included)
 - g. AO = Speed Feedback for each pump
 - h. DO = In Auto Status for each pump
 - i. DO = Fault Status for each pump
6. The chemical metering skids shall be completely assembled and tested by the manufacturer prior to delivery to the job site.

C. Accessories

1. Calibration Columns
 - a. A clear calibration column shall be provided in the chemical supply piping of each system. The piping shall be designed for the calibration column to be used independently with any of the metering pumps while other pumps on the system are in active

01/2017

11261-6

91-0134.1

service. The top of the calibration column shall allow for connection to rigid piping for "vent" return to the supply container or common vent header. Calibration columns may also be used as de-gassing chambers. All materials shall be compatible with chemicals as listed under Service Conditions and Table 2

2. Pressure Relief Valves
 - a. Pressure relief valves shall be provided in the discharge piping of each metering pump, prior to any valves, to eliminate the buildup of excess pressure in the system. The pressure relief valves shall be fully adjustable from 10 – 150 psi with bodies compatible with chemicals as listed under Service Conditions and Table 2 with a Teflon diaphragm and have no metal parts in contact with the chemical. Output of the pressure relief valves shall return to the pump suction header.
3. Pulsation Dampeners
 - a. Gas charged pulsation dampeners shall be provided and sized for a minimum of 90% dampening. Pulsation dampeners shall include gas charge fitting and 316 SS pressure gauge. The dampeners shall be installed in the discharge piping of each metering pump, as close to the metering pump discharge check valve as possible. Pulsation dampeners larger than 10 cu. in. shall attach to the piping by ANSI 150# flanges with 316 SS bolts, threaded connections are not acceptable. All materials shall be compatible with chemicals as listed under Service Conditions and Table 2
4. Diaphragm Protected Pressure Gauges
 - a. 2-1/2" liquid filled pressure gauges with isolators shall be provided for indication of system pressure in the discharge piping of each metering pump. Industrial quality all 316 SS gauges shall be utilized. The isolators shall have housings compatible with chemicals as listed under Service Conditions and Table 2 with a Teflon diaphragm and suitable liquid fill. A fabricated PVC bracket shall be provided for each pressure gauge to secure the isolator and prevent lateral movement of the pressure gauge.
5. Back Pressure/ Anti-Siphon Valves
 - a. Back pressure/ anti-siphon valves shall be provided in the discharge piping of each metering pump to provide constant back pressure at the chemical metering pump discharge and eliminate siphoning. The back pressure valves shall be fully adjustable from 10 – 150 psi with bodies compatible with chemicals as listed under Service Conditions and Table 2 with a Teflon diaphragm and have no metal parts in contact with the chemical.

D. Piping

1. Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC)
 - a. This specification covers pipe and fittings for pressurized pipe systems manufactured of Rigid Poly (Vinylchloride) (PVC) and

01/2017

11261-7

91-0134.1

Chlorinated Poly (Vinylchloride) (CPVC) material as described below. Fittings covered under this specification include heavy-duty Schedule 80 fittings molded of the material described below. Fittings covered under this specification are tees, elbows, couplings, reducer bushings, crosses, adapters, plugs, caps and flanges.

- b. All material used in pipe and fittings for potable water supply shall be listed for such applications by National Sanitation Foundation Laboratories, Inc. (NSF). Workmanship shall be in accordance with good commercial practice. Fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions or other injurious defects. The fittings shall be commercially uniform in color, opacity, density and other physical properties.
- c. All pipe and fittings shall bear the company's name or trademark, material designation, size, applicable IPS schedule, and the NSF mark as indicative of compliance with this specification.
- d. All fittings shall be injection molded of PVC fitting compound of cell classification 12454-B and of CPVC fitting compound of cell classification 23447-B as described in ASTM D- 1784 Standard Specification for Rigid Poly (Vinylchloride) Compounds and Chlorinated Poly (Vinylchloride) Compounds.
- e. All molded threads, internal or external, shall be "blunt start" threads. All threads shall conform to thread standard ANSI/ ASME B1 .20.1 for tapered pipe threads. Threads shall measure not more than 1-½ threads large or small when checked with a plug gauge or ring gauge.
- f. Dimensions and tolerances of sockets shall conform to PVC IPS Schedule 80 Socket Dimensions. All reducer bushings shall be designed so as to provide for a positive and sufficient grip for cementing bushings in place. Waterways shall be smooth and commercially free of flash and irregularities. On tees and 90° elbows, bond lines shall not coincide with the maximum stress area (crotch).
- g. Assembly shall be performed in a controlled shop environment by the skid manufacturer. All pipe shall be squarely cut on precision equipment with the ends chamfered and deburred. All socket welded connections shall follow the guidelines set by the pipe/ fitting manufacturer for proper cleaning, priming and gluing procedures. A heavy bodied solvent suitable for use with all chemicals as listed under Service Conditions and Table 2 shall be used. All threaded connections will utilize Teflon tape, a suitable thread sealant or a combination of both. Threaded connections shall utilize stainless steel reinforcement rings where applicable to reduce the risk of cracking.

E. Valves – The valves for each system shall be as indicated in Table 2.

1. Ball Valve

- a. All Ball Valves, sizes 1/ 2" to 4", shall be of true union design with two-way blocking capability. All O-rings shall be EPDM or FKM with

01/2017

11261-8

91-0134.1

PTFE seats. PTFE seats shall have elastomeric backing cushion of the same material as the valve seals. Stem shall have double O-rings and be of blowout-proof design. The valve handle shall double as carrier removal and/ or tightening tool. ISO mounting pad shall be integrally molded to valve body for actuation. The ball valves shall have a pressure rating of 230 psi for sizes 1/2" to 3" and 150 psi for 4" at 70°F. Type 21 Ball Valves must carry a two-year guarantee, as manufactured by Asahi/ America, Inc, or approved equal.

- b. All ball valves used for chemicals prone to "off-gassing" (e.g. sodium hypochlorite, hydrogen peroxide) shall be vented to avoid entrapment of vapors.

2.04 CHEMICAL METERING PUMPS

- A. The chemical metering pump(s) shall be microprocessor-controlled, simplex, solenoid-driven, reciprocating, mechanically-actuated diaphragm type. All pumping functions shall be set by membrane-switch keypad and status shall be displayed on an illuminated LCD, which is readable. Keypad will allow for simple scrolling and display of programmed parameters. The housing shall be rated NEMA 4X.
- B. The power supply shall be 120 VAC, 60 Hz, single phase. The microprocessor is to automatically compensate for supply voltage variations within 15% of the rated voltage such that the frequency of the pump remains constant.
- C. The liquid end shall be physically separated from the drive unit by a backplate with weep hole creating an air gap. An elastomer shaft wiper seal shall prevent contamination of the solenoid if the primary diaphragm fails. The diaphragm shall be constructed of a steel core, vulcanized into nylon-reinforced EPDM, with PTFE faced fluid contact surface.
- D. The pump shall utilize technology whereby the time sequence of the dosing flow can be exactly matched to the requirements of the application. The user can set a slow pressure stroke for almost continuous dosing, or a quick stroke as needed to prevent incomplete filling of the liquid end due to viscosity of the media being pumped. In cases of outgassing dosing media, the settable suction stroke shall assist in preventing cavitation. Fluctuation in back pressure shall be automatically compensated by the drive.
- E. The pump shall have technology integrated into the drive to detect blocked metering points or broken metering lines, and to detect airlocks within the delivery unit. This will function to prevent uncontrolled metering. These problems are to be shown on the pump delay.
- F. The liquid end shall be constructed of PVDF with Teflon seals, with built-in coarse valve and needle valve for air bleed, manually adjusted for continuous degassing of process fluid and self-priming against pressure. The suction and discharge valves shall be of the double ball check design for discharge pressures greater than 100 psi.
- G. Stroke length control shall be manually adjusted between 0% and 100% with a stroke adjustment knob on the pump face control. The pump shall allow the setting of a maximum stroke length, which will correspond to the maximum analog signal, with stroke length proportional to signal strength below that rate. The LCD shall digitally display stroke length setting in 1% increments in the full range between 0% and 100%.

01/2017

11261-9

91-0134.1

- H. Programming shall allow pump to be calibrated so as to display pump output in gallons/ hour or liters/ hour. Calibration shall be maintained when stroke length is altered up to plus or minus 10% on the stroke length knob. If stroke length is altered by more than 10%, a yellow warning will light and a flashing message “calib” will appear.
- I. The pump shall be equipped with the programmable function of electronic interlocking of the keypad by access code to prevent unauthorized adjustments to the pump.
- J. Keypad shall allow for scrolling and display on LCD such parameters as stroke frequency, stroke length, stroke counter, pump output in gals/ hr or l/ hr, dosing quantity, mA current input being received by pump, and indication of external mode.
- K. Stroke frequency control shall be accomplished by one of the following modes:
 1. Manual - Manually adjusted by touch keypads, with the set stroke rate displayed on the LCD.
 2. Contact 1:1 - The metering pump shall be capable of receiving a pulse input via optional external control cable such that 1 pulse gives 1 pump stroke rate. The pump shall be capable of remote ON-OFF operation using the pause function via a voltage free contact relay through an optional control cable.
 3. Contact Multiply/ Divide - The pump shall allow fine-tune factoring to issue from 1 to 9,999 strokes per pulse input or to issue 1 stroke per 1 to 9,999 input pulses. The dosing can be activated by an impulse via external control through a contact or a semiconductor switching element.
 4. Batch - The dosing can be activated by pressuring the P key or by an external impulse through a contact or a semiconductor switching element. A dosing quantity (batch) or a number of strokes (max 65535) can be preselected via the control unit.
 5. Analog - The pump shall accept an analog signal such that stroke frequency is proportional to 0/4-20mA. The pump shall allow the setting of a maximum stroke rate which corresponds to the maximum analog signal, with stroke rate proportional to signal strength below that rate. Programming for curve processing shall also be possible, in which any stroke frequency ratio in proportion to the electrical signal can be configured. Analog to digital converters external to the pump shall not be allowed.
- L. Relay Output – An SPDT relay shall be installed for fault indication. The metering pump shall have an integral relay to allow remote annunciation of a fault condition configurable as a normally open or normally closed contact closure relay.

2.05 METERING PUMP CONTROLS

- A. Chemical metering pumps shall include built-in microprocessor controls as described above. All metering pump control cables shall terminate in the NEMA 4X FRPT.B mounted to the chemical metering skid.

01/2017

11261-10

91-0134.1

2.06 CHEMICAL FEED SYSTEM SUMMARY

A. The following summarizes the elements of the chemical feed skid:

Table 2: Summary - Sodium Hypochlorite Chemical Feed Skid

	Booster Station	
	Academic Village	Holly Lakes
Chemical Pumped and % Strength	12% NaOCl	12% NaOCl
Location	Semi - Outdoors	Semi - Outdoors
Number of Pumps	2	2
Type of Pump	Solenoid-driven mechanically actuated diaphragm with built-in microprocessor controls	Solenoid-driven mechanically actuated diaphragm with built-in microprocessor controls
Manufacturer / Model	ProMinent Delta 0280 or Engineer approved equal	ProMinent Delta 0450 or Engineer approved equal
Pump Capacity (gph)	19.8	12.9
Pump Pressure (psi)	29	58
Motor Horsepower (watts), Power	73W, 120V, 1-phase	73W, 120V, 1-phase
Liquid End Materials	PVDF/ CE/ PTFE	PVDF/ Cer/ PTFE
Stroke Length Control	Manual	Manual
Stroke Rate Control	Manual and 4-20 mA	Manual and 4-20 mA
Skid Accessibility	Enclosed w/ splash shield	Enclosed w/ splash shield
Piping Material	½" SCH-80 PVC	½" SCH-80 PVC
Valves	Type 21 Vented Ball Valves or approved equal	Type 21 Vented Ball Valves or approved equal
Piping Outputs	1	1
Pump Influent Elev. (from top of slab)	Not to Exceed 15"	Not to Exceed 15"

2.07 SPARE PARTS

A. Spare Parts

1. Provide the following spare parts to the Owner for each chemical metering skid upon delivery of the pump skid. Spare parts shall include all parts required for (2) years of normal maintenance of all components of the chemical metering system. All parts shall be in one box labeled with the Skid ID Information:
 - a. (1) maintenance kits for each chemical metering pump. Maintenance kits shall include but not be limited to diaphragm, check valve seats, gaskets and O-rings.
 - b. (1) Maintenance kits for each pressure relief valve for each pump skid.
 - c. (1) Maintenance kit for each backpressure valve for each pump skid.
 - d. (1) Spare bladder for each pulsation dampener for each pump skid.

01/2017

11261-11

91-0134.1

- e. (1) Spare valve of each size for each pump skid.
- f. (1) Parts list for all serviceable components.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install the chemical metering skids as indicated on the drawings and specified and in compliance with the manufacturer's instructions.

3.02 INSPECTION AND TESTING

- A. Upon completion of installation, a full operating test shall be performed in the presence of the Engineer and a qualified direct company employed manufacturer's representative. The Contractor shall furnish all labor, materials and equipment required for such test and shall correct any deficiencies noted.

3.03 MANUFACTURER'S SERVICES

- A. The manufacturer shall provide the following services as specified.
 - 1. Delivery
 - a. Delivery shall be by the manufacturer's own personnel and delivery vehicle. The delivery person shall be capable of giving the contractor guidance on the installation of the system. Delivery by independent freight carrier is unacceptable.
 - 2. Mechanical Start-Up Services
 - a. Provide a minimum of (1) 8-hour working days of mechanical start-up services.
 - 3. Process Start-Up Services
 - a. Provide a minimum of (1) 8-hour working days of process start-up services.
 - 4. Operator Training Services
 - a. Provide a minimum of (1) 8-hour working day to instruct operating personnel on the operation and maintenance of the system.

3.04 OPERATION & MAINTENANCE MANUALS AND PRODUCTION RECORDS

- A. Operating and maintenance manuals prepared specifically for this project shall be provided. Manuals shall include all procedures, drawings, parts lists, etc. required to instruct personnel unfamiliar with such equipment. Operation and maintenance manuals shall be prepared in accordance with all specifications of this project.
 - 1. Complete operating and maintenance manuals shall be provided in PDF electronic format with bookmarks and index for easy navigation.
 - 2. Operating and maintenance manuals shall include a copy of in-house testing certificate.
- B. A detailed database shall be maintained by the manufacturer containing production data for each chemical metering system. The database shall include serial numbers for all serialized components, production drawings, test data, ship dates, start-up

01/2017

11261-12

91-0134.1

dates and all relevant information.

3.05 WARRANTIES

- A. The system manufacturer shall provide a two (2) year warranty for the metering pumps (1-year liquid end), skid material/construction, and skid-mounted equipment, piping and valves. This warranty shall be in addition to and not in lieu of any warranties provided by the manufacturer of the equipment itself.
- B. The system manufacturer shall pass through any warranties from the equipment suppliers for the pumps, controllers, and other system components manufactured by others.
- C. All warranties periods shall commence at Owners Acceptance of the work.

END OF SECTION

01/2017

11261-13

91-0134.1

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01/2017

11261-14

91-0134.1

SECTION 11262

SODIUM HYPOCHLORITE BAGFILTER

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Bag filter designed to avoid feeding sediment into the bulk liquid sodium hypochlorite storage tank.

1.02 RELATED SECTIONS

- A. Section 01600: Materials and Equipment.
- B. Section 11410: Crosslinked Polyethylene Storage Tanks
- C. Other sections as applicable.

1.03 DESCRIPTION OF SYSTEM

- A. The bag filter is comprised of the filter bag housing (body), filter bag basket, filter bag, vent valve, mounting pad, and related appurtenances.

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Operational Criteria
 - 1. Chemical flow rate: 100 gpm
 - 2. Operating temperature: 30 to 120 degrees F
 - 3. Operating humidity: 5 to 95 percent non-condensing

1.05 WARRANTY

- A. The product includes a one-year warranty from the date the Owner acceptance of the work.

1.06 MAINTENANCE SERVICE

- A. Filter bag should be changed when the differential pressure is between 10-15 psig.
- B. Bag filter should be checked periodically for accumulation of sediments in the basket.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Product shall be manufactured by Hayward Industries, Inc., or approved equal.

2.02 SERVICE CONDITIONS

- A. Bag filter shall be compatible with 12% sodium hypochlorite.

2.03 EQUIPMENT DESCRIPTION

- A. Bag Filter Housing Description
 - 1. End Connection: True Union Socket Threaded
 - 2. Piping Inlet Size: 2 inches

01/2017

11262-1

91-0134.1

3. Piping Outlet Size: 2 inches
4. Basket O-Ring Seal: FPM or EPDM
5. Material: PVC Cell Class 12454 per ASTM D1784, CPVC Cell Class 23447 per ASTM D1784
6. Maximum Operating Flow Rate: 100 gallons per minute
7. Maximum Operating Pressure: 150 psi at 70°F non-shock
8. Hand removable cover
9. Vent Valve included on cover
10. Drain port included at the bottom of the housing
11. Integrally molded mounting pad
12. Hinged basket

B. Filter Bag Description

1. Material: Polyester needled felt
2. Maximum Operating Temperature: 300°F
3. Finish: Singed
4. Micron Rating: 5
5. Bag Size: 7x32 inches
6. Construction: Sewn-in bag ring

2.04 COMPONENTS

A. Standard equipment:

1. Bag Filter Housing
2. Filter Bag

2.05 ACCESSORIES

A. Gaskets

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Contractor will install the bag filter in strict accordance with the manufacturer's instructions and recommendation.

3.02 SPARE PARTS

- A. Provide spare parts and filter bags required for (2) years of normal maintenance per bag filter.

END OF SECTION

01/2017

11262-2

91-0134.1

SECTION 11410

POLYETHYLENE STORAGE TANKS (XLPE)

PART 1 - GENERAL

1.01 DESCRIPTION

A. The contractor shall furnish all labor, materials, equipment and incidentals required to install, complete, and ready for operation, vertical, high density crosslinked polyethylene tanks and accessories, complete and in place, in accordance with the Contract Document as shown in the drawings and specified herein.

B. These Specifications are intended to give a general description of what is required, but do not cover all details that will vary in accordance with the requirements of the equipment as offered. All materials, equipment, and appurtenances for the complete vertical tank, whether specifically mentioned in these Specifications or not, shall be included.

C. The contractor will provide unit responsibility and shall be responsible for furnishing the vertical tanks and its accessories as depicted in the drawings and specified herein.

1.02 RELATED SECTIONS

- A. Section 13300: Instrumentation and Controls
- B. Section 15064: General Purpose PVC Pipes and Fittings
- C. Other sections as applicable.

1.03 REFERENCES

- A. The American Society of Testing Materials (ASTM):
 1. D638 Tensile Properties of Plastics
 2. D883 Standard Definitions of Terms Relating-Gradient Technique
 3. D1505 Density of Plastics by the Density-Gradient Technique
 4. D1525 Test Method for Vicat Softening Temperature of Plastics
 5. D1693 ESCR Specification Thickness 0.125" F50-10% Igepal
 6. F412 Standard Terminology Relating to Plastic Piping Systems
 7. D1998 Standard Specification for Polyethylene Upright Storage Tanks
- B. ANSI Standards: B-16.5, Pipe Flanges and Flanged Fittings
- C. Building Code: Uniform Building Code, [1997 JEdition] / IBC2000

01/2017

11410-1

91-0134.1

D. ARM: Low Temperature Impact Resistance (Falling Dart Test Procedure).

E. NSF/ ANSI Standard 61, AWWA – Drinking Water System Components

1.04 DESCRIPTION OF SYSTEM

A. The tank shall be comprised of, at a minimum, a vertical tank, with ladder, manway access, fittings for fill, overflow, outlet to skid, vent, ultrasonic sensor, visual level indicator, gaskets and all appurtenances as specified herein and shown on the drawings. The vertical tank shall be capable of receiving, storing and dispensing sodium hypochlorite to public water standards.

1.05 QUALITY ASSURANCE

A. The vertical tank of the same material furnished under this Section shall be supplied by the manufacturer who has been regularly engaged in the design and manufacture of chemical storage tanks for a minimum of 5 years.

B. The tank shall be manufactured from virgin materials, with an inner tank wall equipped with, or constructed of, an OR-1000 liner for maximum chemical resistivity. Only a cross-linked polyethylene outer tank with an OR-1000 inner tank wall liner is acceptable.

C. Tanks shall be manufactured from materials certified to NSF/ ANSI Standard 61 for chemical storage for the specific chemical to be stored.

1.06 SUBMITTALS

A. Copies of all materials required to establish compliance with the Specifications shall be submitted in accordance with the provisions of Section 01340.

B. Shop Drawings: Submit the following as a single complete initial submittal. Sufficient data shall be included to show that the product conforms to Specification requirements. Provide the following additional information: Submittal shall include at least the following:

1. Vertical Tank and Fitting Material
 - a. Resin Manufacturer Data Sheet
 - b. Fitting Material
 - c. Gasket style and material
 - d. Bolt material
2. Dimensioned Tank Drawing
 - a. Location and orientation of molded in fitting, openings, fittings, accessories, restraints and supports.
 - b. Details of inlet and molded outlet fitting, manways, flexible connections, and vents.
3. Calculations shall be signed and sealed and by a professional engineer registered in the State of Florida.

01/2017

11410-2

91-0134.1

- a. Wall thickness. Hoop stress shall be calculated using 600 psi @ 100 degrees F.
- b. Tank restraint system. Provide wind load criteria required for Building Permit.

C. Manufacturer's warranty.

D. Manufacturer's unloading procedure.

E. Supporting documentation of Manufacturer's certification to NSF/ ANSI Standard 61 - Drinking Water System Components for water treatment chemicals.

F. Manufacturer's Qualifications: Submit to engineer a list of 10 installations, in Florida, in the same service as proof of manufacturer's qualifications.

G. Factory Test Report

- 1. Material, specific gravity rating at 600 psi @ 100 degrees F. design hoop stress.
- 2. Wall thickness verification.
- 3. Fitting placement verification including molded in outlet
- 4. Visual inspection
- 5. Impact test
- 6. Gel test
- 7. Hydrostatic test

1.07 OPERATING AND MAINTENANCE MANUALS

A. Operating and maintenance manuals shall be furnished. The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, etc. that are required to instruct operating and maintenance personnel unfamiliar with such equipment. The number and special requirements shall be as specified in the Contract Documents.

B. A factory representative who has complete knowledge of proper operation and maintenance shall be provided for one day, to instruct representatives of the Owner and the Engineer on proper operation and maintenance. If there are difficulties in operation of the equipment due to the manufacturer's equipment or fabrication, additional service shall be provided at no cost to the Owner.

1.08 TOOLS AND SPARE PARTS

A. One set of all special tools required for normal operation and maintenance shall be provided. All such tools shall be furnished in a suitable steel tool chest complete with lock and duplicate keys.

01/2017

11410-3

91-0134.1

B. The manufacturer shall furnish a complete set of recommended spare parts necessary for the first five years operation of the system.

C. Spare parts shall be properly packaged and labeled for identification without opening the packaging and suitably protected for long term storage.

1.09 PRODUCT HANDLING

A. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.

B. All equipment and parts must be properly protected against any damage and weather during a prolonged period at the site.

C. Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Engineer.

D. After hydrostatic or other tests, all entrapped water shall be drained prior to shipment, and proper care shall be taken to protect parts from the entrance of water during shipment, storage, and handling.

E. Each box or package shall be properly marked to show its net weight in addition to its content.

PART 2 - PRODUCTS

2.01 EQUIPMENT CRITERIA

A. Tank shall be a vertically configured, rotationally-molded, high density crosslinked polyethylene, one-piece seamless construction, cylindrical in cross-section and vertical with sloping bottoms in axis. Tank manufacturer shall have a readily available Technical Bulletin pertaining to Venting Design for ACFM (air cubic feet per minute) and tank shall be adequately vented as prescribed therein. Tanks shall be marked to identify the manufacturer, date of manufacture and serial numbers must be permanently embossed into the tank. Tanks shall have a manway that provides for easy access and accommodates safety due to surge variability associated with pneumatic filling activity.

2.02 MANUFACTURER'S QUALIFICATIONS

A. Tanks shall be furnished by manufacturers who are fully experienced, reputable, and qualified in the manufacture of the materials. The submittal must include all items indicated in the submittal section listed above. The tank and fittings shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with the Specifications in all respects.

2.03 ACCEPTABLE MANUFACTURERS

A. The polyethylene storage tank and appurtenances shall be furnished by Poly Processing, Inc. or Engineer approved equal.

01/2017

11410-4

91-0134.1

2.04 POLYETHYLENE STORAGE TANKS

A. Service: Chemical storage tanks shall be suited for the following operating conditions:

Attribute	Criteria
Chemical stored	Sodium Hypochlorite
Chemical concentration, percent	9 - 15%
Chemical specific gravity	1.2
Resin	XLPE with Oxidation Resistant System
Fitting Material	PVC
Gasket Material	EPDM
Bolt Material	Stainless Steel Type 316

B. Resin used in the tank manufacture shall be by Exxon Mobil Chemicals or equal and shall contain ultraviolet stabilizer as recommended by resin manufacturer. Where black tanks are indicated, the resin shall have a carbon black compounded into it. The tank material shall be rotationally molded and meet or exceed the following properties:

Property	Type I XLPE	ASTM Test
Density, gm/ cc	0.938-0.944	D1505
Environmental Stress Cracking Resistance, F50, hours, 10% Igepal	>1,000	D1693
Tensile Strength, Ultimate psi, 2-inch/ minimum	2,600	D638 Type IV Specimen
Elongation at Break, % ,2-inch minimum	400	D638 Type IV Specimen
Vicat Softening Point	~ 248 °F	D1525
Impact Brittleness temperature	<- 180 °F	D746
Flexural Modulus, psi	100,000	D790

C. Wall thickness for a given hoop stress is to be calculated in accordance with ASTM D 1998. Tanks shall be designed using a hoop stress no greater than 600 psi. Wall thickness calculations shall assume that all tank contents have a specific gravity of not less than 1.2. In no case shall the tank thickness be less than design requirements per ASTM D 1998.

1. The minimum wall thickness shall be sufficient to support its own weight in an upright position without external support but shall not be less than 0.187" thick.
2. On closed top slope tanks the top head shall be integrally molded with the cylindrical wall. Its minimum thickness shall be equal to the thickness of the top of the straight sidewall. In most cases, flat areas shall be provided for attachment of large fittings on the dome of the tank.
3. The bottom head shall be integrally molded with the cylindrical wall. Knuckle radius shall be:

01/2017

11410-5

91-0134.1

Tank Diameter	Min. Knuckle Radius
≤ 6 ft	1 in
> 6 ft	1-1/2 in

4. Tanks shall have at least 3 lifting lugs. Lugs shall be designed for lifting the tank when empty.

a. Unless otherwise indicated, manways shall be 19-in diameter or greater and equipped with an emergency air pressure relief device to ensure that the tank maintains the proper ACFM at all times.

b. Unless otherwise indicated, bolted sealed top manway shall be 19-inches or greater and be in locations easily accessible from the nearest worker access position. The sealed manway shall be constructed of polyethylene material. The bolts shall be stainless steel type 316. Gaskets shall be closed cell, crosslinked polyethylene foam, EPDM materials.

D. Tank colors shall be black (pigmented).

2.05 TANK ACCESSORIES

A. Ladder:

1. Fiberglass access ladders shall be provided with the vertical polyethylene chemical storage tanks at locations as shown. Use proper chemical resistant materials when anchoring to tank dome or sidewall. Safety cages shall be added to ladders as required.

2. Ladders must be secured to the tank and secured to the concrete to allow for tank expansion / contraction due to temperature and loading changes.

3. Ladders must be designed to OSHA standard 2206; 1910.27; fixed ladders.

B. Restraint System. Metal components to be stainless steel, edge softeners, and tension ring with stainless steel or galvanized cables and clamps.

C. Reverse Float Indicator. The level indicator shall be assembled to the tank and shall consist of PVC float, indicator, polypropylene rope, perforated interior pipe, PVC roller guides, clear PVC sight tube and necessary pipe supports. The level indicator shall act inversely to the tank contents and shall not allow entrance of tank contents into the sight tube at any time.

D. Anti-foam fill assembly device at tank's inlet. The anti-foam assembly shall consist of 45° elbow diverting the inflow to the tank's wall such that the chemical solution cascades down the tank wall.

E. Expansion Joint

01/2017

11410-6

91-0134.1

1. Expansion joint must be designed to compensate for misalignment, absorb expansion and contraction, and isolate the vibration and shock that could damage the tank. Expansion joint shall meet the following conditions:

- a. Type: Flanged
- b. Gaskets type: EPDM
- c. Material: PVC or CPVC

2.06 TANK

A. Tank Schedule

	Location	
	Academic Village	Holly Lakes
Tank Size	2,000 gal.	1,150 gal.
Quantity	1	1
Material Type	XLPE	XLPE
Tank Specific Gravity Rating	1.9	1.9
Outside Diameter, ft	7'-1"	5'-4"
Overall height, ft (see Note 1)	8' - 5 3/4"	8'-6"
Straight sidewall capacity, gallons (to top-sidewall of tank)	2,035 gal.	1,181 gal.
DOMES Volume	142 gal.	61 gal.
Total Volume	2,177 gal.	1,242 gal.
Manway Mounting Diameter, inches	24"	24"
Exposure	Outdoors	Outdoors
Color	Black	Black

Note 1: Approximate overall height is measured along the straight cylindrical portion of the tank and includes the dome top.

B. Fittings

1. Tank fittings shall be according to the fitting schedule, below. Gasket material shall be EPDM, or a material that is compatible with the product being stored and shall be a minimum of 1/4-in thick. Fitting types: PVC Schedule 80, or as specified and agreed to by the tank manufacturer. Threaded fittings shall use American Standard Pipe Threads.

Fitting Schedule	
Item	Type
Fill	2"
U-vent	4"
Tank drain	See plans
Reverse Float Indicator	2"
Outlet to pump	3"
Ultrasonic Sensor	2"

2. Bolted flange fittings shall be constructed with one 150-lb flange, one 150-lb flange gasket, and the correct number of all-thread bolts. Flanges shall be constructed of PVC schedule 80, or as specified and agreed to by the tank manufacturer. Gaskets shall be min 1/4-in thick, constructed of EPDM. The head of

01/2017

11410-7

91-0134.1

the bolts shall be encapsulated with polyethylene preventing fluid contact with the metal material. Encapsulated heads shall have a gasket to provide a sealing surface against the inner wall of the tank. Bolt holes shall straddle the principal centerline of the tank.

3. Outlet fittings shall be capable to provide complete drainage of liquid through the sidewall of a vertical tank any type if insert on the discharge of the tank is not acceptable. A flexjoint connector shall be provided by the manufacturer on the discharge of the tank(s).

4. Down Pipes and Fill Pipes: Down pipes and fill pipes shall be supported at 6-ft max intervals. Down pipes and fill pipes shall be PVC or material compatible with the chemical stored.

5. U-Vents: Each tank must be vented for the material and flow and withdrawal rates expected. Vents should comply with OSHA 1910.106(F)(iii)(2)(IV)(9). U-vents shall be sized by the tank manufacturer and be furnished complete with insect screen (insect screen lessens the tank capacity by 1/3) in accordance with the venting schedule found the Polyethylene Storage Tank Section. U-vents shall be constructed of PVC or material compatible with the chemical stored.

6. Flange Adapters: Adapters may be used to adapt threaded or socket fitting components to 150-lb flange connections. Adapters shall be of material compatible with the chemical stored.

2.07 FACTORY TESTING

A. Material Testing

1. Perform gel and low temperature impact tests in accordance with ASTM D 1998 on condition samples cut from each polyethylene chemical storage tank.
2. Degree of Crosslinking. Use Method C of ASTM D 1998- Section 11.4 to determine the ortho-xylene insoluble fraction of crosslinked polyethylene gel test. Samples shall test at no less than 65 percent.

B. Tank Testing

1. Dimensions: Take exterior dimensions with the tank empty, in the vertical position. Outside diameter tolerance, including out-of-roundness, shall be per ASTM D 1998. Fitting placement tolerance shall be +/- 1/2-in vertical and +/- 1 degree radial.
2. Visual: Inspect for foreign inclusions, air bubbles, pimples, crazing, cracking, and delamination.
3. Hydrostatic test: Following fabrication, the vertical tanks, including inlet and outlet fittings, shall be hydraulically tested with water by filling to the top sidewall for a minimum of 1/2 an hour and inspecting

01/2017

11410-8

91-0134.1

for leaks. Following successful testing, the vertical tank shall be emptied and cleaned prior to shipment.

PART 3 - EXECUTION

3.01 DELIVERY, STORAGE, AND HANDLING

- A. The vertical tank shall be shipped upright or lying down on their sides with blocks and slings to keep them from moving. AVOID sharp objects on trailers.
- B. All fittings shall be installed and, if necessary, removed for shipping and shipped separately unless otherwise noted by the contractor.
- C. Upon arrival at the destination, inspect the vertical tank(s) and accessories for damage in transit. If damage has occurred, Poly Processing Company shall be notified immediately.

3.02 INSTALLATION

- A. Install the vertical tanks in strict accordance with Poly Processing Company's Tank Installation Manual and shop drawings.

3.03 FIELD TESTING

- A. Contractor shall perform a hydrostatic test by filling the tank completely with water to the straight wall capacity at the time of installation and before service. The tank must have zero leakage after a minimum period of six hours.

3.04 WARRANTY

- A. The Manufacturer shall provide a written warranty, acceptable to the Owner, against defects in materials and workmanship. Manufacturer shall warrant the goods provided by the Manufacturer to be free from defects in materials and workmanship under normal conditions and use for a period of one year from the Owners acceptance date.

END OF SECTION

01/2017

11410-9

91-0134.1

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01/2017

11410-10

91-0134.1

SECTION 13300

CONTROL SYSTEM
GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Work includes engineering, furnishing, installing, testing, documenting, and placing in operation the complete Instrumentation and Control Systems or Control System (CS). The work is specified in this Section and further detailed in the following sections:
1. All of Division 13
 2. Other sections as applicable.
- B. The overall system general requirements are given in this section. These requirements apply to each additional section of these specifications as noted herein and as specified in the associated sections.
- C. Instrumentation and control systems for this project are intended to be supplied completely under this section. However, some special control devices specifically called out in other specification sections is to be part of those sections, furnished with that equipment. The instruments and controls shall, however, be furnished in conformance to and in coordination with, this section.
- D. A SYSTEM INTEGRATOR is to be retained by the CONTRACTOR and is to have overall responsibility for designing, furnishing, interfacing, adjusting, testing, documenting, and starting-up the various CS equipment described in the Contract Documents. The CONTRACTOR is to have overall responsibility for making sure the various systems, trades, suppliers, vendors, subcontractors, etc. come together as a complete coordinated system that will reliably perform the specified functions. The CONTRACTOR shall provide written notification of the intended SYSTEM INTEGRATOR at bid time.
- E. The SYSTEM INTEGRATOR shall provide all equipment, materials, programming, software, calibrations and services that are required to successfully interface and interconnect the system and any other control systems and associated equipment that are specified or designated in any drawings or provisions of these specifications for the purpose of providing a fully integrated and functional control system.
- F. The CONTRACTOR shall ensure that the SYSTEM INTEGRATOR coordinates closely with suppliers of other specialty equipment.

1.02 DIVISION OF WORK

- A. It is the ultimate responsibility of the CONTRACTOR to furnish a complete and fully operable CS that reliably performs the specified functions. The CONTRACTOR is to assume full responsibility for additional costs, which may result from unauthorized deviations from the specifications. The CONTRACTOR is to establish the actual division of work with the minimum requirements as specified herein.
1. The SYSTEM INTEGRATOR shall be responsible for:

01/2017

13300-1

91-0134.1

- a) Panel layouts, wiring, and PLC programming.
 - b) All hardware and software submittals.
 - c) The SYSTEM INTEGRATOR shall develop the panel shop drawings, wiring diagrams, plumbing diagrams, PLC, and all other submittals defined herein and in the specification sections identified in paragraph 1.01A hereof. Coordination with the CONTRACTOR and other subcontractors shall be the responsibility of the SYSTEM INTEGRATOR.
 - d) The final system operation and reliability.
 - e) The final demonstration tests and training shall be under the on-site supervision of the SYSTEM INTEGRATOR.
 - f) The CS warranty period shall be through the SYSTEM INTEGRATOR.
 - g) Ordering, fabrication, assembly, delivery, and start-up of the CS.
 - h) All panel fabrication shall be performed at the SYSTEM INTEGRATOR'S shop, unless there are other equipment suppliers that provide a complete, proprietary panel.
 - i) The SYSTEM INTEGRATOR'S personnel shall perform the system checkout tests for the CS.
 - j) Providing any special manufacturer's cables as required.
 - k) Designing the final installation and connection requirements of the CS at the jobsite through development of interconnection diagrams.
 - l) Coordinating all interfacing requirements with mechanical and electrical system suppliers, and furnish any signal isolation devices that might be required in order to insure compatibility between all equipment.
 - m) Verifying correctness of all final power and signal connections to the CS.
 - n) The SYSTEM INTEGRATOR shall make final adjustments to, and calibrate all, field elements provided with the CS. Ensuring that:
 - 1) All components provided under this section are properly installed.
 - 2) The proper type, size, and number of control wires with their conduits and junction boxes are provided and installed, and
 - 3) Proper electric power circuits are provided for all components and systems.
2. The CONTRACTOR shall be responsible for:
- a) Including within the ELECTRICAL SUBCONTRACTOR's scope:
 - 1) The termination of field and power wiring to control panels and field elements. Termination shall be made in accordance with final accepted interconnection diagrams developed by the SYSTEM INTEGRATOR. The electrical subcontractor shall mark on the interconnect diagram the field wire numbers used for each termination point. The SYSTEM INTEGRATOR shall finalize the interconnect diagrams by including these field wire numbers in the final as built version.
 - 2) Installing all network cables, including fiber optic cable, and any interconnecting PICS (Process Instrumentation Control System) supplied equipment.

01/2017

13300-2

91-0134.1

- 3) Installing any special manufacturer's cables furnished by the SYSTEM INTEGRATOR.
 - 4) Physical installation of control panels.
- b) Including within the MECHANICAL SUBCONTRACTOR's scope
- 1) Installation of any field instrumentation. Installation shall be made in accordance with the manufacturer's recommendations and under the direction of the SYSTEM INTEGRATOR.
 - c) Equipment storage and protection until installation following the storage and handling instructions recommended by the SYSTEM INTEGRATOR. Anti-static and winterization requirements shall be per the SYSTEM INTEGRATOR'S instructions, and the SYSTEM INTEGRATOR shall periodically verify that these instructions are followed.
 - d) Incorporating all necessary components into the system.
 - e) Ensuring that the SYSTEM INTEGRATOR coordinate work with other Divisions and Sections of the Specifications.
 - f) Requiring the SYSTEM INTEGRATOR to observe and advise on the installation of equipment furnished by SYSTEM INTEGRATOR and installed by Contractor to the extent required to certify, with the operational check-out tests, that the equipment will perform as required.
 - g) Ensuring that information on equipment provided under other Divisions and needed by the SYSTEM INTEGRATOR to coordinate the CS is provided in a timely manner.
 - h) Equipment found to be defective prior to system acceptance shall be replaced and installed at no additional cost to the OWNER.
 - i) In the bid price, the CONTRACTOR shall include obtaining the services of authorized field personnel from the manufacturers of specialty instruments, and from the suppliers of application software packages. These personnel shall be on site to supervise installation, start-up, and checkout of the respective portions of the CS.

1.03 RELATED WORK

- A. Division 15 – Mechanical. Installation of all mechanical piping and fittings, as well as in-line instruments supplied with and/or for the CS.
- B. Division 16 - Electrical. All conduits are provided and installed under Division 16, Electrical. With the exception of certain specified networking and special manufacturer's cables, all wiring and cables are provided and installed under Division 16, Electrical. Division 16 also covers physical installation of the control panels supplied with and/or for the CS.
- C. Field devices, such as motorized valves, pump motors, solenoid valves, etc. and local control panels for specialized subsystems, such as chemical feed systems, etc. are supplied and installed under other Divisions contained in these Specifications.

1.04 SUBMITTALS

- A. Furnish, as prescribed under the General Requirements, all required submittals covering the items included under this section and its associated sections of the

01/2017

13300-3

91-0134.1

work.

- B. Submit complete, neat, orderly, and indexed submittal packages. Handwritten diagrams are not acceptable and all documentation submittals shall be made using CADD generated utilities as specified herein.
- C. Partial submittals or submittals that do not contain sufficient information for complete review or are unclear will not be reviewed and will be returned by the ENGINEER as Not Approved.
- D. Provide all shop-drawing submittals on disk in PDF format.
- E. Design Related Submittals: Provide individual shop drawing submittals as further defined in each specification section defining the CS. Provide the following additional submittals covering the complete system:
 - 1. Loop diagrams. Consisting of complete wiring and/ or plumbing diagrams for each control loop, including all existing loops, showing all terminal numbers, the location of the dc power supply, the location of any booster relays or common dropping resistors, surge arrestors, etc. The loop diagrams shall meet the minimum requirements of ISA S5.4, plus divide each loop diagram into four areas for identification of element locations: CS I/ O point(s), panel face, back-of-panel, and field, respectively.

On each diagram, present a tabular summary showing:

 - a) The output capability of the transmitting instruments
 - b) The input impedance of each receiving instrument
 - c) An estimate of the loop wiring impedance based on the wire sizes and lengths shown
 - d) The total loop impedance
 - e) Reserve output capacity
 - 2. System interconnect diagram. Showing all connections required between component parts of the items covered in this section and between the various other systems specified in this Contract. Number all electrical terminal blocks and field wiring. Identify each line at each termination point with the same number. Do not use this number again for any other purpose in the complete control scheme.
- F. Test Procedures. Submit the Test Procedures to be followed during all system testing. Procedures shall include test descriptions, forms, and check lists to be used to control and document the required tests.
 - 1. Prior to the preparation of the detailed test procedures, submit outlines of the specific proposed tests. Submittals shall include examples of the proposed forms and check lists that will be used by the SYSTEM INTEGRATOR during the system testing.
 - 2. After the preliminary test procedures submittals have been reviewed by the ENGINEER and returned stamped either "Approved" or "Approved as Noted, Confirm", the SYSTEM INTEGRATOR shall submit the proposed detailed test procedures for ENGINEER approval. Following this, the system tests may be started.
 - 3. Upon completion of each required test, document the test by submitting a

01/2017

13300-4

91-0134.1

copy of the signed off test procedures to the ENGINEER.

G. Training Plan. The SYSTEM INTEGRATOR shall submit a training plan that includes:

1. An overview of the training plan, explaining why specific courses are proposed.
2. Definitions of each course.
3. Specific course attendance.
4. Schedule of training courses including dates, duration, and locations of each class.
5. Resumes of the instructors who will actually implement the plan.

H. Spares, Expendables, and Test Equipment Lists Submittal. This single submittal shall contain separate sections for each Subsystem each including:

1. A list of, and descriptive literature for, spares, expendables, and test equipment as specified in the individual Specification Sections covering the CS.
2. A separate list of, and descriptive literature for, additional spares, expendables, and test equipment recommended by the SYSTEM INTEGRATOR.
3. Unit and total costs for the additional spare items recommended for each subsystem.
4. Storage instructions for all spare parts.

1.05 FINAL SYSTEM DOCUMENTATION

A. After the demonstration tests have been completed, and as a part of the final acceptance requirements, submit the CS Record Drawings. Record Drawings corrected for any changes that may have been made up through Substantial Completion shall include:

1. System block diagram
2. Instrument loop wiring diagrams
3. Panel wiring diagrams covering the complete panel including any components retained from the existing system.
4. Panel elevations
5. Interconnection diagrams showing terminal numbers at each wiring termination

B. Record drawings shall be developed or converted to the latest version of AutoCAD. Provide two copies of all AutoCAD files on separate Compact Disks. Provide two hard copies of drawings in 11 x 17 inch format. Provide two copies of record drawings in PDF format.

C. Operating and Maintenance (O&M) Manuals: Provide the specified number of complete sets of three-ring bound O&M manuals in accordance with Division 1. Provide separate manuals for each Specification Section, clearly marked. Include descriptive material, drawings, and figures bound in appropriate places. Provide two CDs, each containing the complete O&M manual in PDF format. Include:

1. Cross-references to 3rd party O&M manuals. These references shall be specific to a particular page or section and not merely a general reference.

01/2017

13300-5

91-0134.1

2. Additional operating and maintenance instructions in sufficient detail to facilitate the operation, removal, installation, adjustment, calibration, and maintenance of each component provided with the CS.
 3. Internal wiring diagrams (not already shown on the panel wiring diagram record drawings) for all components provided in the CS that clearly show all terminal block number designations and wire numbers.
 4. All the submittal data for each component from the approved shop drawing submittals with corrections made on approved as noted items.
- D. Refer to individual specification sections for final documentation requirements that are in addition to the above.

1.06 QUALITY CONTROL

- A. The SYSTEM INTEGRATOR shall meet all of the requirements of these specifications, and, unless specifically stated otherwise, no prior acceptance of any subsystem, equipment, or materials has been made.
- B. Component equipment shall be as supplied by one of the manufacturers named in the individual specification sections or approved equal. The design of the PICS is based on the first- named manufacturer's equipment if there is a difference.
- C. All equipment furnished by the SYSTEM INTEGRATOR shall be of the latest and most recent design and shall have overall accuracy as guaranteed by the manufacturer.
- D. To facilitate the OWNER'S operation and maintenance, products shall be of the same major instrumentation MANUFACTURER, with panel-mounted devices of the same type and model, as far as possible.
- E. In order to insure the interchangeability of parts, the maintenance of quality, the ease of interfacing between the various subsystems, and the establishment of minimums with regard to ranges and accuracy, strict compliance with the above requirements shall be maintained.
- F. The SYSTEM INTEGRATOR shall designate a single point of contact for interface with the ENGINEER on this project. The ENGINEER reserves the sole right to approve or reject this point of contact.
- G. The SYSTEM INTEGRATOR shall provide, on-site, an experienced project engineer to supervise and coordinate all of the on-site CS activities. An experienced technician may be provided to assist the project engineer in field element installation, field calibration, and checkout tests. The SYSTEM INTEGRATOR'S project engineer shall be on-site during the period required to affect all of the critical on-site activities related to the CS, particularly the software debugging, PICS training, and witnessed testing activities.
- H. The SYSTEM INTEGRATOR'S selected project personnel shall meet the following requirements:
 1. Project engineer shall have at least 10 years' experience in installing similar systems and shall have a minimum of secondary education in the field of electronics or similar technical discipline.
 2. Project technician assisting the project engineer for field element calibration

01/2017

13300-6

91-0134.1

and check out shall have at least five years experience in installing similar systems.

3. Key staff resumes shall be submitted for ENGINEER's approval with the Project Plan as further detailed under submittals.

1.07 STANDARDS

- A. The design, testing, assembly, and methods of installation of the wiring materials, electrical equipment, and accessories proposed under this Contract shall conform to the National Electrical Code and to applicable state and local requirements. UL listing and labeling shall be adhered to under this Contract.
- B. Any equipment that does not have a UL, FM, CSA, or other approved testing laboratory label shall be furnished with a notarized letter signed by the supplier stating that the equipment furnished has been manufactured in accordance with the National Electrical Code and OSHA requirements.
- C. Any additional work needed resulting from any deviation from codes or local requirements shall be at no additional cost to the OWNER.
- D. Instrument Society of America (ISA) and National Electrical Manufacturers Association (NEMA) standards shall be used where applicable in the design of the CS.
- E. All equipment used on this project to test and calibrate the installed equipment shall be in calibration at the time of use. Calibration shall be traceable to National Institute of Standards (NIS - formally NBS) calibration standards.

1.08 WARRANTY AND GUARANTEES

- A. The SYSTEM INTEGRATOR shall furnish to the OWNER a written guarantee in accordance with Division 1.
- B. The SYSTEM INTEGRATOR shall guarantee all equipment whether or not of his own manufacture.

1.09 SPARES AND EXPENDABLES

- A. Obtain from the manufacturer(s) and provide the recommended critical spare parts as part of the work. Refer to the individual requirements listed in the associated specification sections for the CS for specific parts lists to be provided as a minimum. The spare parts are the property of the OWNER.
- B. Obtain from the manufacturer(s) and furnish any special tools, calibration equipment, and testing apparatus required for the proper adjustment and maintenance of the material provided.

PART 2 - PRODUCTS

This Part not used.

PART 3 - EXECUTION

3.01 SEQUENCE OF WORK

- A. Coordination Meetings. In order to ensure timely performance of the Contract and the system's conformance with these specifications, coordination meetings shall be

01/2017

13300-7

91-0134.1

held at the OWNER's engineering office. The first meeting will be held 30 days after award of the Contract to the CONTRACTOR. The CONTRACTOR and SYSTEM INTEGRATOR shall provide for their attendance at this meeting in their quotation. A schedule for additional coordination meetings (approximately one each month) will be derived at this initial meeting for periodic update, coordination, and conflict resolution during the project duration.

- B. Prerequisite Activities and Lead Times. Do not start the following key project activities until the listed prerequisite activities have been completed and lead times have been satisfied:
1. Hardware Purchasing, Fabrication, and Assembly: Associated design related submittals completed (no exceptions, or approved as noted).
 2. Shipment: Completion and approval of all design related submittals.
 3. Startup: Operational Checkout Tests.
 4. OWNER Training: Owner Training Plan completed and O&M manuals delivered.
 5. Demonstration Tests: Operational Check-out Tests, Startup, OWNER Training, and Demonstration Test Procedures must be complete. Give 4-weeks' notice prior to the planned test start date.

3.02 PRODUCT HANDLING

- A. Store and protect equipment until installation following the storage and handling instructions recommended by the equipment manufacturers. Place special emphasis on proper anti-static protection of sensitive equipment.
- B. Protection During Construction. Throughout this Contract, provide protection for materials and equipment against loss or damage, and from the effects of weather. Prior to installation, store items in indoor, dry locations. Provide heating in storage areas for items subject to corrosion under damp conditions. Provide covers for panels and other elements that may be exposed to dusty construction environments. Specific storage requirements shall be in accordance with the SYSTEM INTEGRATOR'S recommendations.
- C. Corrosion Protection. Protect all consoles, panels, enclosures, and other equipment containing electrical or instrumentation and control devices, including spare parts, from corrosion using corrosion-inhibiting vapor capsules. Prior to shipment, include vapor capsules in the shipping containers and equipment as recommended by the capsule manufacturer. During the construction period, periodically replace the capsules in accordance with the capsule manufacturer's recommendations. Replace all capsules just prior to Final Acceptance.
- D. ESD Protection. Provide for the proper handling, storage, and environmental conditions required for the CS components deemed static sensitive by the equipment manufacturer. Utilize anti-stat wrist straps and matting during installation of these items to prevent component degradation.
- E. Adequately pack manufactured material to prevent damage during shipping, handling, storage, and erection. Pack all material shipped to the project site in a container properly marked for identification. Use blocks and padding to prevent movement.

01/2017

13300-8

91-0134.1

- F. Ship materials that must be handled with the aid of mechanical tools in wood-framed crates.
- G. Ship all materials to the project site with at least one layer of plastic wrapping or other approved means to make it weatherproof. Anti-stat protection shall be provided for all sensitive equipment.
- H. Inspect the material prior to removing it from the carrier. Do not unwrap equipment until it is ready to be installed. If any damage is observed, immediately notify the carrier so that a claim can be made. If no such notice is given, the material shall be assumed to be in undamaged condition, and any subsequent damage that is discovered shall be repaired and replaced at no additional expense to the OWNER.
- I. The Contractor shall be responsible for any damage charges resulting from the handling of the materials.

3.03 SCHEDULING

- A. Coordinate I&C work with the OWNER and the work of other trades to avoid conflicts, errors, delays, and unnecessary interference with operation of the existing plant during construction.

3.04 INSTALLATION

- A. Install the CS in locations indicated on the Drawings and follow each manufacturer's installation instructions explicitly, unless otherwise indicated. Wherever any conflict arises between manufacturer's instructions and these Contract Documents, follow the ENGINEER's decision at no additional cost. Keep a copy of the manufacturer's instructions on the jobsite, available for review at all times
- B. Install materials and equipment in a workman-like manner utilizing craftsmen skilled in the particular trade. Provide work that has a neat and finished appearance.
- C. Where existing materials and equipment are removed or relocated, remove and deliver to the OWNER all materials no longer used unless otherwise directed by the ENGINEER. Repair affected surfaces to conform to the type, quality, and finish of the surrounding surface in a neat and workmanlike manner. Follow any specific instructions given by the ENGINEER.
- D. Provide materials and equipment with manufacturer's standard finish system. Provide manufacturer's standard finish color, except where specific color is indicated. If manufacturer has no standard color, finish equipment with a light gray color.
- E. Keep the premises free from accumulation of waste material or rubbish. Upon completion of work, remove materials, scraps, and debris from premises and from interior and exterior of all devices and equipment. Touch-up scratches, scrapes, or chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the type, color, consistency, and type of surface of the original finish. Clean and polish the exterior of all panels and enclosures upon the completion of the demonstration tests.
- F. Grounding. Ground each analog signal shield on one end at the receiver end only. Properly ground all surge and transient protection devices. Coordinate grounding system with Division 16 - ELECTRICAL.

01/2017

13300-9

91-0134.1

- G. Surge Protection. Provide appropriately sized electrical transient protection devices for all electrical elements of the system to protect the CS equipment and equipment which interfaces with the CS from transient surges in power and signal wiring (from lightning and other ground potential differences). Locate and properly ground surge suppressors at: 1) any connection between power sources and electrical equipment including panels, assemblies, and field devices; 2) at both ends of all analog signal circuits.

3.05 TRAINING

- A. The cost of training programs to be conducted with OWNER's personnel shall be included in the Contract price. The training and instruction, insofar as practicable, shall be directly related to the System being supplied.
- B. The SYSTEM INTEGRATOR shall provide detailed manuals to supplement the training courses. The manuals shall include specific details of equipment supplied and operations specific to the project.
- C. The SYSTEM INTEGRATOR shall make use of teaching aids, manuals, slide/ video presentations, etc. After the training services, such materials shall be delivered to OWNER.
- D. The training program shall represent a comprehensive program covering all aspects of the operation and maintenance of the system.
- E. All training schedules shall be coordinated with, and at the convenience of the OWNER. Shift training may be required to correspond to the OWNER's working schedule.
- F. Specific details of the nature and duration of training to be provided are defined in the individual specification sections.

3.06 TESTING – GENERAL

- A. All elements of the CS, both hardware and software, shall be tested to demonstrate that the total system satisfies all of the requirements of the Contract Documents.
- B. As a minimum, the testing shall include shop tests, operational check-out tests, and Demonstration Tests.
- C. Each test shall be in the cause and effect format. The person conducting the test shall initiate an input (cause) and, upon the system producing the correct result (effect), the specific test requirements will have been satisfied.
- D. All tests shall be conducted in accordance with, and documented on, prior approved procedures, forms, and checklists. Each specific test to be performed shall be described and a space provided after it for signoff by the appropriate party after its satisfactory completion. Copies of these signoff test procedures, forms, and checklists will constitute the required test documentation.
- E. Provide all special testing materials and equipment. Wherever possible, perform tests using actual process variables, equipment, and data. Where it is not practical to test with real process variables, equipment, and data, provide a suitable means of simulation. Define these simulation techniques in the test procedures.
- F. The SYSTEM INTEGRATOR shall coordinate all of their testing with the CONTRACTOR, the ENGINEER, all affected suppliers, and the OWNER.

01/2017

13300-10

91-0134.1

- G. The ENGINEER reserves the right to test or retest any and all specified functions whether or not explicitly stated in the approved test procedures. The ENGINEER'S decision shall be final regarding the acceptability and completeness of all testing.

END OF SECTION

01/2017

13300-11

91-0134.1

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91-0134.1

SECTION 13302

INSTRUMENTATION AND CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish, install and place into service operating process instrumentation, control systems and panels including accessories related to the City of Pembroke Pines Booster Pump Station projects as shown on plans and specified herein.
1. Modify existing PLC control panel at the Academic Village Booster Pump Station as required and as shown on drawings for a complete and working PLC system in place.
 2. Furnish and install a new PLC control panel consisting of a programmable logic controller (PLC) with associated I/O rack, PLC power supplies, analog and digital input and output module, communication module, surge suppressions, terminal strips, interposing relays, panel mounted touch screen human-machine interface (HMI), wireways, Ethernet Switch, UPS, relocated radio, valve electronic controllers supplied by specification 15101 at Holly Lakes Booster Pump Station as shown on drawings and as describes in this specification for a complete and working PLC system in place. Coordinate with Fill valve supplier (specification 15101) for obtaining the fill valve electronic controllers (total of two units) to be mounted on the exterior right side (when facing the panel) of new PLC control panel. Coordinate with specification 15101 for power requirements as well as Ethernet communication requirements and provide all necessary power supply and wiring accordingly.
 3. Existing PLC control panel at Holly Lakes Booster Pump Station shall remain until new PLC control panel is in operational. Relocate existing relays and power supply units from the existing pump control panel to a temporary panel and wires them as needed for temporary operation during installation of new PLC control panel at the location of existing pump control panel. Contractor shall provide a detailed plan for temporary relocation of the relays and power supply units and get approval from Engineer/Owner before removing the existing pump control panel.
 4. Furnish and install all instruments shown on the contract drawings and specified herein. Furnish and install all necessary tubing, valves, connectors, manifolds, supports, stands, hoods and mounting hardware for a complete working system in place.
 5. Furnish programming services described herein. Programming of the new hypochlorite system into the existing PLC program at Academic Village Booster Pump Station and new PLC program as part of new PLC control panel at Holly Lakes Booster Pump Station, including HMI touch panel located on

07/2017

13300-1

91-0134.1
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the panel shall be in the scope of the Instrumentation Contractor. Contractor shall copy the existing PLC logic at Holly Lakes Booster Pump Station and import it into the new PLC system and modify to add new signals and logic as shown on drawings and as describes in this specification.

6. The plant SCADA system (iFIX) programming is also part of this contract and shall be programmed at the City of Pembroke Pine Water Treatment Plant located at 7960 Johnson Street, Hollywood, FL 33024. I&C contractor shall provide fully annotated word and bit addressing and description to the Owner/City. Word values shall be in Engineering units, not raw data. I&C Contractor shall provide updates of any modifications or changes made to the PLC software that may have an effect on the existing iFIXSCADA system.
 7. The contractor shall furnish all shop drawings to the instrumentation contractor for systems that interface with the station control system. The instrumentation contractor shall inform the general contractor in writing of the shop drawings necessary for instrumentation and control system coordination.
 8. The contractor is responsible for providing a complete working station instrumentation and control system in place.
 9. Power supplies, surge suppressors, terminal strips, etc. for all I/O that are to be connected to the new control system must be provided new. The instrument contractor is responsible to provide completed panels that are clean, functional and present a professional workman-like appearance.
 10. All wires in control panels must be permanently tagged and shown on the as-built drawings. This includes all spare and abandoned wires and cables. Spare and abandoned cables are to be taped and left coiled in the panels for future use. Cable and wire numbers are to be assigned by the contractor, documented and controlled to prevent duplicate numbers. The contractor shall turn over to the owner, at the project conclusion, a cable and wire list showing assigned numbers and their physical location in the plant.
 11. See electrical drawings and specifications for additional work required of the instrument contractor as part of this project.
 12. Furnish updated PLC loop diagram after modification of existing PLC system as required by this project.
- B. Work Includes: Engineering, furnishing, installing, calibrating, adjusting, testing, documenting, starting up, and Owner training for a complete Instrumentation and Control System in place.
1. Major elements are:
 - a. Field Instruments including elements and transmitters.
 - b. New PLC control panel at Holly Lakes Booster Pump Station, including PLC and touch screen HMI programming.
 - c. Modification of existing PLC control panel at Academic Village Booster Pump Station, including PLC and touch screen HMI programming.

07/2017

13300-2

91-0134.1
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- d. SCADA (iFIX) programming, including adding new I/O's into the existing database at the WTP SCADA system.
 - e. Start-up and testing.
- C. Instrument and Control (I&C) Supplier work scope:
- 1. For I&C equipment and ancillaries provide the following:
 - a. Completion of detailed design.
 - b. Required Submittals.
 - c. Equipment and ancillaries.
 - d. Instructions, details, and recommendations to, and coordination with, Contractor for proper installation.
 - e. Coordination with package system shop drawings and other disciplines.
 - f. Loop checks.
 - g. Verify readiness for operation.
 - h. Verify the correctness of final power and signal connections.
 - i. Adjusting and calibrating.
 - j. Starting up.
 - k. Testing and coordination of testing.
 - l. Training.
 - m. As-built documentation.
 - 2. Verify following work not by I&C Supplier is provided:
 - a. Correct type, size, and number of signal wires with their raceways.
 - b. Correct electrical power circuits and raceways.
 - c. Correct size, type, and number of I&C related pipes, valves, fittings, and tubes.
 - d. Correct size, type, materials, and connection of process mechanical piping for in-line primary elements.
 - 3. For equipment not provided under I&C Supplier, but directly connected to equipment required by I&C Supplier:
 - a. Obtain from Contractor, manufacturer's information on installation, interface, function, and adjustment.
 - b. Coordinate with Contractor to allow required interface and operation with I&C System.
 - c. For operation and control, verify that installations, interfacing signal terminations, and adjustments have been completed with manufacturer's recommendations.

07/2017

13300-3

91-0134.1
(By Hillers Engineering)

- d. Test to demonstrate required interface and operation with I&C System. Examples of items in this category, but not limited to the following:
 - 1) Valve operators, position switches, and controls.
 - 2) Chemical feed pump and feeder speed/ stroke controls.
 - 3) Automatic samplers.
 - 4) Motor control centers.
 - 5) Variable speed drive systems.
- e. Examples of items not in this category:
 - 1) Internal portions of equipment provided under Division 16, Electrical, that are not directly connected to equipment under I&C System.
 - 2) Internal portions of I&C Systems provided as part of package systems and that are not directly connected to equipment provided under I&C System.
- 4. Wiring external to equipment provided by I&C Supplier:
 - a. Special control and communications cable: Provided by I&C Supplier.

D. Software Engineering work scope:

- 1. Software engineering work shall be performed by the instrumentation and control contractor. The instrumentation and control contractor shall have be responsible to coordinate loop-checks, start-up etc. for a complete working system in place. The following are part of the software engineering scope:
 - a. Correct I/ O mapping and scaling.
 - b. Ladder logic implementation defined in control strategies.
 - c. HMI interface graphic screens and mapping.
 - d. Start-up support, including system testing and trouble shooting.
 - e. System training.
 - f. Specifications/ documents including: System External Specification, System Internal Specification, I/ O Checklist, Site Acceptance Test Plan.

1.02 SINGLE INSTRUMENT SUPPLIER

- A. The Contractor shall assign to the Single Instrument and Control (I&C) supplier full responsibility for the functional operation of all new instrumentation and control systems. The Contractor shall have said supplier perform all engineering necessary in order to select, furnish, program, supervise the installation of, connection, calibrate, and place into operation of all sensors, instruments, alarm equipment, control panels, accessories, and all other equipment as specified herein. The I&C supplier shall have a maintenance office within a 150 mile radius of the project.
- B. The single instrument and controls supplier shall demonstrate his/her ability to successfully complete projects of similar sizes and nature. Provide references (including phone number and contact name) for at least three projects successfully

07/2017

13300-4

91-0134.1
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completed in which the following tasks were performed: system engineering, programming, panel assembly, instrumentation installation, documentation (including panel assembly), schematics and wiring diagrams, field testing, calibration and start-up, operator instruction and maintenance training. Provide references (including phone number and contact name) for at least three projects where software engineering (programming) tasks such as ladder logic programming, computer based SCADA system configuration, documentation, field testing, start-up, and operator instruction were performed.

- C. The foregoing shall enable the Contractor and the Owner to be assured that the full responsibility for the requirements of this Section shall reside in an organization which is qualified and experienced in the water treatment and distribution field and its associated process technology on a functional systems basis.
- D. The single I&C supplier shall have a UL approved shop and shall build all panels according to UL 508A. All control panels shall bear a UL 508A label. All control panels shall also meet the requirements of national electrical code article 419 for industrial control panels.
- E. Instrumentation and Controls supplier shall be:
 - 1. C.C. Control Corp.
 - 2. Or Owner approved equal.

1.03 INSTALLATION WORK

- A. The I&C contractor is not required to employ the services of the instrument or manufacturer's organization, or any division thereof, to accomplish the physical installation of any elements, instruments, accessories or assemblies specified herein. However, the Contractor shall employ installers who are skilled and experienced in the installation and connection of all elements, instruments, accessories and assemblies; portions of their work shall be supervised or checked as specified in Part 3, herein.

1.04 PREPARATION OF SUBMITTAL OF DRAWINGS AND DATA

- A. It is incumbent upon the Contractor to coordinate the work specified in these Sections so that a complete well I&C system shall be provided and shall be supported by accurate Shop and record Drawings. As a part of the responsibility as assigned by the Contractor, the Single I&C supplier shall prepare and submit through the Contractor, complete organized Shop Drawings, as specified in Part 2.02, herein. Interface between instruments, motor starters, etc. shall be included in his Shop Drawing submittal.
- B. During the period of preparation of this submittal, the Contractor shall authorize direct, informal liaison between his Single I&C supplier and the Engineer for exchange of technical information. As a result of this liaison, the Engineer may authorize certain minor refinements and revisions in the systems as specified informally, but these shall not alter the scope of work or cause increase or decrease in the Contract Price. During

07/2017

13300-5

91-0134.1
(By Hillers Engineering)

this informal exchange, no oral statement by the Engineer shall be construed to give formal approval of any component or method, nor shall any statement be construed to grant formal exception to or variation from these Specifications.

1.05 ADDITIONAL TECHNICAL SERVICES

- A. At no separate additional cost to the Owner, the Contractor shall provide the following services of qualified technical representatives of the Single I&C supplier (See Part 3, herein).
1. To supervise installation and connection of all instruments, elements, and components of every system, including connection of instrument signals to primary measurement elements and to final control elements such as pumps, valves, and chemical feeders.
 2. To make all necessary adjustments, calibrations and tests; and
 3. To instruct plant operating and maintenance personnel on instrumentation. This time shall be in addition to whatever time is required for other facets of work at the site, and shall be during the Owner's normal working days and hours.
 4. To terminate and test all fiber optic cable and effected devices (if applicable).

1.06 GUARANTEE

- A. The Contractor shall guarantee all equipment and installation, as specified herein, for a period of one year following the date of completion of the work. To fulfill this obligation, the Contractor shall utilize technical service personnel designated by the Single I&C supplier to which the Contractor originally assigned project responsibility for instrumentation. Services shall be performed within two calendar days after notification by the Owner.

1.07 ADDITIONAL PROVISIONS

- A. The applicable provisions of the following Sections under Electrical Work shall apply to work and equipment specified herein, the same as if stated in full, herein:
1. Codes and Standards
 2. Equipment, Materials and Workmanship
 3. Testing
 4. Grounding
 5. Equipment Anchoring
 6. Conductor and Equipment Identification
 7. Terminal Cabinets and Control Compartments

07/2017

13300-6

91-0134.1
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8. Process Control Devices

1.08 NEWEST MODEL COMPONENTS

- A. All meters, instruments, and other components shall be the most recent field proven models marketed by their manufacturers at the time of submittal of Shop Drawings unless otherwise specified to match existing equipment. All technical data publications included with submittals shall be the most recent issue.

1.09 INSPECTION OF THE SITE AND EXISTING CONDITIONS

- A. The instrumentation drawings were developed from past record drawings and information supplied by the Owner.
- B. Before submitting a bid, visit the site and determine conditions at the site and at all existing structures in order to become familiar with all existing conditions and instrumentation and control systems that will, in any way or manner, affect the work required under this Contract. No subsequent increase in Contract cost will be allowed for additional work required because of the Contractor's failure to fulfill this requirement.

1.10 RELATED WORK

- A. Division 16 – Electrical
- B. Division 11 – Equipment

PART 2 - PRODUCTS

2.01 INSTRUMENTATION CRITERIA

- A. Designation of Components
 - 1. In these Specifications and on the Drawings, all systems, meters, instruments, and other elements are represented schematically, and are designated by numbers, as derived from criteria in Instrument Signal and Automation Society of America Standard ANSI/ISA S5.1-1973. The nomenclature and numbers designated herein and on the Drawings shall be employed exclusively throughout Shop Drawings, data sheets, and similar materials. Any other symbols, designations, and nomenclature unique to the manufacturers standard methods shall not replace these prescribed above, used, herein and on the Drawings.
- B. Signal Characteristics
 - 1. Signals shall be electrical, as indicated herein, and shall vary in direct linear proportion to the measured variable, except as noted. Electrical signals outside control panel(s) shall be 4 to 20 milliamperes DC, except as noted. Signals within enclosures may be 1-5 volts DC.

07/2017

13300-7

91-0134.1
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C. Matching Style Appearance and Type

1. All instruments to be panel mounted at the control panels shall have matching style and general appearance. Instruments performing similar functions shall be of the same type, model, or class, and shall be of one manufacturer, where applicable.

D. Accuracy and Repeatability

1. The overall accuracy of each instrumentation system or loop shall be as described in the Specifications for that system or loop. Each system's accuracy shall be determined as a probable maximum error; this shall be the square-root of the sum of the squares of certified "accuracies" of certain designated components in each system, expressed as a percentage of the actual span or value of the measured variable. Each individual electronic instrument shall have a minimum accuracy of +0.7 percent of full scale and a minimum repeatability of +0.4 percent of full scale unless otherwise specified. Instruments that do not conform to or improve upon these criteria are not acceptable.

E. Signal Isolators, Converters, and Power Supplies

1. Signal isolators shall be furnished and installed in each measurement and control loop, wherever required, to insure adjacent component impedance match or where feedback paths may be generated. Signal converters shall be included where required to resolve any signal level incompatibilities. Signal power supplies shall be included, as required by the manufacturer's instrument load characteristics, to insure sufficient power to each loop component.

F. Alternative Equipment or Methods

1. Equipment or methods requiring redesign of any project details are not acceptable without prior approval of the Engineer. Any changes inherent to a proposal alternative shall be at no additional cost to the Owner. The required approval shall be obtained in writing by the I&C Subcontractor through the Contractor prior to submittal of Shop Drawings and data. Any proposal for approval of alternative equipment or methods shall include evidence of improved performance, operational advantage and maintenance enhancement over the equipment or method specified, or shall include evidence that a specified component is not available. Otherwise, alternative equipment (other than direct, equivalent substitutions) and alternative methods shall not be proposed.

2.02 DETAILED SYSTEMS DRAWINGS AND DATA

A. Content

1. The Contractor shall submit detailed Shop Drawings and data prepared and

07/2017

13300-8

91-0134.1
(By Hillers Engineering)

organized by the Single I&C supplier designated at the time of bidding. Six submittal sets shall be required. These Drawings and data shall be submitted as a complete, bound package at one time, within 80 calendar days after date of Notice to Proceed and shall include:

- a. Drawings showing definite diagrams for every instrument loop system. These diagrams shall show and identify each component of each loop or system using legend and symbols from ISA Standard S5.4, each having the format of ISA Standard S5.1 as used on the Project Drawing. (Each system or loop diagram shall be drawn on a separate Drawing sheet.)
- b. Data sheets for each component, together with a technical product brochure or bulletin. The data sheets shall show:
 - 1) Component function description used herein and on the Drawings;
 - 2) Manufacturer's model number or other product designation;
 - 3) Project tag number used herein and on the Drawings;
 - 4) Project system loop of which the component is a part;
 - 5) Project location or assembly at which the component is to be installed;
 - 6) Input and output characteristics;
 - 7) Scale range and units (if any) and multiplier (if any);
 - 8) Requirements for electric supply (if any);
 - 9) Requirements for air supply (if any);
 - 10) Materials of component parts to be in contact with, or otherwise exposed to, process media;
 - 11) Calibration curves as required.
 - 12) Special requirements or features.
- c. A complete index shall appear in the front of each bound submittal volume. A separate technical brochure or bulletin shall be included with each instrument data sheet. The data sheets shall be indexed in the submittal by systems or loops, as a separate group for each system or loop. If, within a single system or loop, a single instrument is employed more than once, one data sheet with one brochure or bulletin may cover all identical uses of that instrument in that system. Each brochure or bulletin shall include a list of tag numbers for which it applies. System groups shall be separated by labeled tags.
- d. Drawings showing both schematic and wiring diagrams for control circuits. Complete details on the circuit interrelationship of all devices within and outside each control panel shall be submitted first, using schematic control diagrams. Subsequent to return of this first submittal by the Engineer, piping and wiring diagrams shall be prepared and submitted for review by the Engineer; the diagrams shall consist of component layout Drawings to scale, showing numbered terminals on components together with the unique number of the wire to be connected to each terminal. Piping and wiring diagrams shall show terminal assignments from all primary measurement devices, such as flow meters, and to all final control devices, such as samplers, pumps, valves, and chemical feeders. The Contractor shall furnish all necessary equipment supplier's Shop Drawings to facilitate inclusion of this information by the I&C system supplier.

07/2017

13300-9

91-0134.1
(By Hillers Engineering)

- e. Schematic and wiring diagram criteria shall be followed as established in NEMA Standards Publication ANSI/ NEMA ICS-1-1978, "Industrial Control and Systems."
- f. Assembly and construction Drawings for each control panel and for other special enclosed assemblies for field installation. These Drawings shall include dimensions, identification of all components, surface preparation and finish data, nameplates, and the like. These Drawings also shall include enough other details, including prototype photographs, to define exactly the style and overall appearance of the assembly; a finish treatment sample shall be included.
- g. Installation, mounting and anchoring details for all components and assemblies to be field-mounted, including conduit connection or entry details.
- h. Complete and detailed bills of materials. A master Bill of Materials listing all field mounted devices, control panels and other equipment that shall be shipped to the job site. A Bill of Materials for each control panel listing all devices within the panel.
- i. Modifications to existing equipment. A complete description of all proposed modifications to existing instrumentation equipment, control panels, control devices, cabinets, etc., shall be submitted with the Shop Drawings complete with detailed Drawings of the proposed modifications.

B. Organization and Binding

- 1. The organization of initial Shop Drawing submittal required above shall be compatible to eventual inclusion with the Technical Manuals submittal and shall include final alterations reflecting "as built" conditions. Accordingly, the initial multiple copy Shop Drawing submittal shall be separately bound in 3-ring binders of the type specified under Part 2.03, herein, for the Technical Manuals.

2.03 TECHNICAL MANUALS

- A. Five final sets of technical manuals shall be supplied for the Owner, and one final set shall be supplied to the Engineer, as a condition of acceptance of the project. Each set shall consist of one or more volumes, each of which shall be bound in a standard size, three-ring, loose-leaf, vinyl plastic hard cover binder, suitable for bookshelf storage. Binder ring size shall not exceed 3.0 inches.
- B. Initially, two (2) sets of these manuals shall be submitted to the Engineer, and two sets submitted to the Owner, for review. Coordinate with front end documents for quantity of submittal requirements and adjust accordingly. Following the Engineer's, and Owner's review, one (1) set shall be returned to the Contractor with comments. The sets shall be revised and/or amended as required and the requisite final sets shall

07/2017

13300-10

91-0134.1
(By Hillers Engineering)

be submitted to the Engineer fifteen (15) days prior to start-up of systems. The Engineer shall distribute the copies to the Owner.

- C. In addition to updated Shop Drawing information to reflect actual existing conditions, each set of technical manuals shall include installation, connection, operating, trouble-shooting, maintenance, and overhaul instructions in complete detail. This shall provide the Owner with comprehensive information on all systems and components to enable operation, service, maintenance, and repair. Exploded or other detailed views of all instruments, assemblies, and accessory components shall be included together with complete parts lists and ordering instructions.

2.04 MODIFICATION OF EXISTING PLC CONTROL PANELS

A. General:

1. Contractor shall modify the existing PLC control panel as shown on drawings and as described in this specification. Modify existing panel to add new signals as shown on drawings, including relays, surge arrestors, terminal block, wiring, etc. as necessary for a complete and function PLC system.
2. New control panels shall be furnished and installed under this Contract if shown on drawings. They shall house the instrumentation, control devices, indicating lights, PLC's, RTU's, alarm chasses, displays, all necessary accessories, wiring and terminal blocks as necessary and as shown on the Drawings and as described herein. Control panel doors shall be equipped with a door latch kit or a fast operating clamp assembly as applicable. 120 volt AC control voltage in a control panel shall be supplied with a line noise suppressing transformer specified elsewhere in this Section. Each control panel shall be properly grounded and as such be provided with a ground terminal block. Control panels shall be properly sized for installation through new and existing entry ways and custom fit for locations as shown on the drawings
3. Construction:
 - a. Control Room: Control room panels shall be Nema 12. The enclosures shall be manufactured of 14 gauge steel.
 - b. Building interior, non air-conditioned area: Control panels inside a building (not in a control room) shall be Nema 12, 304 stainless steel 14 gauge construction with painted white. Control panels in corrosive areas shall be construed to be outdoors.
 - c. Outdoor: All outdoor control panels shall be NEMA 4X with drip shield kit, 3 point latch mechanism and 316 stainless steel 14 gauge construction, unless otherwise noted on drawings.
 - d. Painting: Control panels shall be thoroughly cleaned and sandblasted per SSPC-SP-6 (Commercial Blast) after which surfaces shall receive a prime coat (Amercoat 185, Koppers 622HB, or equal) 3-mils dry, followed by two (2) or more finish coats (Amercoat 5401, Koppers 501, or equal) 3-mils dry, for a total thickness of the complete system of 6 mils. The finished color of the outside

07/2017

13300-11

91-0134.1
(By Hillers Engineering)

surfaces shall be white, unless otherwise noted or requested by Owner. The inside surfaces shall have a white finish coat.

4. **Cooling:** Control panels shall have sufficient cooling and/or ventilation not to exceed the maximum operating temperature of any of the internal components. Ambient temperature limits shall be 90 degrees F for indoor and 100 degrees F for outdoor control panels. Outdoor control panels with electronic equipment shall be furnished with sun shields around and on top of the control panels.
5. **UPS:** Control Panels shall be furnished with a UPS to provide power to the PLC microprocessor and all PLC support, interface, and communication equipment for 10 minutes. UPS shall be manufactured by Eaton or APC.
6. **Power supply units for non-PLC modules:** Provide power supply units for 120V to 24VDC and 12VDC as needed and sized accordingly to the load supplied. Power supply units for non-PLC modules shall be Puls or Owner approved equal.

B. Signal and Control Circuit Wiring

1. **Wire Type and Sizes:** Conductors shall be flexible stranded copper wire; these shall be U.L. listed Type THHN and shall be rated 600 volts. Wire for control signal circuits and alarm input circuits shall be 16 AWG. All instrumentation cables shall be shielded No. 20 AWG minimum with a copper drain wire. All special instrumentation cable such as between sensor and transmitter shall be supplied by the I&C supplier.
2. **Wire Insulation Colors:** Conductors supplying 120 volt AC power on the line side of a disconnecting switch shall have a black insulation for the ungrounded conductor. Grounded circuit conductors shall have white insulation. Insulation for ungrounded 120 volt AC control circuit conductors shall be red. All wires energized by a voltage source external to the control board(s) shall have yellow insulation. Insulation for all DC conductors shall be blue.
3. **Wiring Installation:**
 - a. All wires shall be run in plastic wireways except (1) field wiring, (2) wiring run between mating blocks in adjacent sections, (3) wiring run from components on a swing-out panel to components on a part of the fixed structure, and (4) wiring run to panel mounted components. Wiring run from components on a swing-out panels to other components on a fixed panel shall be made up in tied bundles. These shall be tied with nylon wire ties, and shall be secured to panels at both sides of the "hinge loop" so that conductors are not strained at terminals.
 - b. Wiring run to control devices on the front panels shall be tied together at short intervals with nylon wire ties and secured to the inside face of the panel using adhesive mounts.
 - c. Wiring to rear terminals on panel mount instruments shall be run in

07/2017

13300-12

91-0134.1
(By Hillers Engineering)

plastic wireways secured to horizontal brackets run above or below the instruments in about the same plane as the rear of the instruments.

- d. Shields of shielded instrument cable shall only be grounded on one side of each cable run. The side to be grounded shall always be in the field as applicable.
- e. Care shall be exercised to properly insulate the ungrounded side, to prevent ground loops from occurring.
- f. Conformance to the above wiring installation requirements shall be reflected by details shown on the Shop Drawings for the Engineer's review.
- g. Wires shall be terminated using pin connectors or spade lugs.

4. Wire Marking:

- a. Each signal, control, alarm, and indicating circuit conductor connected to a given electrical point shall be designated by a single unique number which shall be shown on all Shop Drawings. These numbers shall be marked on all conductors at every terminal using permanently marked heat-shrink plastic. Instrument signal circuit conductors shall be tagged with unique multiple digit numbers. Black and white wires from the circuit breaker panelboard shall be tagged including the one (1) or two (2) digit number of the branch circuit breaker.

5. Terminal Blocks:

- a. Terminal blocks shall be molded plastic with barriers and box lug terminals, and shall be rated 15 amperes at 600 volts. White marking strips, fastened securely to the molded sections, shall be provided and wire numbers or circuit identifications shall be marked thereon with permanent marking fluid. Terminal blocks shall be General Electric Type CR 151A1 with mounting rack, equivalent by Cinch-Jones or equal.

2.05 PLC REQUIREMENTS

- A. All input/output hardware and interface equipment shall be provided by the computer & PLC system supplier for all specified inputs and outputs. Input/output hardware shall be plug-in modules (or equivalent I/O assembly and associated printed circuit board) in associated I/O rack assemblies.
- B. Existing PLC system at Academic Village Booster Pump Station is Allen-Bradley ControlLogix PLC system and existing PLC I/O system has enough spare I/O points for this project. Provide and install new I/O module as needed and as shown on

07/2017

13300-13

91-0134.1
(By Hillers Engineering)

drawings for Academic Village Booster Pump Station PLC system. New I/O module shall match existing models to minimize spare inventory for Owner.

- C. New PLC control panel for Holly Lakes Booster Pump Station shall be Allen-Bradley Controllogix PLC system and match I/O module type with existing. New PLC control panel shall have space for existing radio to be relocated in the field and fill valve electronic controllers. New Allen-Bradley Controllogix CPU shall be model 1756-L61 processor with 2MB memory or Engineer approved higher model. New I/O module shall match existing models to minimize spare inventory for Owner.

2.06 PROGRAMMABLE LOGIC CONTROLLER SOFTWARE

- A. No new PLC software is needed. Contractor shall use its own software for programming of the existing PLC and HMI system.

2.07 ACCESSORIES

- A. General purpose relays in the control panels shall be plug in type with contacts rated 10 amperes at 120 volts AC. The quantity and type of contacts shall be as shown on the Drawings. Each relay shall be enclosed in a clear plastic heat and shock resistant dust cover with LED indication. Sockets for relays shall have screw type terminals. Relays shall be Potter and Brumfield, Square-D, or equal.
- B. Time delay relays shall be solid-state on-delay or off-delay type with contacts rated for 10 amperes at 120VAC. Units shall include adjustable dial with graduated scale covering the time range in each case. Time delay relays shall be Agastat Series 7000, Omron Series H3, SSAC Type TDM, or approved equal.
- C. Additional slave relays shall be installed when the number or type of contacts shown exceeds the contact capacity of the specified relays and timers.
- D. Switches and indicating lights shall be round, 30.5 mm configuration, heavy duty and corrosion resistant. Legend plate shall be standard size square style laminate with white field and black markings as shown.
- E. Indicating lights shall have LED type, unless otherwise noted. Lens color shall be as noted. All indicating lights shall be push-to-test type. Pushbuttons shall include full guard with flush button and selector switches shall include a black non-illuminated knob on switch, unless otherwise noted. Contact arrangement and configuration shall be as shown.
- F. Devices shall be Eaton Electrical Type E-30, General Electric Type CR104, Square D class 9001 Type SK, Allen-Bradley Bulletin 800 or equal.
- G. Selector switches shall be of the rotary type with the number of positions as shown on the Drawings. Color, escutcheon engravings, contact configurations and the like shall be as shown. Devices shall be Eaton Electrical Type E-24, General Electric Type CR104, or equal.

07/2017

13300-14

91-0134.1
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- H. Circuit breakers shall be single pole, 120 volt, 15 ampere rating or as required to protect wires and equipment and mounted inside the panels as shown.
- I. Nameplates shall be supplied for identification of all field-mounted elements, including flow meters and their transmitters. These nameplates shall identify the instrument, or meter, descriptively, as to function and system. These nameplates shall be fabricated from black-face, white-center, laminated engraving plastic. A nameplate shall be provided for each signal transducer, signal converter, signal isolator, each electronic trip, and the like, mounted inside the control panels. These shall be descriptive, to define the function and system of such element. Adhesives shall be acceptable for attaching nameplates. Painted surfaces must be prepared to allow permanent bonding of adhesives. Nameplates shall be provided for instruments, function titles for each group of instruments and other components mounted on the front of the control panels as shown. These nameplates and/or individual letters shall be fabricated from VI-LAM, Catalog No. 200, manufactured by N/P Company, or equivalent by Formica, or equal. Colors, lettering, style and sizes shall be as shown or as selected by the Engineer.
- J. Solenoid Valves, if not otherwise noted, shall be globe valve, directly actuated by solenoid and not requiring minimum pressure differential for operation. Materials shall be brass globe valve bodies and Buna-N valve seats. The size shall be 1/4" normally closed. The coil shall be 115 VAC coil, NEMA 4 solenoid enclosure. Manufacturer shall be ASCO Red Hat, or equal.
- K. Ethernet Switch: Ethernet switch shall have a minimum of 4 – RJ45 ports and the power supply requirement shall be 120V, 1-phase. Ethernet switch shall be Blackbox LBH101A-H or Owner approved equal.

2.08 TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS) PROTECTION

A. General

- 1. TVSS protection shall be provided to protect the electronic instrumentation system from induced surges propagating along the signal and power supply lines. The protection systems shall be such that the protective level shall not interfere with normal operation, but shall be lower than the instrument surge withstand level, and be maintenance free and self-restoring.
- 2. Instruments shall be housed in a suitable case, properly grounded. Ground wires for all TVSS shall be connected to a good earth ground and where practical, each ground wire run individually and insulated from each other. These protectors shall be mounted within the instrument enclosure or a separate NEMA-4X junction box coupled to the enclosure.

B. Power Supply

- 1. Protection of all 120 VAC instrument power supply lines shall be provided. Control panels shall be protected by line noise suppressing isolation transformers and TVSS. Field instruments shall be protected by TVSS. For

07/2017

13300-15

91-0134.1
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control panels, the line noise suppressing isolation transformer shall be Topaz Series 30 Ultra isolators or approved equal. The suppressor shall be Edco HSP-121 and U.L. 1449 compliant.

C. Analog Signals

1. Protection of analog signal lines originating and terminating not in the same building shall be provided by TVSS. For analog signal lines, the TVSS shall be EDCO PC-642. For field mounted two-wire instruments, the TVSS shall be encapsulated in stainless steel pipe nipples and shall be EDCO SS64 series, and U.L. 497B compliant.
2. For field mounted four-wire 120VAC instruments, the TVSS shall be in a NEMA 4X polycarbonate enclosure, EDCO SLAC series.

2.09 INSTRUMENTATION AND CONTROL EQUIPMENT SPECIFICATIONS

L1. SMALL FLOAT LEVEL SWITCH

Level switches of the direct acting float-operated design shall be comprised of a sealed, approximately 1.5 inch diameter CPVC float, containing non-mercury switches. Float shall be suited for rough service and for use in chemical and plating application. Unless otherwise specific, media specific gravity is .95 to 1.05. Non-Mercury switches shall be one (1) normally open and one (1) normally closed, 5 amp, 115 volt AC capacity. Float hangers and supports shall be provided as shown on the installation detail Drawings. Float switches shall be as manufactured by Gems Sensors and Controls, Model: LS-74780-CPVC, or Engineer approved equal.

L2. LEVEL TRANSMITTER (ULTRASONIC) WITH REMOTE CONTROLLER

1. Transducers
 - a. Type:
 - 1) The transducer generates an ultrasonic signal and receives an echo from the liquid or solid surface.
 - b. Operational/ Functional:
 - 1) Sensor shall be potted/ encapsulated in a chemical and corrosion resistant PVC or CPVC housing suitable for the chemical make-up of the monitored liquid. Sensors shall be capable of being completely submersed without damage.
 - 2) Ambient Temperature limits: minus 40 degrees F to plus 194 degrees F.
 - 3) Accuracy: 0.25% of range or 0.24", whichever is greater.
 - 4) Normal operating frequency: 41 kHz
 - 5) PZT ceramic transducer
 - 6) Power: from remote controller box.
 - 7) 3 degree inclusive beam angle.
 - 8) Analog output: 4-20mA
 - 9) Range: See drawings and instrument list.
 - 10) Sensors shall be provided with automatic air temperature and

07/2017

13300-16

91-0134.1
(By Hillers Engineering)

- density compensation.
- 11) Sensors shall be suitable for surface, pipe, or flange mounting as indicated on the Drawings or instrument device schedule.
NOTE: Coordinate with tank supplier or verify on the field connection type and size (flange, NTP, etc) prior submittal process.
- c. Enclosure: IP68 (NEMA 6P)
- d. Options/ Accessories Required:
- 1) The supplier shall be responsible for coordinating all sensor mounting requirements and shall furnish dimensional and elevational drawings to ensure a proper and satisfactory installation.
2. Remote Controller
- a. Blackbox:
- 1) Physical: 5.12" x 5.12" x 2.36"
 - 2) Enclosure: ABS Base with polycarbonate lid, flammability rating UL 94HB. NEMA 4X (IP66) rating.
 - 3) Power Supply: 115VAC +5%, -10%
 - 4) Analog Output: 4-20mA
 - 5) Display: 12 digit alpha numeric display
 - 6) See Instrumentation for installation of level transmitter. Level transmitter shall be installed in the fill panel as shown on drawings.
- b. Manufacturer:
- 1) Pulsar dB XX Transducer with Blackbox 130 – Level model or Owner Approved Equal. (XX varies according to the range of level, e.g. hypochlorite storage tank range: 0 to 15.0 feet, dB 6 [20feet] transducer shall be used).

A1. CHLORINE ANALYZER

1. General:
- a. Function: Measure, indication, and transmit the total chlorine of a process stream.
 - b. Type: Colorimetric DPD type sensor.
 - c. Parts: Chlorine element, flow assembly, transmitter, interconnecting cable, and accessories.
2. Performance:
- a. Range: As noted (maximum of 0 to 5 mg/l) free or total chlorine.
 - b. Accuracy: Plus or minus 0.3 percent of range.
 - c. Linearity: Plus or minus 0.3 percent of range.
3. Element:

07/2017

13300-17

91-0134.1
(By Hillers Engineering)

- a. Type: use colorimetric DPD chemistry to monitor water continuously for free or total chlorine.
 - b. Sample Flow: 200 to 500 mL per minute minimum.
 - c. Sample Temperature Range: 0 to 50 degrees C.
 - d. Materials: Corrosion-resistant plastic.
 - e. Process Connections: Adaptable to plastic, PVC, and stainless tubing.
 - 1) Inlet: 1/4-inch NPT.
 - 2) Outlet: 1/2-inch NPT.
 - f. Mounting: Surface or wall mounting.
4. Transmitter:
- a. Features:
 - 1) Type: Microprocessor based.
 - 2) Indicator: Auto-ranging LCD readout which continuously displays total chlorine.
 - 3) Scale Range: 0 to 30 mg/l.
 - 4) Diagnostics: Self-test diagnostics to automatically indicate possible instrument malfunctions. System warning and shutdown alarms each activate a SPDT contact.
 - b. Enclosure:
 - 1) Type: NEMA 4X plastic with clear polycarbonate front cover.
 - 2) Mounting: Wall.
 - c. Signal Interface:
 - 1) Output: 4 to 20 mA DC signal for load impedance 0 to 500 ohms minimum for 24V dc supply without load adjustments.
 - 2) Contacts: SPDT rated 5-amp continuous at 120-volt ac minimum.
 - d. Power 120-volt ac, 60-Hz.
5. Cable: Length as required to accommodate the device location.
6. Manufacturers: Hach CL-17 Analyzer, no approved equal.

A2. AMMONIA MONOCHLORINE ANALYZER

1. General:
- a. Ammonia and Monochloramine process analyzer for continuous monitoring of total and free ammonia and monochloramine in water.
 - b. The analyzer measures total ammonia and monochloramine in drinking water and determines free ammonia concentration. The chemical analysis uses a modified phenate method to measure monochloramine concentration directly by colorimetry. In parallel analysis, an excess of hypochlorite at the correct pH generates total ammonia values measured

07/2017

13300-18

91-0134.1
(By Hillers Engineering)

directly by colorimetry. Immediately after, the analyzer calculates the free ammonia values out of the difference between the directly measured parameters.

2. System Description:

- a. Measurement Range: 0.01 to 2 ppm Ammonia (NH₄ as N) or Monochloramine (as N).
- b. Detection Limit: 0.01 ppm NH₄ (as N).
- c. Accuracy: ± 5 % or 0.01 ppm (as N) for 5 to 40 °C (41 to 104 °F); ±10% or 0.02 ppm for 40 to 50 °C (104 to 122 °F), whichever is greater.
- d. Repeatability: 3 % or 0.01 ppm (as N), whichever is greater.
- e. Response time at T>90%: Less than 5 minutes.

3. Analyzer:

- a. The display screen shall be a colored 5.7" LCD screen, and shall include a dashboard view, with measurements recent calibration information, reagent status, and Prognosis indicators.
- b. The display screen shall be capable of graphing all available parameters on a scalable time.
- c. The analyzer shall be capable of a continual measurement of every 4.5 minutes or a user selectable interval between measurements of 4.5 to 240 minutes.
- d. The analyzer shall be capable of grab sample IN (from external source to the analyzer) and grab sample OUT (from the analyzer to external source) to save time, without interrupting continuous sample flow to the analyzer
- e. The analyzer shall have Link2sc capability to communicate measurements and provide calibration information between the analyzer and laboratory spectrophotometers.
- f. The analyzer must operate using 110-240VAC, 50/ 60 Hz power
- g. The analyzer must perform a self-test and auto-blanking between analysis points to compensate for sample color, turbidity, and changes in light intensity due to voltage fluctuations or light source aging.
- h. The analyzer must be able to conduct 2-point automatic calibration using installed standards.
- i. The analyzer shall operate with an LED light source at a peak wavelength of 650nm Accuracy.
- j. Four analog 0/4-20 mA outputs (with possibilities to extend to eight (8x)) are provided with a maximum impedance of 500 ohms.
- k. The following parameters can be assigned to a 4-20mA output:
 - 1) Total Ammonia measurement.
 - 2) Free Ammonia measurement.
 - 3) Monochlorine measurement.
 - 4) Calculated Ratio.
- l. The analyzer shall provide the user with built in help screens provide the user with built in help screens.
- m. The analyzer shall provide for continuous purge of sample to drain to assure fresh sample to the analyzer and reduce analysis lag time
- n. Sample shall be delivered to the analyzer at the pressure of 2–100 psi to preset pressure regulator
- o. The analyzer shall provide separate discharge lines for unchanged (bypass) and contaminated sample (waste)

07/2017

13300-19

91-0134.1
(By Hillers Engineering)

- p. Software updates and data extraction shall be completed via an SD card.
- 4. Reagents and Standards:
 - a. The analyzer shall use quick connect reagent bottles with pre-installed tubing.
 - b. Reagents shall be pressurized using a built-in air compressor.
 - c. The analyzer shall include a 30 days' supply of reagents (using a 4.5 minute cycle time).
 - d. The reagents usage shall be 1L of each reagent for every 30 days with a 4.5 minute cycle time.
 - e. Manufacturer shall provide certified pre-mixed reagents and standards.
- 5. Manufacturer:
 - a. Hach 5500sc Ammonia Monochloramine Analyzer (1-channel).
 - b. No equal.
- 6. Components shall include a minimum of analyzer, installation kit, installation manual, operations manual, maintenance and troubleshooting manual, reagents and cleaning solution.

2.10 CONTROL STRATEGY AND LOOP DESCRIPTIONS

- A. The control strategies are written descriptions of the programming required to implement regulatory and sequential control of the unit processes. Control strategies shall fully reside in the memory of the designated PLC. Coefficients pertaining to control strategies shall be modifiable through the operator interface in the monitoring / control mode.
- B. The I&C supplier/ software programmer shall include an additional 40 hours of on-site time to fine tune control systems and make minor software modifications in order to resolve any logic discrepancies encountered during start-up, and supply the Owner with a completely functional system. This shall be part of the bid package with no additional cost to the owner. The existing PLC program of the booster pump station control strategy shall remain.
- C. P&I Drawing: Hypochlorite metering pump control strategy (Both Academic Village and Holly Lakes Booster Pump Station):
 - 1. The hypochlorite metering pump control strategy shall have "AUTO" and "MANUAL" dosage control selections and shall be selectable from the SCADA and HMI screens.
 - 2. Auto Mode:
 - a. If "AUTO" dosage control is selected, Operator shall enter the desired dosage setpoint in MG/L (adjustable) via the SCADA or HMI screens. When one or more of the existing booster pump (s) is/ are running, the PLC logic shall start one of the hypochlorite metering pumps and flow pace based on the existing flowmeter (FE-1/ FIT-1). PLC logic shall have a PID controller to adjust the speed of the hypochlorite metering pump based on the flow pacing and dosage setpoint.
 - b. If the flow increases, the PID controller shall increase the pump speed

07/2017

13300-20

91-0134.1
(By Hillers Engineering)

and if the flow decreases, the PID controller shall decrease the pump speed until it reaches the minimum speed. Coordinate with Process Engineer for minimum speed and set during start-up.

- c. PLC logic shall have “Auto Trim” or “without Trim” option selection and shall be selectable from the SCADA or HMI screens. When “Auto Trim” is selected, the PLC logic shall use chlorine analyzer (AE/ AIT--CL01 for Academic Village Booster PS and AE/ AIT-HL-CL02 for Holly Lakes Booster PS) to trim the chlorine dosage setpoint by adjusting the PID parameter based on the error between the dosage setpoint and the actual chlorine measurement. When “without Trim” option is selected, the PLC logic shall only use the flow pacing signal.
 - d. PLC logic shall also have a correction factor setpoint (adjustable) and shall be entered by Operator thru the SCADA or HMI screens. Normal value for correction factor will be 1.0 and can be adjusted from 0.5 to 2.0 value range. If the chlorine solution is not used for multiple days and losing its concentration, the Operator shall adjust the correction factor setpoint based on the field experience. This option shall be password protected so that only authorized Owner’s personnel can adjust this setpoint.
3. Manual Mode:
 - a. If “MANUAL” dosage control is selected, the Operator shall manually start the hypochlorite metering pump and set the pump speed from SCADA or HMI screens. The plant total flow and chlorine analyzer value shall be displayed on the SCADA and HMI screens for Operator to make the decision for the pump speed.
 4. Incoming Chlorine Measurement (Holly Lakes Only):
 - a. Incoming chlorine measurement (AE/ AIT-HL-CL01) will be used for monitoring purpose only. No control function is needed.
 5. Ammonia Measurement (Both Academic Village and Holly Lakes):
 - a. Ammonia measurement (AE/ AIT-HL-NH01 and AE/ AIT-AV-NH01) will be used for monitoring purpose only. No control function is needed.
 6. Ground Storage Tank Level Measurement (Holly Lakes Only):
 - a. Study existing tank fill logic associated with the existing ground storage tank level measurement and modify the PLC logic to include a level measurement of both ground storage tanks. Record the existing level range. New tank level shall be coming from the altitude valve pressure transmitter and shall be converted to level from pressure using formula [Level = Pressure / (local gravity * Specific gravity * Density of water)]. PLC program shall have a tank level selection logic: “select GST#1 level”, “select GST#2 level”, or “average GST levels”

07/2017

13300-21

91-0134.1
(By Hillers Engineering)

selection and shall be selectable from the SCADA screen.

- D. **Miscellaneous Control and Monitoring:** In addition to process monitoring and control shown on the Instrumentation drawings, the reclaimed PLC shall control and/ or monitor the following station attributes:
1. **Pump Running Status, if not available from metering pump:** PLC logic shall create a pump running status if not available from metering pump. Pump running status shall be active if pump is called to start and not receive failed signal.
 2. **Pump Alternation:** PLC logic shall have automatic or manual pump alternation. If Automatic pump alternation is selected, PLC logic shall automatically alternate based on the last pump running. If manual is selected, the PLC logic shall let operator to select "Lead" and "Lag" from SCADA screen and start the lead pump.
 3. **Total Run Time:** The PLC program shall have a counter for total run time for each pump and display on SCADA/ HMI screens. Coordinate with Owner for recording the existing runtimes at the Holly Lakes Booster Pump Control Panel before removing the panel and add those runtimes number into the PLC total run time calculation.
 4. **Analog Input (level, flow, and pressure):** The PLC program shall have the "Hi-Hi", "High", "Low", and "Low-Low" alarms set point (adjustable) for all analog inputs and generate the "Hi-Hi", "High", "Low", and "Low-Low" alarms if the condition occurs. All alarms shall be auto reset when alarm condition goes away. Coordinate with Owner for which alarms are to be displayed and to be added to alarm screen and program accordingly.
 5. **Panel HMI Touch Screens:** Panel View Screens shall mimic the P&ID drawings and implement graphic displays. The Contractor shall submit all the screens for approval from the ENGINEER and OWNER. The screens shall have appropriate Analog value displays, set points, alarms, etc. All alarms shall have auto reset in panel view if the alarm condition goes away. Revise the screens as required before Start-up testing.

2.11 INSTRUMENT LIST

A. Academic Village Booster Pump Station

TAGNO.	COMPONENT CODE	COMPONENT TITLE	COMPONENT OPTIONS/ RANGE	REMARKS
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07/2017

13300-22

91-0134.1
(By Hillers Engineering)

LSHH-AV-HYPO2	L1	Containment Sump High Level Alarm		
LE-AV-HYPO1, LIT-AV-HYPO1	L2	Ultrasonic Level Sensor and Transmitter	0-15 Feet	Level transmitter to be installed in fill panel.
AE/ AIT-AV-CL01	A1	Total Chlorine	0-5 PPM	
AE/ AIT-AV-NH01	A2	Free Ammonia, Total Ammonia, Mono-Chloramine	0-2 PPM as N	
LCP-HYPO	Fill Panel			See drawings.
Display Panel				See drawings.

B. Holly Lakes Booster Pump Station

TAG NO.	COMPONENT CODE	COMPONENT TITLE	COMPONENT OPTIONS/ RANGE	REMARKS
LSHH-HL-HYPO2	L1	Containment Sump High Level Alarm		
LE-HL-HYPO1, LIT-HL-HYPO1	L2	Ultrasonic Level Sensor and Transmitter	0-15 Feet	Level transmitter to be installed in fill panel.
AE/ AIT-HL-CL01	A1	Total Chlorine (Incoming)	0-5 PPM	
AE/ AIT-HL-CL02	A1	Discharge Total Chlorine	0-5 PPM	
AE/ AIT-HL-NH01	A2	Free Ammonia, Total Ammonia, Mono-Chloramine	0-2 PPM as N	
LCP-HYPO	Fill Panel			See drawings.

07/2017

13300-23

91-0134.1
(By Hillers Engineering)

Display Panel				See drawings.

PART 3 - EXECUTION

3.01 INSTALLATION, CALIBRATION, TESTING, START-UP AND INSTRUCTION

A. General:

1. Under the supervision of the Single I&C supplier, all systems specified in this Section shall be installed, connected, calibrated and tested, and in coordination with the Engineer and the Owner, shall be started to place the processes in operation. This shall include final calibration in concert with equipment specified elsewhere in these Specifications, including pumps, valves, as well as certain existing equipment.

B. Testing

1. All systems shall be exercised through operational tests in the presence of the Engineer in order to demonstrate achievement of the specified performance. Operational tests depend upon completion of work specified elsewhere in these Specifications. The scheduling of tests shall be coordinated by the Contractor among all parties involved so that the tests may proceed without delays or disruption by incomplete work.
2. Check the function of each loop, including set points, alarms, displays, and operator interface. Check all loops. Check data logging, alarm logging, and event logging.
3. See section 3.02 supplements for sample "Loop Status Report" and "Functional Acceptance Test Sheet".

C. Installation and Connection:

1. The Contractor shall install and connect all field-mounted components and assemblies under the criteria imposed in Part 1, 1.03, herein. The installation personnel shall be provided with a final reviewed copy of the Shop Drawings and data.
2. The instrument process sensing lines and air signal tubing shall, in general, be installed in a similar manner to the installation of conduit specified under Division 16. Individual tubes shall be run parallel and near the surfaces from which they are supported.
3. Supports shall be used at intervals of not more than 3 feet of rigid tubing.

07/2017

13300-24

91-0134.1
(By Hillers Engineering)

4. Bends shall be formed with the proper tool and to uniform radii and shall be made without deforming or thinning the walls of the tubing. Plastic clips shall be used to hold individual plastic tubes parallel. Ends of tubing shall be square cut and cleaned before being inserted in the fittings. Bulkhead fittings shall be provided at all panels.
5. The Contractor shall have a technical field representative of the I&C supplier to instruct these installation personnel on any and all installation requirements; thereafter, the technical field representative shall be readily available by telephone to answer questions and supply clarification when needed by the installation personnel.
6. Where primary elements (supplied by I&C supplier) shall be part of a mechanical system, the I&C supplier shall coordinate the installation of the primary elements with the mechanical system manufacturer.
7. Finally, after all installation and connection work has been completed, the technical field representative shall check it all for correctness, verifying polarity of electric power and signal connections, making sure all process connections are free of leaks, and all such similar details. If the initial inspection finds no deficiencies, the technical field representative shall proceed to the certification to the Contractor. Any completed work that is found to have deficiencies shall have those deficiencies corrected by installation personnel at no additional cost to the Owner. The technical field representative shall then recheck the work after the identified deficiencies are corrected. If the technical field representative finds deficiencies in the follow-up inspection, then remedial action shall be taken by the Contractor at no cost to the Owner. This pattern shall be repeated until the installation is free from defect. The technical field representative shall then certify in writing to the Contractor that for each loop or system that he has inspected is complete and without discrepancies.
8. The field representative of the Single I&C supplier shall coordinate all work required to interface the new equipment and control devices with the existing equipment, including all required modifications to existing equipment and related devices.

D. Calibration

1. All instruments and systems shall be calibrated after installation, in conformance with the component manufacturer's written instructions. This shall provide that those components having adjustable features are set carefully for the specific conditions and applications of this installation, and that the components and/or systems are within the specified limits of accuracy. Defective elements that cannot achieve proper calibration or accuracy, either individually or within a system, shall be replaced. This calibration work shall be accomplished by the technical field representatives of the I&C system supplier who shall certify in writing to the Contractor that for each loop or system all calibrations have been made and that all

07/2017

13300-25

91-0134.1
(By Hillers Engineering)

instruments are ready to operate. See section 3.02 supplements for sample "Instrumentation Calibration Sheet".

2. Proof of Conformance - The burden of proof of conformance to specified accuracy and performance is on the Contractor using its designated Single I&C supplier. The Contractor's designer shall supply necessary test equipment and technical personnel if called upon to prove accuracy and/or performance, at no separate additional cost to the Owner, wherever reasonable doubt or evidence of malfunction or poor performance may appear within the guarantee period.

E. Pre-Commissioning:

1. The I&C Supplier shall test each loop (discrete and analog) to determine if it is functioning correctly. The I&C Supplier shall furnish a loop sheet for each loop to be tested. The loop sheet shall represent the actual "as-built" condition of the loop. The I&C Supplier shall perform a field functional loop test which shall be witnessed by the Engineer and Owner. If the loop fails the functional test, the I&C Supplier shall coordinate repairs for the Contractor to correct whatever is wrong with the loop. The I&C Supplier shall retest the loop until it is approved.
2. Each loop shall be tested and approved by Engineer and Owner until all loops have been approved.

F. Start-up and Instruction

1. When all systems are assessed by the Contractor to have been successfully carried through complete operational tests with a minimum of simulation, and the Engineer concurs in this assessment, plant start-up by the Owner's operating personnel can follow. When the owner has accepted the system, instruction shall be given by qualified persons who have been made familiar in advance with the systems in accordance with item 3.01.I. All equipment shall be checked during the first year of operation at intervals of three months for a period of not less than one day or as may be required to correct any defects to the satisfaction of the Owner.
2. The Contractor shall provide manufacturer's start-up service for new instruments, unless otherwise approved by the Engineer and Owner.

G. Modifications to Existing Facilities

1. The Contractor shall make all modifications to existing equipment and control devices that are required to successfully install and integrate all new instrumentation equipment. All costs for any required modification and rehabilitation effort shall be included in the Contractor's original bid amount and no additional payment shall be allowed.

H. Plant Shutdowns

07/2017

13300-26

91-0134.1
(By Hillers Engineering)

1. The Single I&C supplier shall carefully examine all work to be performed relative to existing I&C equipment and the installation of new equipment and control devices. Work shall be scheduled to minimize required plant shutdown times.

I. Training

1. The cost of training programs to be conducted with City's personnel shall be included in the Contract price. The training and instruction, insofar as practicable, shall be directly related to the systems being supplied.
2. The supplier shall provide detailed manuals to supplement the training courses. The manuals shall include specific details of equipment supplied and operations specific to the project.
3. The supplier shall make use of teaching aids, manuals, slide/ video presentations, etc as necessary to provide a complete and valuable training experience. After the training services, such materials shall be delivered to City.
4. The training program shall represent a comprehensive program covering all aspects of the operation, maintenance, calibration and cleaning procedures for the system.
5. All training schedules shall be coordinated with, and at the convenience of the City. Shift training may be required to correspond to the City's working schedule.
6. Training shall be performed by qualified representatives of the Instrumentation Control and Monitoring System Integrator. Training shall be specifically tailored to this project and reflect the control system installation and configuration. All training shall be conducted at the job site, unless an alternate location is approved by the City. Training shall be for a minimum of 2 full days and may require multiple classes to accommodate different shifts of operations personnel. Submit training materials and resumes of the training personnel to the City a minimum of two weeks prior to the training session(s) for City approval.

3.02 SUPPLEMENTS

A. Supplements listed below; following "END OF SECTION" is part of this Specification.

1. Instrumentation Calibration Sheet
2. Loop Status Report

END OF SECTION

07/2017

13300-27

91-0134.1
(By Hillers Engineering)

COMPONENT			MANUFACTURER:				PROJECT					
CODE: NAME:			MODEL: SERIAL:				NUMBER: NAME:					
UNITS	RANGE	VALUE	<input type="checkbox"/> COMPUTE				<input type="checkbox"/> CONTROL					
<input type="checkbox"/> INDICATE/ RECORD	CHART	_____	FUNCTIONS				ACTION (DIRECT/ REVERSE) MODES (P/ I/ D)					
	SCALE	_____					<input type="checkbox"/> SWITCH					
<input type="checkbox"/> TRANS/ CONVERT	INPUT	_____					UNIT RANGE (VALUE/ UNITS)					
	OUTPUT	_____					DIFFERENTIAL (FIXED/ ADJUSTABLE) RESET (AUTOMATIC/ MANUAL)					
ANALOG							DISCRETE					
REQUIRED			AS CALIBRATED				REQUIRED			AS CALIBRATED		REMARKS CODE
IN	SCALE	OUT	SCALE	OUT	SCALE	OUT	NUMBER	TRIP PT	RESET PT	TRIP PT	RESET PT	
C. MODE SETTINGS: P			I	D								
										COMPONENT CALIBRATED AND READY FOR START-UP BY DATE		
										TAG NO.		

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SECTION 13315

CONTROL PANELS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This Specification Section defines general requirements applicable to all control panels and enclosures furnished under the Contract. Additional requirements are defined in other Specification Sections as defined in paragraph 1.02.
- B. The control panels shall be furnished by the same SYSTEM SUPPLIER furnishing services and equipment as outlined in Section 13300 – CONTROL SYSTEM GENERAL REQUIREMENTS.
- C. The SYSTEM SUPPLIER shall furnish all labor, materials, equipment, services, and incidentals required to install and place into operation all control panels shown on the Contract Drawings and as specified herein.
- D. Size free-standing control panel(s) as necessary to contain all equipment associated with the Work, including future equipment, and to adequately dissipate heat generated by equipment mounted in or on the panel. It shall not be necessary to provide additional panels to accommodate future system expansion.
- E. Smaller surface-mount panels shall be sized to adequately dissipate heat generated by equipment, with ventilation components mounted inside or on the panel front face.
- F. The SYSTEM SUPPLIER shall design, furnish and install all interior wiring within the control panels and furnish complete wiring diagrams showing the electrical circuits inside the panel and interconnections between the panel and external instruments and components.

1.02 RELATED WORK

- A. Control Panels are further defined, and furnished under, the following Specification Sections:
 - 1. Specification Section 16001 – GENERAL ELECTRICAL REQUIREMENTS defines additional requirements.
 - 2. ALL field instruments are to be mounted on the control panels as shown in the Contract Drawings.

1.03 SUBMITTALS

- A. Submit the following control panel shop drawings in a single package:
 - 1. Layout diagrams. Include panel elevations (front, side, interior), and sizing. Panel front elevations shall be of sufficient scale to allow all engraved nameplates and inscriptions to be legible without the use of schedules.
 - 2. Wiring Diagrams. Diagrams shall be complete electrical wiring diagrams showing all components and auxiliary devices such as relays, alarms, fuses, lights, fans, heaters, etc. All wires and terminals shall be numbered on the

01/2017

13315-1

91-0134.1

diagrams, and line cross-references shall be labeled. Include on these drawings a tag number to identify each component, referenced to a component identification list.

3. Power requirements and heat dissipation summary for all control panels. Power requirements shall state required voltages, currents, and phase(s). Heat dissipations shall be maximums and shall be given in Btu/hr. Summary shall be supplemented with calculations.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Equipment to be installed in a hazardous area shall meet Class, Group, and Division classification as shown on the Contract Electrical Drawings, or comply with the local or National Electrical Code, whichever is the most stringent requirement.
- B. Electronic equipment shall utilize printed circuitry, suitably coated to prevent contamination by dust, moisture, and fungus. Solid-state components shall be conservatively rated for their purpose, to assure optimum long-term performance and dependability over ambient atmosphere fluctuations and 0 to 100 percent relative humidity. The field mounted equipment and system components shall be designed for installation in dusty, humid, and slightly corrosive service conditions.
- C. All equipment shall be designed to operate on a 60 Hz alternating current power source, at a normal 120 volts, +/- 10 percent, except where noted. All regulators and power supplies required for compliance with the above shall be provided between the power supply and the interconnected instrument loop. Where equipment requires voltage regulation, constant voltage transformers shall be supplied.
- D. All equipment, cabinets and devices furnished hereunder shall be heavy-duty type, designed for continuous industrial service. The system shall contain products of a single MANUFACTURER, insofar as possible, and shall consist of equipment models which are currently in production.
- E. All switches shall have double-pole, double-throw contacts, rated at a minimum of 600 volts-amperes (VA), unless noted otherwise.
- F. All equipment shall be designed and constructed so that in the event of a power interruption, the equipment shall resume normal operation without manual resetting when power is restored.

2.02 LIGHTNING/ SURGE PROTECTION

- A. Surge suppressors and arrestors meeting the requirements of ANSI Standard C-62.41 (latest revision) shall be provided on all wiring entering all panels and enclosures.
- B. DC signals. Lightning and surge protection shall be provided on all 4-20 mA signal wires. The protectors shall meet the following criteria:
 1. 35 mm DIN rail mounted
 2. Response time: less than five nanoseconds
 3. Automatic reset
 4. Operating signal voltage: up to 30 VDC

01/2017

13315-2

91-0134.1

5. Operating signal current: up to 150 mA
6. Capable of withstanding 1,200 Amps at IEEE/ ANSI C-62.41 8 x 20 microseconds combination wave
7. Capable of withstanding 100 Amps at IEEE/ ANSI C-62.41 10 x 1 milliseconds long wave
8. Nominal series resistance of 5 ohms each leg
9. Manufacturer and Model:
 - a) EDCO DRS-036, or ENGINEER approved equal.

C. Discrete Signals

1. All discrete outputs regardless of their destination shall be equipped with interposing relays each fitted with a snubber circuit across the coil.

D. Single phase AC Power (to 15 Amps). Lightning and surge protectors for AC power supply lines up to 15 Amps service shall meet the following criteria:

1. Serial protection with replaceable fuse
2. Failure indicator
3. Response time of less than five nanoseconds
4. Capable of withstanding up to 10,000 Amps at IEEE/ ANSI C-62.41 8 x 20 microseconds combination wave
5. Manufacturer and Model:
 - a) EDCO HSP121BT, or approved equal

E. Single phase AC Power (over 15Amps). Lightning and surge protectors for AC power supply lines over 15 Amps service shall meet the following criteria:

1. Parallel protection using MOVs and thermal fusing technology
2. Failure indicator
3. Response time of less than five nanoseconds
4. Capable of withstanding up to 6,500 Amps at IEEE/ ANSI C-62.41 8 x 20 microseconds combination wave
5. Manufacturer and Model
 - a) EDCO FAS-120AC, or approved equal

2.03 CONTROL PANELS AND ENCLOSURES

A. Enclosure Rating

1. Outdoor enclosures shall be rated NEMA 4X, and manufactured from 304 SS.
2. Outdoor enclosures shall be furnished with stainless steel sun shields on all sides except the front panel, and shall be affixed in such a manner as to not compromise the NEMA 4X rating.
3. Indoor enclosures shall be rated NEMA 4 or 4X. If NEMA 4 is selected, then a suitable coating system shall be specified for the area intended, and as further defined in Section 09990 – Protective Coatings.

B. Finish

1. All front panel openings for panel-mounted equipment shall be cut with counter-boring and provided with trim strips as required to give a neat finished appearance.

01/2017

13315-3

91-0134.1

2. With the exception of stainless steel panels, all steel panel surfaces shall be treated with phosphatized treatment inside and out, and then finished on the exterior with two coats of baked enamel of the approved color. Interiors of panels shall be white, ANSI No. 51.
 3. Stainless steel panels shall be No. 7 polished, 316 stainless steel.
- C. Doors
1. All control panels shall have a continuous piano hinge door. A minimum of 80% of the panel interior shall be exposed by doors.
 2. Panel door openings shall be NEMA 4X rated and shall be sealed and fully gasketed.
 3. The inside of each door shall be equipped with a drawing pocket.
 4. Two-door enclosures shall have a removable center post.
 5. Sealed panel doors shall be equipped with quick-release latches.
 6. NEMA 1 rated panel doors shall be equipped with a three-point latching mechanism.
 7. Where noted, doors shall be equipped with a fully gasketed glass window for viewing internally mounted devices without opening the door.
- D. All components and terminals shall be accessible without removing other components, except for covers.
- E. Surface mounted panels shall have conduit entry from the bottom only. Freestanding, NEMA 1 panels shall have an open area in the bottom for conduit entry.
- F. All panels shall be provided with an isolated copper grounding bus to ground all signal and shield connections.
- G. Free standing control panels shall each be equipped with an internal 40-watt fluorescent light and one 120 VAC, 15 amp, duplex utility receptacle.
- H. Nameplates
1. All front-face panel mounted controls shall be equipped with screw mounted laminated plastic nameplates to completely define their use. The use of adhesive to mount front panel nameplates will not be acceptable.
 2. All internal components shall be equipped with identification tags, using PID identifiers where applicable.
 3. All wiring shall be labeled.
- I. Electrical
1. Provide a main circuit breaker and branch circuit breaker(s) for each branch circuit as required to distribute power from the main power feed.
 2. All breakers shall be accessible when the panel door is open.
 3. No more than 20 devices on any single circuit.
 4. No more than 12 amps for any branch circuit.
 5. Panel (or site) lighting, receptacles, heaters, controls, telemetry and fans on separate branch circuits.

01/2017

13315-4

91-0134.1

J. Wiring

1. Power wiring shall be 300 volt, type THWN stranded copper, No. 14 AWG size, for 120 VAC service.
2. Discrete wiring shall be 300 volt type THWN stranded copper, sized for the current carried, no smaller than No. 16 AWG.
3. Analog signal wiring shall be 300 volt, stranded copper in twisted shield pairs, no smaller than No. 16 AWG.
4. Panel wiring shall be routed through wire troughs or Panduits.
5. Hinge wiring shall be secured at each end, with the bend portion protected by a plastic sleeve.
6. Analog or DC wiring shall be separated from any AC power or control wiring by at least six inches.
7. Each wire shall be uniquely identified using plastic, snap-on numbered tags.
8. Terminal blocks shall be provided for all field wiring entering the panel. The greater of 4 or 15% spare terminal blocks shall be provided.
9. No more than one wire per screw and yoke termination.

K. Construction

1. Minimum metal thickness: 14-gauge.
2. Stiffeners as required to prevent deflection under instrument loading and permit lifting without racking or distortion.
3. Use removable lifting rings where required, and fill plugs to replace rings after installation.

L. Miscellaneous Equipment

1. All panels shall be protected from internal corrosion by the use of corrosion-inhibiting vapor capsules by Northern Instruments (Model Zerust VC), Hoffman (Model A-HCI), or ENGINEER approved equal.
2. All sealed panels shall be equipped with combination drain/breathers, Crouse-Hinds Model ECD18; or ENGINEER approved equal.

- M. All enclosures shall be manufactured items by Hoffman Engineering, or ENGINEER approved equal.

2.04 PANEL MOUNTED DEVICES

A. Selector Switch

1. Heavy-duty, oil-tight, industrial type selector switches rated for NEMA 4 service.
2. Contacts rated for 120 VAC service at 10 amperes, continuous.
3. Number of positions and contact arrangements as required.
4. Factory-engraved legend plate indicating position definition.
5. Accommodating a panel thickness between 1/16 to 1/4 Inch.
6. Black knob type operator.
7. Square D Class 9001, Type K; Allen-Bradley type 800T, or ENGINEER

01/2017

13315-5

91-0134.1

approved equal.

B. Pushbutton

1. Heavy-duty, oil-tight, industrial type push buttons rated for NEMA 4 service.
2. Contacts rated for 120 VAC service at 10 amperes continuous.
3. Number of positions and contact arrangements as required.
4. Factory-engraved legend plate indicating function.
5. Accommodating a panel thickness between 1/16 to 1/4 inch.
6. Operator: Red extended head for STOP, green flush head for START, black flush head for other functions.
7. Square D Class 9001, Type K; Allen-Bradley type 800T, or ENGINEER approved equal.

C. Process Indicator

1. Signal loop powered.
2. 3 ½ digit with selectable decimal point.
3. 0.4 inch digit LCD
4. Factory supplied nameplate legend in process units
5. Separate span and zero adjustment
6. NEMA 4X enclosure
7. Dynalco LMD-120D, or ENGINEER approved equal.

D. Indicating Light

1. Heavy-duty, oil-tight, push-to-test industrial type with integral transformer for 120 VAC application.
2. Rated for NEMA 4 service.
3. Screwed on flat-faced lenses in colors shown on the drawings.
4. Factory-engraved legend plates.
5. Square D type K, Allen-Bradley Type 800T, or ENGINEER approved equal.

E. Control/ Interposing Relays

1. Compact, general-purpose, plug-in type.
2. Socket mounted.
3. Contacts rated for not less than 10 amperes at 120 VAC.
4. Equipped with neon status lights and test buttons.
5. Permanent, legible identification.
6. Potter & Brumfield series KRPA, or ENGINEER approved equal.

F. Time Delay Relay

1. Available functions: On delay, Off delay, or one shot.
2. Socket mounted.
3. Knob adjustment.
4. Contacts rated for not less than 10 amperes at 12 VAC.
5. Timing range as appropriate for the application.
6. Magnecraft series W211, or ENGINEER approved equal.

G. Terminal Blocks

1. Screw terminals capable of accepting 10-26 AWG wire.
2. Fused disconnect style.
3. DIN-rail mounting.

01/2017

13315-6

91-0134.1

4. Connectors shall be either copper or steel. Use of aluminum connectors shall not be permitted without prior approval of the Engineer.
5. Phoenix Contact UT4 HES1, or ENGINEER approved equal.

H. Process Indicator/ Retransmitter

1. 120 VAC/ 60 Hz powered.
2. 4 digit with selectable decimal point.
3. 0.6 inch digit LED with three colors, and programmable, based on process value
4. Separate span and offset adjustment to scale input.
5. Isolated 4-20 mA retransmission output
6. Dual programmable SPDT contact outputs rated for 3A at 250 VAC
7. RS-232, RS-485 Serial Communications Options
8. NEMA 4X, IP65 Front
9. Precision Digital PD765, or ENGINEER approved equal

2.05 SPARES AND EXPENDABLES

A. Provide the following spare parts

1. Five percent (rounded up) spare relays of each type provided.
2. Five percent (rounded up) spare surge suppressors of each type provided
3. Five percent (rounded up) spare panel mounted device of each type used

B. Provide the following expendables

1. Two year supply of corrosion inhibitor capsules
2. Ten percent (rounded up) spare fuses of each type and rating supplied
3. Ten percent (rounded up) spare indicator light bulbs of each type and color supplied

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Control panels shall be provided to the electrical subcontractor for installation and connection of field and power wiring.
- B. All free-standing control panels shall be installed on a minimum of 3 inches high concrete housekeeping pad.
- C. Verify the correct installation of all panels supplied under this Specification Section.

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01/2017

13315-7

91-0134.1

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01/2017

13315-8

91-0134.1

SECTION 15010

TESTING PIPING SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Perform pressure testing of water mains and sewage force mains using Contractor's qualified personnel, or employ and pay for a qualified organization to perform specified services.

1.02 RELATED SECTIONS

- A. Section 15062 – Ductile Iron Pipe and Fittings
- B. Section 15064 – General Purpose PVC Pipe and Fittings
- C. Other Sections as applicable.

1.01 REFERENCES

- A. AWWA C600 – Installation of Ductile-Iron Mains and their Appurtenances
- B. AWWA C605 – Underground Installation of PVC and Molecularly Oriented PVCO Pressure Pipe and Fittings
- C. Other Sections as Applicable.

1.02 DESCRIPTION

- A. Perform testing of piping systems in accordance with the latest edition of the AWWA REFERENCES and as specified above.
- B. Provide instrument required for testing of piping systems.
 - 1. Make instruments available to Engineer to facilitate spot checks during testing.
 - 2. Retain possession of instruments; remove from site at completion of services.
- C. Provide all water required for flushing and testing. The Contractor shall obtain a construction meter from the City at current rates and pay for meter rental and all water used.
- D. Provide all necessary pumping equipment and other equipment, materials and facilities required for proper completion of the flushing and testing specified.
- E. Source and quality of water, procedure and test equipment shall be acceptable to the Engineer. Length of tested line shall not exceed 2,000 feet.

01/2017

15010-1

91-0134.1

- F. All tests shall be made in the presence of the Engineer. Notify Engineer at least 48 hours before any Work is to be inspected or tested.
- G. If inspection or test shows defects, the piping system(s) shall be repaired or replaced and inspection repeated, until such piping is acceptable to the Engineer.
- H. All pipe, fittings, valves and joints shall be carefully examined during test. Leaky joints shall be tightened by remaking the joint.
- I. Sections of the system may be tested separately. It shall be distinctly understood that any defect which may subsequently develop in section already tested and accepted shall promptly be corrected and that section retested.
- J. Disposal of the water used for testing shall be subject to the approval of the Engineer.

1.03 QUALITY ASSURANCE

- A. The organization which performs the testing shall, prior to testing, provide their qualifications and demonstrate their ability to perform the services to the satisfaction of the Engineer.

1.04 SUBMITTALS

- A. Preliminary
 - 1. Submit three copies of documentation to confirm compliance with Quality Assurance provisions:
 - a. Organization supervisor and personnel training and qualifications.
 - b. Specimen copy of each of the report forms proposed for use.
- B. At least fifteen days prior to Contractor's request for final inspection, submit three copies of final reports on applicable reporting forms, for review.
 - 1. Each individual final reporting form must bear the signature of the person who recorded data and that of the supervisor of the reporting organization.
 - 2. Identify instruments of all types which were used and last date of calibration of each.

1.05 JOB CONDITIONS

- A. Prior to start of testing of piping systems, verify that required "Job Conditions" are met:
 - 1. System or system element installation is complete.
 - 2. All required materials, water, instruments, etc. are on hand.
 - 3. All other preparations are completed.

1.06 TESTING PROCEDURES

- A. Pressure Piping Systems

01/2017

15010-2

91-0134.1

1. Water, sewer, and drainage pressure piping shall pass a hydrostatic pressure test and a leakage test as defined below before acceptance. The pressure and leakage test shall be made after all jointing operations are completed and after backfilling is completed. All concrete reaction blocks, or other bracing and restraining facilities, shall be in place at least 14 days before the initial filling of the line.
2. The pressure and leakage tests may be applied to an individual section of line isolated between the existing line valves, or may be applied to shorter sections of line at the Contractor's option. If shorter sections are tested, test plugs or bulkheads as required at the ends of the test section shall be furnished and installed by the Contractor at his expense, together with all anchors, braces, and other devices required to withstand the hydrostatic pressure on such plug or plugs, without imposing any hydraulic thrust on the pipe line or any part thereof. The Contractor shall be solely responsible for any and all damage to the pipe line, and/or to any other facility, which may result from the failure of test plugs furnished by him or supports therefore, in any case.
3. Hydrostatic Tests:
 - a. The section of line to be tested shall be slowly filled with water and all air expelled from the pipe. Care shall be taken that all air valves are installed and open in the section being filled, and that the rate of filling does not exceed the venting capacity of the air valves.
 - b. Hydrostatic test pressure shall be as follows:

System	Test Pressure
Wastewater Force Main	150 psi
Potable Water Main	150psi
Other Pressure Pipe	1.5 times maximum operation pressure at the lowest elevation of the test section.

- c. After the pipe has been laid, all newly laid pipe of any valved section thereof shall be subjected to a hydrostatic pressure test.
 - 1) Test pressure shall:
 - i. Not exceed pipe or thrust-restraint design pressures.
 - ii. Be of at least 2-hour duration.
 - iii. Not vary by more than ± 5 psi (0.35 Bar) for the duration of the test.
 - iv. Not exceed twice the rated pressure of the valves or hydrants when the pressure boundary of the test section includes closed gate valves or hydrants.
NOTE: Valves shall not be operated in either direction at differential pressures exceeding the rated pressures.
 - v. Not exceed the rated pressure of the valves when the pressure boundary of the test section includes closed valves.

01/2017

15010-3

91-0134.1

- 2) Each valved section of pipe shall be filled with water slowly and the specified test pressure based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer. Valves shall not be operated in either the opening or closing direction at differential pressures above the rated pressure. The system shall be allowed to stabilize at the test pressure before conducting the leakage test.
- d. Examination. Any exposed pipe, fittings, valves, hydrants and joints shall be examined carefully during the test. Any damaged or defective pipe fittings, valves or hydrants that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory to the Engineer.
- 1) Leakage Test
- i. A leakage test shall be conducted concurrently with the pressure test. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or valved section thereof, to maintain pressure within 5 psi (0.35 Bar) of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. Leakage SHALL NOT BE MEASURED BY A DROP IN PRESSURE IN A TEST SECTION OVER A PERIOD OF TIME.
- ii. No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD * P^{1/2}}{148,000}$$

In which L is the allowable leakage, in gallons per hour; S is the length of pipe tested in feet; D is the nominal diameter of the pipe in inches; and P is the average test pressure during the leakage test in pounds per square inch.

- (a) To obtain leakage in liter/ hour, multiply the values in the table by 3.785.
- (b) When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal/ h/ in (0.0012 L/ h/ mm) of nominal valve size shall be allowed.
- (c) When hydrants are in the test section, the test shall be made against the closed hydrant.
- (d) Acceptance shall be determined on the basis of allowable leakage. If any test of pipe laid discloses leakage greater than that specified

- in Section “b” above, Contractor shall, at his own expense, locate and make repairs as necessary until the leakage is within the specified allowance.
- (e) All visible leaks are to be repaired regardless of the amount of leakage.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

- A. Prior to testing, pig and flush all piping systems with water to remove all debris in the system. Pigging of lines 12” and smaller is not required unless the line becomes contaminated.
- B. No separate payment for testing shall be made.

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01/2017

15010-5

91-0134.1

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01/2017

15010-6

91-0134.1

SECTION 15012

MISCELLANEOUS HOSES, TUBING, AND PIPING SPECIALTIES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. This section covers the work necessary to furnish and install, complete, miscellaneous hoses and piping specialties as described below.

1.02 GENERAL

- A. See GENERAL CONDITIONS OF THE CONTRACT and Division 1, GENERAL REQUIREMENTS, which contain information and requirements that apply to the work specified herein and are mandatory for this project.

1.03 LIKE ITEMS

- A. Like items of materials provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance, maintenance, and replacement.

1.04 SUBMITTALS

- A. Submittals shall be made in accordance with Section 01340.

PART 2 - PRODUCTS

2.01 WYE STRAINERS

- A. Wye strainers shall be iron body, Y-pattern, 200 psig WOG rating with screwed bronze or bolted iron cap. Screen shall be heavy gauge stainless steel, or monel, 30 mesh. Strainer shall be Crane, Mueller, or equal.

2.02 PVC WYE STRAINERS

- A. PVC wye strainer shall be sized as indicated on the Drawings. Strainer shall have the PVC removable cap, PVC mesh strainer with 40 percent, open area and shall be rated for 150 psi working pressure at 75 degrees F. Strainers shall be Simple Y-strainers as manufactured by Hayward Co. or equal.

2.03 PIGS FOR PIPE CLEANING

- A. All pigs shall be "bare aqua duraform" as manufactured by Girard Polly-Pig, Inc., Houston, TX; Style IIA as manufactured by Knapp, Inc., Houston, TX; or equal.

2.04 HOSES FOR HOSE BIBBS

01/2017

15012-1

91-0134.1

- A. Furnish a 50-foot length of rayon braid reinforced rubber water hose at each hose rack location indicated on the Drawings. Hose shall be rated 150 psi minimum working pressure at 100 degrees F. All hoses shall have heat, ozone, and wear-resistant synthetic outer cover. Hoses shall be provided with double-clamped male and female long shank brass fittings. Hose size shall match adjacent hose valve size shown on the Drawings. Hoses shall be Uniroyal P-340, Goodyear Contender Utility, or equal.

2.05 HOSE NOZZLES

- A. Furnish nozzles for each hose. Nozzle sizes shall match hose sizes and shall be straight stream type. Nozzles shall be 12 inches in length with a 1/2-inch orifice.
- B. Nozzles shall be cast brass and shall be as manufactured or supplied by SECO Manufacturing, Inc., Western Fire Equipment Co., Hancock-Gress Industrial Hose Nozzle, or equal.

2.06 QUICK CONNECT COUPLINGS (QCC)

- A. Type 1: Quick connect couplings shall be polypropylene with male NPT adapter, size as shown on the Drawings, OPW Model polypropylene, OPW Model 634B; or equal.
- B. Type 2: Quick connect couplings shall be Type 316 stainless steel, OPW Model 633F male adapter, size as shown on the Drawings, with OPW 634B cap; or equal.
- C. Type 3: Quick connect couplings shall be bronze male NPT adapter, size as shown on the Drawings, OPW, Model 633F Kamlock; or equal. Adapter caps shall be bronze, OPW, Model 634B; or equal.

2.07 TUBING

- A. Tubing shall be made of polyethylene and compatible with barbed, compression, and push-to-connect fittings. Tubing shall have an inside diameter (I.D.) of 3/16-inches and a minimum wall thickness of 1/16". The tubing hardness shall be firm with a durometer scale of 75-95A or 22-44D. The tubing shall have a maximum bend radius of 2 inches and a minimum temperature range of -40°F to 125°F.

PART 3 - EXECUTION

3.01 GENERAL

- A. Installation, handling and storage of the equipment specified herein shall be in strict accordance with the manufacturer's printed instructions.

3.02 HOSES

- A. All hose and tubing shall be cut, made up, and installed in strict accordance with the manufacturer's written recommendations, as approved and as further specified hereinunder.

01/2017

15012-2

91-0134.1

3.03 TESTING

- A. Prior to plant startup, all miscellaneous hoses, tubing and accessories shall be inspected for proper connection and satisfactory performance. Each item shall be tested at the same time that the adjacent pipeline is tested. Joints should show no visible leakage under test. Repair joints that show signs of leakage prior to final acceptance. If there are special parts of control systems or operators that might be damaged by the pipeline test, they shall be properly protected. The Contractor will be held responsible for any damage caused by the testing.

END OF SECTION

01/2017

15012-3

91-0134.1

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01/2017

15012-4

91-0134.1

SECTION 15062

DUCTILE IRON PIPE AND FITTINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Ductile iron pipe and fittings piping shall be installed in those locations and depths as shown on the Drawings.
- B. The equipment and materials specified herein is intended to be standard and ductile iron pipe and fittings used in transporting water and wastewater.

1.02 RELATED SECTIONS

- A. Section 01340 – Shop Drawings, Working Drawings and Samples
- B. Section 15010 – Testing Piping Systems
- C. Section 15100: Valves and Appurtenances
- D. Other Sections as Applicable.

1.03 REFERENCES

- A. ASTM A307 Grade B: Low-Carbon Steel Bolts for Flanged Pipe.
- B. ANSI/ AWWA C104/ A21.4: American National Standard for Cement-Mortar Lining for Ductile Iron and Gray Iron Pipe and Fittings for Water.
- C. ANSI/ AWWA C105/ A21.5: American National Standard for Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids.
- D. ANSI/ AWWA C110/ A21.10: American National Standard for ductile iron and gray iron fittings 3 inch through 48 inch for Water and Other Liquids.
- E. ANSI/ AWWA C110/ A21.10: American National Standard for ductile iron and gray iron fittings 3 inch through 48 inch for Water and Other Liquids.
- F. ANSI/ AWWA C150/ A21.50: American National Standard for Thickness Design of Ductile Iron Pipe.
- G. ANSI/ AWWA C151/ A21.51: American National Standard for Ductile Iron Pipe, Centrifugally Cast.
- H. ANSI/ AWWA C153/ A21.53: American National Standard for ductile iron compact and gray iron fittings 3 inch through 16 inch for Water and Other Liquids.
- I. ANSI/ AWWA C600: American Water Works Association Standard for Installation of Ductile Iron Water Mains and Their Appurtenances.

01/2017

15062-1

91-0134.1

- J. ASME/ ANSI B16.1: Cast Iron Pipe Flanges and Flanged Fittings, Class 125.
- K. ASME/ ANSI B16.5: Pipe Flanges and Flanged Fittings, Class 150 (Flat Face Flange).
- L. ASME/ ANSI B16.42: Ductile Iron Pipe flanges and Flanged Fittings, Class 150 (Flat Face Flange).
- M. Ductile Iron Pipe Research Association: Thrust Restraint Design for Ductile Iron Pipe.

1.04 SUBMITTALS

- A. Submit a list of materials to be furnished, with the names of the suppliers and the date of delivery.
- B. Submit sworn certificates of foundry material and strength tests, and their results. In addition, all ductile iron pipe and fittings may be inspected at the foundry for compliance with the Specifications by an independent testing laboratory selected by the Owners. The manufacturer's cooperation shall be required in these inspections. The cost of foundry inspections requested by the Owner will be borne by the Contractor.
- C. Waiving of the inspection privileges shall not relieve the Contractor or manufacturer of the responsibility of furnishing pipe and fittings meeting the Specification.
- D. Shop Drawings shall be submitted in accordance with Section 01340 and shall include dimensioning, methods and location of supports and all other pertinent technical specifications for all pipe and fittings to be furnished. Shop drawings shall be prepared by the pipe and fittings manufacturer.
- E. Manufacturer shall furnish a laying schedule providing a location, type and size of all pipe joints.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Ductile iron pipe and fittings shall be furnished by manufacturers who are fully experienced, reputable, and qualified in the manufacture of the materials. The pipe and fittings shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with the Specifications in all respects. Acceptable manufacturers include:
 - 1. American Cast Iron Pipe Company
 - 2. Atlantic States Cast Iron Pipe Company
 - 3. Clow Water Systems Company
 - 4. Griffin Pipe Products Company
 - 5. McWane Cast Iron Pipe Company

01/2017

15062-2

91-0134.1

6. Pacific States Cast Iron Pipe Company
7. United States Pipe and Foundry Company

2.02 COMPRESSION JOINT PIPE AND FITTINGS

- A. Pipe shall conform to ANSI/ AWWA C151/ A21.51 and C150/ A21.50.
- B. Fittings shall conform to ANSI/ AWWA C110/ A21.10 & C153/ A21.53.
- C. Rubber gaskets shall conform to ANSI/ AWWA C111/ A21.11.
- D. Thickness shall be minimum pressure Class 350 through 12" and pressure Class 300 in sizes 14" and larger.
- E. Install compression joint pipe below ground. Provide sufficient quantities of lubricant and gaskets.

2.03 MECHANICAL JOINT PIPE AND FITTINGS

- A. Pipe shall conform to ANSI/ AWWA A21.50/ C151 and C150/ A21.50.
- B. Fittings shall conform to ANSI/ AWWA C110/ A21.10 & C153/ A21.53.
- C. Thickness shall be minimum pressure Class 350 through 12" and pressure Class 300 in sizes 14" and larger.
- D. Rubber gaskets shall conform to ANSI/ AWWA C111/ A21.11.
- E. Bolts for mechanical joint pipe shall be tee-head design. Nuts and bolts shall be high-strength low alloy steel.
- F. Mechanical joint pipe shall be installed below ground.
- G. Furnish with sufficient supply of accessories, ie, gaskets, bolts, and glands, as required for each joint.

2.04 FLANGED JOINT PIPE AND FITTINGS

- A. Pipe and fittings shall conform to ANSI/ AWWA C115/ A21.15.
- B. Thickness shall be minimum pressure Class 350 through 12" and pressure Class 300 in sizes 14" and larger.
- C. Flanges and flanged fittings shall be flat face conforming to ANSI/ AWWA C110/ A21.10. Full face 1/8 inch thick gaskets shall conform to ANSI/ AWWA C110/ A21.10.
- D. Flanges shall be ductile iron. Cast iron flanges will not be allowed.
- E. Flanged ductile iron pipe shall have factory applied screwed long hub flanges. Flanges shall be faced and drilled after being screwed on the pipe, with flanges true to 90 degrees with the pipe axis and shall be flush with end of pipe conforming to

01/2017

15062-3

91-0134.1

ANSI B16.1 Class 125.

- F. Bolts for flange pipe shall be low-carbon steel conforming to ASTM A307 Grade B.
- G. Flanged joints shall be used for above ground piping and exposed piping in vaults and in indoor pipe galleries.

2.05 GROOVED END PIPE AND FITTINGS

- A. Grooved end pipe and fittings shall be acceptable for above-ground installation.
- B. Pipe shall conform to ANSI/ AWWA C606.
- C. Grooved end pipe shall be minimum thickness to conform to former Class 53.
- D. Grooved end joints shall be flexible type, radius cut grooved, conforming to AWWA C606.
- E. Grooved end fittings shall be ANSI B16.1, radius cut grooved, rigid joint, as manufactured by Victaulic Company, Gustin-Bacon, or approved equal.
- F. Grooved end pipe adapter flanges shall be ductile iron, ASTM A536, Victaulic, Gustin-Bacon, or approved equal.
- G. Bolts shall be manufactured standard.
- H. Gaskets for grooved end joints shall be manufacturer's flush-seal type specifically designed for cast surfaces. Properties shall be as designated in ASTM D 2000. Dimensions shall conform to AWWA C606. Lubricant shall be manufacturer's standard.
- I. Install in accordance with manufacturer's printed instructions. Dress cut ends of pipe for couplings and adapters as recommended.

2.06 LININGS AND COATINGS

- A. Pipe and fittings for water/wastewater service shall be double thickness cement mortar lining in accordance with ANSI/ AWWA C104/ A21.4. Cement lining shall be Type 2 Portland Cement, a sulfate resistant cement.
- B. An interior bituminous coating shall not be required; however, coated pipe will not be rejected. The Owner will not, however, pay for the additional interior coating costs.
- C. Below ground pipe and fittings shall receive a manufacturer's standard bituminous coating per AWWA C151 for ductile iron pipe, AWWA C115 for flange pipe and AWWA C110 for fittings.
- D. Pipe and fittings exposed to view in the finished work shall not receive the standard bituminous or asphalt coat on the outside surfaces, but shall be shop primed on the outside with one coat of a rust inhibitive primer. Should portions of the pipe inadvertently be given the outside coating of coal tar enamel instead of the rust

01/2017

15062-4

91-0134.1

inhibitive primer as required for exposed piping, the surfaces shall be sealed with a non-bleeding sealer coat. Sealer shall be a part of the work of this Section.

- E. Pipe and fitting installations in corrosive earth between the limits shown on the drawings or as required by the Engineer shall be fully encased in an 8 mil polyethylene sleeve in accordance with ANSI A21.5 Method "A".

2.07 SPECIAL PIPE AND FITTING

- A. Long span flange pipe shall be minimum pressure Class 350. Gaskets shall be Toruseal type with O-ring or equal.
- B. Wall castings shall be of the size and types shown on the Drawings and bituminous coated.
- C. Flexible joint (ball joint or river crossing) type pipe shall comply with ANSI/ AWWA C151/ A21.51 and ANSI/ AWWA C110/ A21.10. Pipe shall provide a variable deflection of up to 15 degrees. The spherical threaded socket shall be manufactured in conformance with AWWA C110 and ANSI B2.1.

2.08 RESTRAINED JOINTS

- A. The location and number of restrained joints are shown on the drawings and details.
- B. Joints shall be the standard design of the pipe and fitting manufacturer and shall provide a 2:1 safety factor.
- C. Restrained joints shall be designed for a pressure class rating of 350 psi in sizes 4 inch through 12 inch and 300 psi for 14 inch through 64 inch unless shown otherwise on the drawings.
- D. Bolts and nuts for restrained joints shall be low alloy, high strength steel.
- E. Restrained joints are to meet the applicable requirements of ANSI/ AWWA C110/ A21.10 and shall be manufacturer's standard, Mega lug by EBAA Iron Inc. or approved equal.

PART 3 - EXECUTION

3.01 HANDLING PIPE AND FITTINGS

- A. Care shall be taken in loading, transporting and unloading to prevent injury to the pipe or coatings. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying. No piece shall be installed which is found to be defective. Any damage to the pipe coatings shall be required as directed by the Engineer.
- B. All pipe and fittings shall be subjected to a careful inspection prior to being laid or installed.
- C. If any defective pipe is discovered after it has been laid, it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional expense to the

01/2017

15062-5

91-0134.1

Owner. All pipe and fittings shall be thoroughly cleaned before laying, shall be kept clean until they are used in the work, and when installed or until they are used in the work, and when installed or laid, shall conform to the lines and grades required.

3.02 LAYING PIPE AND FITTINGS

- A. Ductile iron pipe and fittings shall be installed in accordance with requirements of ANSI/ AWWA C600 except as otherwise provided herein.
- B. All pipe shall be sound and clean before laying. When laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by watertight plugs or other approved means.
- C. Suitable excavations shall be made in the trench bottom to receive pipe with raised bells.
- D. As soon as the excavation is completed to the normal grade of the bottom of the trench, immediately place screen gravel or crushed stone (where applicable) bedding in the trench, and then the pipe shall be firmly bedded in this material to conform accurately to the line and grade indicated on the Drawings. Blocking under the pipe will not be permitted. Bedding shall conform with Type 2 condition unless otherwise specified.
- E. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be used with a "Tyton" type bell shall be beveled to conform to the manufactured spigot end. The lining shall remain undamaged.

3.03 JOINTS

- A. Push-on joints shall be made in strict accordance with the manufacturer's instructions. Pipe shall be laid with bell ends looking ahead. A rubber gasket shall be inserted in the groove of the bell end of the pipe, and the joint surfaces cleaned and lubricated. The plain end of the pipe is to be aligned with the bell of the pipe to which it is to be joined, and pushed home with a jack or by other means. After joining the pipe, a metal feeler shall be used to make certain that the rubber gasket is correctly located.
- B. Mechanical joints at valves, fittings, and where designated on the Drawings and as specified, shall be in accordance with the "Notes on Method of Installation" under ANSI A21.11 and the instructions of the manufacturer. To assemble the joints in the field, thoroughly clean the joint surfaces and rubber gasket with soapy water before tightening bolts. Bolts shall be tight to the specified torques. Under no condition shall extension wrenches, pipe over handle or ordinary ratchet wrenches be used to secure greater leverage.
- C. Ball joints, where designated on the drawings and as specified, shall be installed in strict accordance with the manufacturer's instructions. Where ball joint assemblies occur at the face of structures or tanks, the socket end shall be at the structure or tank and the ball end assembled to the socket.
- D. Flanged joints shall be in accordance with ANSI A21.15 including its Appendix "A"

01/2017

15062-6

91-0134.1

and the instructions of the manufacturer. Flanged joints shall be fitted so that the contact faces bear uniformly on the gasket and then are made up with relatively uniform bolt stress.

- E. All valves, hydrants, fittings and other appurtenances needed upon the pipe lines shall be set and jointed as indicated on the Drawings or as required by the manufacturer.
- F. Unless otherwise noted, underground piping shall be push-on joint or mechanical joint with restraints as needed and above ground or exposed piping shall be flanged.
- G. Deflected bell pipe shown on the Drawings is shown only to assistance in illustrating a preferred means of installation in specific locations, and is not intended to indicate all deflected bell pipe necessary to effect the installation as shown in plan and profile views. The cost of all such deflections shall be included within the bid price for furnishing and installing the pipe.
- H. When it is necessary to deflect pipe from a straight line in either the vertical or horizontal plane, or where long radius curves are permitted, the amount of deflection shall not exceed 50% of the maximum deflection allowed by manufacturer.

3.04 RESTRAINED JOINTS

- A. Section of piping designated on the Drawings as having restrained joints or those requiring restrained joints shall be constructed using mechanical or compression joint pipe and fittings with restraining devices.
- B. Restrained pipe joints that achieve restraint by incorporating cut out sections in the wall of the pipe shall have a minimum wall thickness at the point of cut out that corresponds with the minimum specified wall thickness for the rest of the pipe.
- C. The minimum number of restrained joints required for resisting forces at fittings and changes in direction of pipe shall be determined from the length of restrained pipe on each side of fittings and changes in direction necessary to develop adequate resisting friction with the soil. This shall be determined in accordance with the requirements of the Ductile Iron Pipe Research Association: Thrust Restraint Design for Ductile Iron Pipe.

3.05 PIPE THRUST BLOCKS

- A. Concrete thrust blocks are not an acceptable alternative to restrained joints. Concrete thrust blocks may only be used on a case-by-case basis as approved by the Engineer.

3.06 CLEANING AND FLUSHING

- A. The pipe shall be thoroughly cleaned of all foreign matter before installation. It is the Contractor's responsibility to insure cleanliness of the pipe during installation and backfilling. At the conclusion of the work, the Contractor shall thoroughly clean the entire pipe by flushing with water or other materials which may have entered during the construction period. Debris cleaned from the lines shall be removed

01/2017

15062-7

91-0134.1

from the lowest outlet. If, after this cleaning, obstructions remain, they shall be removed. After the pipe is cleaned, the Engineer will examine the pipe for leaks. If defective pipes or joints are discovered at this time, they shall be repaired by the Contractor.

- B. The method required for use is the passage of a sufficient number of "pigs" through the pipeline to effect the cleaning of the system.
- C. Passage of the cleaning "pigs" through the system shall be constantly monitored, controlled. Pigs entered into the system shall be individually parked and identified so that their exiting from the system can be confirmed.
- D. The Contractor must demonstrate to the satisfaction of the proper authority(s) that this work will be performed by experienced and knowledgeable supervision and personnel who have properly, safely and effectively provided for the cleaning of comparable systems in other applications. These personnel will be required to provide acceptable procedures prior to the work being initiated, that will clearly illustrate they are capable and have the means on hand to resolve potential or real problems that may occur with the cleaning pigs in the system. The Contractor shall provide evidence of qualification by providing copies of his/ her state certification or license to perform such work as herein describe. Such documentation shall be included as part of the submittal process.
- E. Report Completion: The Contractor shall provide a written report upon completion of line cleaning to outline and detail information acquired during the cleaning process about the system or to confirm existing information.
- F. Cost of pigging the pipelines shall be included in the unit price for furnishing and installing the pipe and fittings. No additional cost for pigging will be allowed.

3.07 PRESSURE & LEAKAGE TESTS

- A. Hydrostatic pressure and leakage test shall conform to AWWA C600, with the exception that the Contractor shall furnish all gauges, meters, pressure pumps and other equipment needed to test the line.
- B. The pressure required for the field hydrostatic pressure test shall be minimum 150 psi. The Contractor shall provide temporary plugs and blocking necessary to maintain the required test pressure. Corporation cocks at least 3/4 inches in diameter, pipe riser and angle globe valves shall be provided at each pipe dead-end in order to bleed air from the line. Duration of pressure test shall be at least two (2) hours. The cost of these items shall be included as a part of testing and is included in the cost to furnish and install pipe and fittings.
- C. The leakage test shall be a concurrent test, at the maximum operating pressure as determined by the Engineer, with the pressure test and shall be not less than two hours in duration. All leaks evident at the surface shall be repaired and leakage eliminated regardless of total leakage as shown by test. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are compiled with. Defective materials, pipes, valves and accessories shall be removed and replaced. The pipe lines shall be tested in such sections as may be directed by

01/2017

15062-8

91-0134.1

the Engineer by shutting valves or installing temporary plugs as required. The pipe shall be filled with water, all air removed and the test pressure maintained in the pipe for the entire test period by means of a force pump to be furnished by the Contractor. Accurate means shall be provided for measuring the water required at this pressure. The amount of water required is a measure of the leakage.

- D. The amount of leakage which will be permitted shall be in accordance with AWWA C600 for all pressure lines.
- E. The Contractor must submit his plan for testing to the Engineer for review at least ten (10) days before starting the test. The Contractor shall remove and adequately dispose of all blocking material and equipment after completion and acceptance of the field hydrostatic test, unless otherwise directed by the Engineer. Any damage to the pipe coating shall be repaired by the Contractor. Lines shall be totally free and clean prior to final acceptance.

3.08 DISINFECTING

- A. Before being placed in service, all potable water pipelines shall be chlorinated in accordance with AWWA C651, "Standard Procedure for Disinfecting Water Mains." The procedure shall be approved by the Engineer. The location of the chlorination and sampling points will be determined by the Engineer in the field. Taps for chlorination and sampling shall be uncovered and backfilled by the Contractor as required.
- B. The general procedure for chlorination shall be first to flush all dirty or discolored water from the lines, and then introduce chlorine in approved dosages through a tap at one end, while water is being withdrawn at the other end of the line. The chlorine solution shall remain in the pipeline for at least 24 hours.
- C. Following the chlorination period, all treated water shall be flushed from the lines at their extremities and replaced with water from the distribution system. Bacteriological sampling and analysis of the replacement water shall then be made by the Engineer in full accordance with AWWA C651. The Contractor will be required to re-chlorinate, if necessary. The line shall not be placed in service until the requirements of the State and County Public Health Department are met.
- D. Special disinfecting procedures shall be used in connections to existing mains, and where the method outlined above is not practical.
- E. The Contractor shall make all arrangements necessary with the County Health Department for the collection and examination of samples of water from disinfected water mains. These samples shall be examined for compliance with Department of Health and Rehabilitative Services requirements. Sampling shall be made daily and continuously until two successive examinations are found satisfactory. If unsatisfactory, the line shall be flushed and disinfected again. The cost of sampling, flushing and disinfecting shall be included in the contract price and no additional charge shall be made to the Owner for this work.

END OF SECTION

01/2017

15062-9

91-0134.1

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01/2017

15062-10

91-0134.1

SECTION 15064

GENERAL PURPOSE POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, and incidentals required to install PVC pipe made in schedule 40 or 80 sizes and pressure rated for water, fittings and appurtenances as specified herein.

1.02 RELATED WORK

- A. Section 15100: Valves and Appurtenances

1.03 DESCRIPTION OF SYSTEM

- A. Plastic piping shall be installed in the locations as indicated in the Drawings.

1.04 QUALIFICATIONS

- A. Plastic pipe, fittings, and appurtenances shall be furnished by a single manufacturer who is fully experienced, reputable, and qualified in the manufacture of the items to be furnished. The equipment shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these Specifications.

1.05 SUBMITTALS

- A. Submit shop drawings. Provide dimensioning and technical specifications for piping to be furnished.
- B. Submit samples of all materials specified herein.
- C. Submit a pipe layout schedule listing pipe size and Class, use, and location.

1.06 TOOLS

- A. Special tools, solvents, lubricants, and caulking compounds required for normal installation shall be furnished with the pipe.

01/2017

15064-1

91-0134.1

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Plastic pipe shall be rigid, unplasticized, polyvinyl chloride (PVC) pipe and shall be in accordance with ASTM D1784 and ASTM D1785, ASTM 1120 or in conformance with AWWA C-900, Class 150 psi, and as manufactured by Celanese Piping Systems, Chemtrol Division., Cabot Company., or approved equal.
- B. The pipe shall be suitable for field cutting, welding, bending, and coupling; shall be Schedule 80 unless otherwise shown on the Drawings; and shall be of the sizes shown on the Drawings.
- C. All PVC pipe, fittings and valves outside a closed containment (e.g., chemical skid) and exposed to sunlight shall be ultraviolet light resistant.
- D. All pipe shall be bundled or packaged in such a manner as to provide adequate protection for the ends, whether threaded or flanged, during transportation from the manufacturer.
- E. Fittings shall be the socket type for solvent welded joints as designated in ASTM D2467 or D2466, except where threaded as shown on the Drawings, and as designated in ASTM D2464 or flanged as shown on the Drawings and shall be compatible with the pipe where installed. Flanges shall be furnished with 1/8 inch thick full-faced gaskets. Flange bolts and nuts shall be ASTM A276, Type 304 or 316 stainless steel.
- F. Plastic tubing shall be clear, flexible, and non-cracking, with a wall thickness that is adequate for the pressures involved and shall be of the sizes as shown on the Drawings.
- G. Caulking for plastic pipes in wall sleeves shall be by a mechanical, modular, rubber sealing element placed in between the sleeve and the pipe and expanded to make a tight fit or shall be by another method approved by the Engineer.
- H. Expansion joints shall have integral duck and rubber flanges. They shall have individual solid steel ring reinforcement with a carcass of highest grade woven cotton or acceptable synthetic fiber. Joints shall be constructed of pipeline size and shall meet working pressure and corrosive conditions similar to the line where installed. They shall be of a filled arch type construction with a minimum of three arches per joint. All joints must be finish-coated with Hypalon paint to prevent ozone attack. They shall be Style 500 as manufactured by Mercer Rubber Co. of Trenton, New Jersey, or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The installation of plastic pipe shall be done in strict accordance with the

01/2017

15064-2

91-0134.1

manufacturer's technical data, printed instructions and ASTM D2855

- B. Joints for plastic pipe shall be solvent welded, except flanged or threaded where required. In making solvent welded connections, clean dirt and moisture from pipe and fittings, bevel pipe ends slightly with emery cloth, and apply solvent cement. Expansion joints shall be installed every 50 feet on long runs and in every straight run longer than 15 feet.
1. Primer shall be of premium industrial strength to be used for proper softening and preparation of PVC and CPVC pipe and fitting surfaces. Primer shall be Weld-On p-70 manufactured by Weld-On Adhesives, Inc., or Engineer approved equal.
 2. Solvent cement shall be a high strength, industrial grade applicable for all classes and schedules of pipe and fittings of either PVC or CPVC material. It shall be chemically resistant to sodium hypochlorite solutions and be compliant with NSF/ANSI Standard 61 for use on potable water. Solvent cement shall be Weld-On 724 manufactured by Weld-On Adhesives, Inc., or Engineer approved equal.
- C. Installation of valves and fittings shall be in strict accordance with manufacturer's instructions. Particular care shall be taken not to overstress threaded connections at sleeves. In making solvent welded connections care shall be taken to ensure that no solvent is spilled on valves or allowed to run from joints.
- D. All piping shall have a sufficient number of unions to allow convenient removal of piping and shall be as approved by the Engineer.
- E. Where plastic pipe passes through wall sleeves, joints shall be sealed with a mechanical sealing element as specified in Section 15100.
- F. All plastic pipe-to-metal pipe connections shall be made using flanged connections. Metal piping shall not be threaded into plastic fittings, valves, or couplings, nor shall plastic piping be threaded into metal valves, fittings or couplings.
- G. Concrete inserts for hangers and supports shall be furnished and installed in the concrete as it is placed. The inserts shall be set in accordance with the requirements of the piping layout and the Contractor shall verify their locations from approved piping layout drawings and the structural drawings. Pipe hangers and supports are specified in Section 15140.

3.02 FIELD PAINTING

- A. Pipe normally exposed to view shall be painted and marked as specified in the Painting Section 09900. Identify pipe contents, direction of flow, use proper color (per OSHA) and identification of pipe.

3.03 TESTING

- A. Pipelines shall remain undisturbed for 24 hours to develop complete strength at all

01/2017

15064-3

91-0134.1

joints. Pipelines shall be subjected to a minimum 150 psi hydrostatic pressure test for 2 hours. All leaks shall be repaired and lines retested as approved by the Engineer. Prior to testing, the pipelines shall be supported in an approved manner to prevent movement during tests.

END OF SECTION

01/2017

15064-4

91-0134.1

SECTION 15100

VALVES AND APPURTENANCES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish labor, materials, equipment, and incidentals required for operation of all valves and appurtenances as shown on the Drawings and as specified herein.
- B. The equipment shall include the following:
 - 1. Air Release Valves
 - 2. Backflow Prevention Assembly
 - 3. Ball Valves
 - 4. Butterfly Valves
 - 5. Detector Tape
 - 6. Fire Hydrants
 - 7. Flanged Coupling Adapters
 - 8. Flexible Connectors
 - 9. Gate Valves
 - 10. Gate Valves (Wheel Style)
 - 11. Link Seals and Wall Sleeves
 - 12. Plug Valves
 - 13. Pressure Gauge Assembly
 - 14. Resilient Seat Ball Valves
 - 15. Retainer Glands
 - 16. Strainers
 - 17. Service Connections
 - 18. Tapping Sleeves
 - 19. Unions
 - 20. Valve Boxes
 - 21. Dresser Couplings

1.02 RELATED SECTIONS

- A. Section 02221 – Trenching Bedding Backfill for Pipe

01/2017

15100-1

91-0134.1

- B. Section 15062 - Ductile Iron Pipe & Fittings
- C. Section 15064 – General Purpose PVC Pipe and Fittings

1.03 REFERENCES

- A. ANSI/ AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 in. through 12 in. (100 mm through 300 mm), for Water Transmission and Distribution.
- B. ANSI/ AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 in. through 48 in. (350 mm through 1200 mm), for Water Transmission and Distribution.
- C. ANSI/ AWWA C906 – AWWA C906 Polyethylene (PE) Pressure Pipe & Fittings - 4 Inch through 63 Inch for Water Distribution
- D. Manufactures Standardization Society (MSS) for the Valve and Fitting Industry
- E. Other references as stated below.

1.04 QUALIFICATIONS

- A. Valves and appurtenances shall be products of well-established reputable firms who are fully experienced, and qualified in the manufacture of the particular equipment to be furnished in the business of manufacturing of the specific product for a minimum of ten (10) years. The equipment shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these specifications, as applicable.

1.05 SUBMITTALS

- A. Within 30 days after contract execution, submit a list of valves to be furnished, with the names of suppliers, and the date of delivery.
- B. Complete shop drawings of all valves and appurtenances shall be submitted in accordance with the requirements of Section 01340.

1.06 TOOLS

- A. Special tools, handles, or wrenches, if required for normal operation and maintenance of the specified valves, shall be supplied with the equipment furnished.

1.07 SUBSTITUTIONS

- A. Substitutions are not permitted unless otherwise stated.
- B. All valves and appurtenances shall be of the size of the valve being replaced and all similar valves shall be from one manufacturer.
- C. Valves and appurtenances shall have the name of the manufacturer and the working

01/2017

15100-2

91-0134.1

pressure for which they are designed cast in raised letters upon some appropriate part of the body.

PART 2 - PRODUCTS

2.01 AIR RELEASE VALVES

- A. Sewer Force Main Air Release Valves – System shall be a combination of one sewage air release valve and one sewage air/ vacuum valve with dual isolation plug valves. Valve bodies and covers shall be of cast iron construction in accordance with ASTM A126-B. All internal parts shall be of stainless steel, ASTM A240 - Type 304 and ASTM A276 - Type 303. The venting orifice shall be 5/ 16" in diameter with stainless steel seat. The inlet openings shall be a minimum of 2" NPT screwed connection for both valves. The valves shall be fully capable of operation in sewage force main. Both valves shall include a back-flushing feature for periodic cleaning of the internal mechanism. The overall height shall not exceed 22 inches. Valves shall be manufactured by Val-Matic Corporation, or approved equal.
- B. Water Main Air Release Valves – Valve body and cover shall be of cast iron construction, per ASTM A126-B. All internal parts shall be of stainless steel, ASTM A240 – Type 304 for the float, and ASTM A296 – Type 316 for the linkage. The venting orifice shall be 3/ 16" diameter with brass seat. The inlet opening shall be a 2" NPT screwed connection. The overall height shall not exceed 13 inches. Valves shall be manufactured by Valve and Primer Corporation, model number APCO 200A, or approved equal.

2.02 BACKFLOW PREVENTION ASSEMBLY

- A. The assembly shall conform to the latest revision of ANSI/ AWWA C510 and shall be capable of withstanding a working pressure of at least 150 psi without damage to working parts or impairment of function. It shall consist of two internally loaded, independently operating check valves, located between two tightly closing resilient-seated shut off valves, with four properly placed resilient-seated test cocks.

2.03 BALL VALVES

- A. Vented Ball Valves
 - 1. Ball valves for use with sodium hypochlorite shall be factory equipped with a vent hole for out-gassing to the pressure port. The ball valve shall be compatible with a sodium hypochlorite concentration up to 20% and shall be of a PVC or CPVC construction and of true union design with upstream and downstream blocking capability to stop flow when an alternate union is removed for servicing the piping system All O-rings shall be FKM with PTFE seats. PTFE seats shall have FKM elastomeric backing cushions. The valve shall be installed with the vent hole on the upstream side of the system to keep the liquid in the cavity of the ball fluid. Valve sizes ½" to 3" shall be rated for 230 psi and and 4" valves shall be rated at 150 psi at 70°F water non-shock full-port. Applications requiring flanged end connections shall be

01/2017

15100-3

91-0134.1

compatible with ANSI B16.5 Class 150.

2. PVC shall conform to ASTM D1784 Cell Classification 12454-A while CPVC shall conform to ASTM D1784 Cell Classification 23567-A. Ball valves shall be UV resistant and NSF-61 certified.
3. Acceptable manufacturers shall be:
 - a. Asahi/America,
 - b. NIBCO,
 - c. or approved equal.

2.04 BUTTERFLY VALVES

- A. For this product, see separate Specification 15104 (Butterfly Valves).

2.05 DETECTOR TAPE

- A. Detector tape shall be 3" wide, blue tape for water mains, green tape for force mains, with a metallized foil core laminated between 2 layers of plastic film. The words "CAUTION WATER LINE BURIED BELOW" or "CAUTION FORCE MAIN BURIED BELOW" shall be printed at 30" intervals along the tape. Tape shall be placed 18" below grade above all PVC mains and services, or as recommended by manufacturer. Non-metallic tape shall be used above ductile iron pipe.

2.06 FIRE HYDRANTS

- A. Fire hydrants shall have a minimum 5 1/4" valve opening and shall open against the pressure and close with the flow. Hydrants shall be American, model number B-84-B or approved equal. Hydrants shall meet or exceed the requirements of the latest editions of ANSI/ AWWA C502 or C503, and shall comply with Factory Mutual Research Corporation and Underwriters Laboratories UL246 Standard.
- B. Three blue reflective pavement markers shall be provided in the center of the nearest lanes of road pavement adjacent to all fire hydrant locations.
- C. Hydrants maintained by the City shall be painted in accordance with City standards. Hydrants privately maintained shall be painted yellow. All painting shall be in accordance with Section 09900 – Painting.

2.07 FLANGED COUPLING ADAPTERS

- A. Body and follower flange shall be iron. Bolt circle sizes and spacing shall conform to ASA 125 flange. Gasket shall be Nitrile (Buna-N) per ASTM D2000. Cross and tee bolts shall conform to ANSI A21.11. Coupling adapters shall be Smith-Blair or approved equal.

2.08 FLEXIBLE CONNECTOR

- A. Flexible connectors or rubber expansion joints shall be spool type containing elastomers woven with nylon fabric and nylon tire core cord reinforced with wire.

01/2017

15100-4

91-0134.1

- B. Elastomers shall be nitrile (BUNA-N) unless otherwise depicted on the Drawings.
- C. All elastomers design for exterior applications shall have a factory applied UV coating.
- D. Backing plates and hardware shall be 316L stainless steel.
- E. Flexible connectors shall be manufactured by Proco series 230 or Approved Equal.

2.09 GATE VALVES

- A. Gate valves shall be iron body, fully resilient seat, and bronze mounted non-rising stem, double disc, rated at 200 psi and conforming to the latest revision of ANSI/ AWWA C509. Exposed valves shall be outside screw and yoke type. Gate valves shall be Mueller, Clow, American Darling, or approved equal.

2.10 GATE VALVES (WHEEL STYLE)

- A. Exposed wheel gate valves, unless otherwise specified or approved, shall be iron-body, bronze-mounted, double disc type, with flanged ends, and shall conform to the AWWA Standard Specification for Gate Valves for Ordinary Water Works Service, Designation C500. Exposed valves shall be outside screw and yoke type.
- B. Face-to-face dimension shall conform to ANSI Standard Face-to-Face and End-to-End Dimensions of Ferrous Valves, (ANSI B16.10) for 125 pound cast-iron valves.
- C. Bronze gate rings shall be fitted into grooves of dovetail or similar shape in the gates. For grooves or other shapes, the rings shall be firmly attached to the gates with bronze rivets.
- D. Gate valves shall have a resilient rubber-seated ring or wedge, permanently bonded to the wedge disc, and complying with AWWA C509.
- E. Stuffing box follower bolts shall be of steel, and the nuts shall be of bronze.
- F. The design of the valves shall be such as to permit packing the valves without undue leakage while they are wide open and in service. O-ring stuffing boxes may be used.
- G. Chain wheel operators shall be furnished with the valves. Such operators shall be designed with adequate strength for the valves with which they are supplied and shall provide for easy operation of the valve. Chains for valve operators shall be stainless steel. Gate valves shall be as manufactured by the Mueller Company, Clow Valve Company, or equal.
- H. Where required, gate valves shall be provided with a box, cast in the slab, and a box cover. The depth of the valve box shall not be less than the slab thickness. Box cover opening shall be for valve wheel. The floor box and cover shall be equal to those manufactured by Rodney Hunt Machine Company or Clow Corporation.
- I. Gate valves for diesel fuel service shall have API approval. Bodies shall be cast iron or bronze.

01/2017

15100-5

91-0134.1

2.11 LINK SEALS & WALL SLEEVES

- A. The pipe-to-wall penetration closures shall be "Link-Seal" as manufactured by Thunderline Corp., Belleville, MI 48111. Seals shall be modular mechanical type, consisting of interlocking synthetic rubber links shaped to fill continuously the annular space between the pipe and wall opening. Links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and nut. Seals shall be installed such that bolt heads are facing the inside of the structure and shall be accessible from grade without the need for excavation. After the seal assembly is positioned in the wall sleeve, tightening of the bolts shall cause the rubber sealing elements to expand and provide an absolutely water-tight seal between the pipe and wall opening. The seal shall be constructed so as to provide electrical insulation between the pipe and wall, thus reducing chances of cathodic reaction between these two members.
- B. Contractor shall determine the required inside diameter of each individual wall sleeve before ordering, fabricating or installing. The inside diameter of each wall sleeve shall be sized as recommended by the manufacturer to fit the pipe and Link-Seal to assure a water-tight joint.
- C. Wall sleeve shall be specially designed to mate with the Link-Seal. The wall sleeve shall be heavy wall welded or seamless steel pipe. The sleeve shall have a full-circle continuously-welded water stop plate on the sleeve O.D. which acts as the sleeve anchor and water stop. Wall sleeve shall be model WS by Thunderline Corp.

2.12 PLUG VALVES

- A. Plug valves shall be non-lubricated eccentric type with resilient faced plugs, and shall be furnished with end connections as shown on the plans. Flanged valves shall be faced and drilled in conformance with ANSI B16.1 Class 125 standard. Mechanical joint ends shall be in conformance with AWWA C111. Bell ends shall be in conformance with AWWA C100 Class B.
- B. Unless otherwise specified on the plans, port areas for all valves shall be min. 80% of full pipe area.
- C. Valve bodies shall be of ASTM A126 Class B cast iron in compliance with AWWA Standard C507 Section 5.1 and AWWA Standard C504. All exposed nuts, bolts, springs, washers, etc. shall be zinc plated. Resilient plug facings shall be Neoprene or Buna-N, on a single piece plug. The plug shall be of sufficient construction so that no strengthening member is required opposite the face.
- D. Valves shall be furnished with corrosion resistant seats which comply with AWWA Standard C507 Section 7 paragraph 7.2 and with AWWA Standard C504 Section 3.5. The seat shall be in the body only. Seat ring shall be adjustable and replaceable.
- E. Valves shall be furnished with replaceable, sleeve-type bearings in the upper and lower journals. These bearings shall comply with AWWA Standard C507 Section 8 paragraphs 8.1, 8.3 and 8.5 and with AWWA Standard C504 Section 3.6.

01/2017

15100-6

91-0134.1

- F. Valve shaft seals or packing shall be adjustable and replaceable without removing the valve from service or interrupting service with flow in either direction. Shaft seals shall comply with AWWA Standard C507 Section 10 and with AWWA C507 Section 111.
- G. Valve pressure ratings shall be as follows and shall be established by hydrostatic tests as specified by ANSI Standard B16.1. Pressure ratings shall be 175 psi for valves through 12", 150 psi for valves in sizes 14" through 36" and 125 psi for valves in sizes 42" through 54". Valves shall be capable of providing drip-tight shutoff up to the full valve rating with pressure in either direction.
- H. All valves 8 inches and larger shall be equipped with gear actuators. All gearing shall be enclosed and suitable for running in oil, with seals provided on all shafts to prevent entry of dirt and water into the actuator. All shaft bearings shall be furnished with permanently lubricated bronze bearing bushings. Actuator shall clearly indicate valve position. An adjustable stop shall be provided. Construction of actuator housing shall be cast iron or steel.
- I. Plug valves installed such that actuators are 6 feet or more above the floor shall have chain-wheels and chains provided.
- J. For plug valves with extended shafts and actuators, the actuators shall be mounted on floor stands where indicated on the Drawings or shall have removable hand-wheels where floor stands are not called for. Six inch sleeves shall be provided for extended shafts in all floors. Where necessary, covers shall be provided. Shafts shall be of adequate strength to operate the valve. Floor stands and covers, where called for, shall be cast iron. Floor stands shall be equipped with valve position indicators and a lock for the hand-wheel.
- K. All plug valves shall be installed so that the direction of flow through the valve is in accordance with the manufacturer's recommendations.
- L. Valves and actuators shall be as manufactured by DeZurik.

2.13 PRESSURE GAUGE ASSEMBLY

- A. Pressure gauge shall be direct-mounted with a minimum 4-1/2 inch diameter dial with a clear glass crystal window constructed to the following standards:
 1. Accuracy – 1% full scale grade A ASME B40, 100
 2. Weather Protection – Dry Case International Protection Rating (IP) IP54
 3. Fill - Glycerin filled, hermetically sealed IP65
 4. Case type – Open front 304 stainless steel case
 5. Dial – Aluminum dial, brushed aluminum background, black figures and graduations.
 6. Bourdon Tube and Socket – 316L/316L Stainless steel

01/2017

15100-7

91-0134.1

7. Scale and range – As depicted on Drawings.
8. Manufacture – ISO 9001 registered.
9. Pressure gauge shall be manufactured by Ashcroft Type 1009 or Approved Equal

B. All pressure gauges for wastewater applications shall be mounted to a Pressure Sensor.

1. Pressure Sensors shall be of the wafer type, designed to fit between standard ANSI B16.1 Class 125/ ANSI B16.5 Class 150 pipeline flanges. The face-to-face of the entire sensor shall be no longer than specifications for butterfly valves - MSS-SP67.
2. Pressure Sensors shall be flow through design with a nitrile (BUNA-N) elastomer sensing ring around the full circumference. There shall be no dead ends or crevices, and flow passage shall make the sensor self-cleaning.
3. The sensing ring shall have a cavity behind the ring filled with ethylene glycol fluid to transfer pressure to the gauge.
4. Pressure Sensor shall be manufactured by Red Valve Series 48 or Approved Equal

C. Pressure gauge assembly shall include ½” brass fittings, ball valves, snubbers or gauge guards as depicted on the Drawings.

2.14 RESILIENT SEAT BALL VALVE

- A. Ball valve shall be tight closing, shaft-mounted complying with Fed. Spec. WW-V-35, Type II, Class C, Style 3. Valve design shall eliminate metal-to-metal contact or wedging in the sealing action. Design pressure rating shall be greater than 150 psi.
- B. Valve body shall be one- or two-piece stainless steel ASTM A351. Ball shall be stainless steel ASTM A276. Seat ring shall be reinforced TFE.
- C. Valve shall have a stainless steel 1/4 turn lever arm. Ends shall be threaded. Ball valve shall be Figure No. T-580-S6-R-66 as manufactured by Nibco, Inc. or equal.

2.15 RETAINER GLANDS

- A. Retainer glands shall conform to the latest revision of ANSI/ AWWA C111/ A21.11. All glands shall be manufactured from ductile iron as listed by Underwriters Laboratories for 250 psi minimum water pressure rating, manufactured by Clow Corporation, EBAA Iron, or approved equal.

2.16 STRAINERS

- A. Strainers shall be of the "Y" type, shall have bronze bodies with a removable bronze screen, and shall be as manufactured by Watts Regulator Company, Lawrence, MA.

01/2017

15100-8

91-0134.1

2.17 SERVICE CONNECTIONS

- A. Service saddles shall be Ductile Iron, epoxy or nylon coated, with double stainless steel straps, or a single wide strap. Saddles shall conform to the latest revisions of ANSI/ AWWA C111/ 21.11 and ASTM A588.
- B. Service lines shall be polyethylene (PE) tubing as described in ANSI/ AWWA C901, latest revision, with a working pressure of 200 psi (DR 9). Pipe joints shall be of the compression type, with totally confined grip seal and coupling nut. Polyethylene shall be extruded from PE 3408 high molecular weight materials and must conform to ASTM D2737.
- C. Corporation stops shall be manufactured of brass alloy in accordance with ASTM B62 with threaded ends and shall be Ford or approved equal.
- D. Meter stops shall be the 90 degree lockwing type and shall be of bronze construction in accordance with ASTM B62. Meter stops shall be closed button design, with a resilient "O" ring, sealed against external leakage at the top. Stops shall be equipped with a meter coupling nut on the outlet side, as manufactured by Mueller, Ford or approved equal.
- E. All meters (2 1/2" and smaller) and meter boxes will be supplied and installed by the City at the owner's expense. Meters larger than 2 1/2 inches will have special installation requirements.

2.18 TAPPING SLEEVES

- A. Tapping sleeves shall be ductile iron or stainless steel, mechanical or joint, as stated on the Drawings, manufactured by Clow, or approved equal.

2.19 UNIONS

- A. Unions on ferrous pipe, 2 inch diameter and smaller, shall be 150 lb. malleable iron, and zinc-coated. Unions on water piping, 2 1/2 inch diameter and larger, shall be 125 lb. pound flange pattern, and zinc-coated. Gaskets for flanged unions shall be of the best quality fiber or plastic. Unions shall not be concealed in walls, ceilings, or partitions.

2.20 VALVE BOXES

- A. Valve boxes for water mains and sewer force mains shall be U.S. Foundry Model 7500, marked "Water" or "Sewer", or approved equal.
- B. Valve boxes for blow-off assembly shall be U.S. Foundry Model 7630 (No. 3) or approved equal.

2.21 PIPE COUPLINGS

- A. Pipe couplings shall be style 38 all 316L stainless steel by Piping Specialties Dresser, Inc.

01/2017

15100-9

91-0134.1

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Valves and appurtenances shall be installed in the locations shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the Engineer before they are installed.
- B. Install floor boxes, brackets, extension rods, guides, and the various types of operators and appurtenances that are in masonry floors or walls, and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, the Contractor shall check all plans and figures having direct bearing on the locations of the valves and appurtenances, and he shall be responsible for the proper location of these items during the construction of the structures.
- C. Flanged joints shall be made with hot-dipped galvanized bolts, nuts and washers. Mechanical joints shall be made with mild corrosion-resistant alloy steel bolts and nuts. All exposed bolts shall be painted the same color as the pipe. All buried bolts and nuts shall be heavily coated with two (2) coats of bituminous paint.
- D. Prior to assembly of split couplings, the grooves and other parts shall be thoroughly cleaned. The ends of the pipes and the outsides of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes. The housing sections shall then be placed. After the bolts have been inserted, the nuts shall be tightened until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.
- E. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly. Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6 inches from the end, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint. The other pipe end shall be inserted into the middle pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flares. After the bolts have been inserted and all nuts have been made up finger tight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts.

3.02 SHOP PAINTING

- A. Ferrous surfaces of valves and appurtenances shall receive an exterior coating of rust-inhibitive primer. Interior coatings shall be the manufacturer's standard except that valves for potable water lines shall be coated with paints approved by EPA, FDA and AWWA for potable water service. All pipe connection openings shall be capped after shop painting to prevent the entry of foreign matter prior to installation.

01/2017

15100-10

91-0134.1

3.03 FIELD PAINTING

- A. All above ground valves and appurtenances shall be painted in accordance with Section 09900 – Painting.

3.04 INSPECTION AND TESTING

- A. Completed pipe shall be subjected to hydrostatic pressure test for 2 hours at 150% full working pressure. All leaks shall be repaired and lines retested until approved by the Engineer.

END OF SECTION

01/2017

15100-11

91-0134.1

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01/2017

15100-12

91-0134.1

SECTION 15101

FILL VALVES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish labor, materials, equipment and incidentals required for the installation of Fill Valves of the water storage tanks at the Holly Lakes Booster Station. Fill valves shall be complete and operable, including manual operators, protective coating, and appurtenant work as depicted in the Drawings and specified herein.
- B. Coordinate with Instrumentation Contractor and ship electronic controllers to the UL 508A panel builder shop/ Instrumentation System Integrator location. Instrumentation System Integrator shall mount two electronic controllers of the fill valves on the exterior right side (when facing the panel) of the new PLC control panel.

1.01 RELATED SECTIONS

- A. Section 13302 – Instrumentation and Controls
- B. Section 15010 – Testing Piping Systems
- C. Section 15062 - DIP Pipe and Fittings
- D. Section 15100 - Valves and Appurtenances
- E. Other Sections as applicable.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Fill valves shall be a completely self-contained metering valve and control system that accurately meters and/ or controls flow rate.
- B. Fill valve shall be certified to NSF 61 standards.
- C. Valve will be designed as an electronic metering and flow control valve with hydraulic pressure sustaining backup. It will be supplied with an electronic proportional controller. This controller will monitor valve position and differential pressure and meter the flow through the valve. The controller will accept a remote or local flow set point input from operations and position the 16" valve to control the flow. This control will position the main valve using opening and closing solenoids. This electronic valve controller can also accept a valve position set point and control the valve on position while metering flow independently. This valve will have an electronic actuated hydraulic pilot to provide for pressure sustaining control to maintain a minimum upstream pressure while flowing. This control will be manually adjustable. In the event of a loss in power the closing solenoid will open and the opening solenoid will close, causing the main valve close. This electronic valve controller will retransmit the flow and valve position signal back to operations for monitoring valve flow and position. Furnish a pressure indicating transmitter for the inlet of fill valve that shall transmit the inlet pressure 4-20mA

01/2017

15101-1

91-0134.1

signal to the electronic controller. Provide an isolation valve at the inlet pressure indicating transmitter so that it can be closed for maintenance purposes. If high water level setpoint is reached in the downstream tank the PLC logic (by Division 13) will send a dry contact digital signal to the electronic valve controller to go to zero flow and close the valve fill. If high water level condition is no longer active when the water level in the tank is below setpoint, the signal shall be automatically remove without needing a reset or acknowledgement.

2.02 FILL VALVE

- A. The main valve will be a 16" ported valve. It consists of three different parts; the body with seat installed with flat head stainless machine screws, the cover with cover bearing and the disc and diaphragm assembly. The diaphragm assembly will be the only moving part. The cover of the main valve will have a locating lip for ease of maintenance and to maintain alignment of the stem within the disc/ diaphragm assembly. There shall be no pins in the cover for alignment. The main valve will be of the packless design and shall have no O-rings or packing anywhere within the main valve.

2.03 PILOT CONTROL SYSTEM

- A. The pilot control system will consist of two separate controls systems. There will be two solenoids mounted on the valve cover. One will open to exhaust water from the cover (opening) and one will open to admit water onto the cover (closing). These solenoids will be controlled by outputs from the electronic valve controller. The opening solenoid will be normally closed and the closing solenoid will be normally open. In the event of a loss of power the main valve will close drip tight. There will also be an electronic actuated pressure reducing pilot control hydraulic pilot designed to sustain a minimum upstream pressure. It will be manually adjusted at the valve site and set at 55 psi. This is a backup pressure-sustaining feature. It will remain closed unless the upstream pressure drops. At that point, it will open and allow water to enter the cover of the main valve throttling to maintain a minimum upstream pressure. There shall be opening and closing independent needle valves in the control loop. The pilot control system will also contain a strainer to prevent any debris from entering the control loop. The system will also contain pilot isolation valves for maintenance and troubleshooting. The manufacturer will also supply an x141 gage mounted on the inlet for set up and monitoring. The pilot system will consist of all stainless steel solenoids, speed controls, strainers, tubing, and fittings.

2.04 ELECTRONIC VALVE CONTROLLER

- A. The electronic valve controller will be a 300ma @ 24vdc steady state unit that is manufactured by the control valve manufacturer. The controller for each fill valve will be mounted on the exterior right side of the new Holly Lakes PLC control panel supplied by Division 13 and the panel builder shall provide power supply and wire the controller for power and remote signals. The controller shall accept the valve position, inlet pressure, and differential pressure inputs. It will use these inputs to meter the flow through the 16" valve. It will use the solid state outputs to pulse solenoids to position the valve to control the flow to the operator supplied set point. This controller will provide proportional control to allow for smooth operation of the valve through the normal flows from 170-2100 gpm. This controller will retransmit the flow reading, inlet pressure reading, and also the valve position. The

01/2017

15101-2

91-0134.1

electronic valve controller will accept a digital input to close the valve on high water level from PLC. The controller shall also retransmit the status of each solenoid valve (energized or not energized) to the PLC.

- B. The electronic controller shall be supplied with pre-programmed valve application templates used to setup and configure the controller to match the desired function of the valve in the piping system.
- C. The controller display shall be a color TFT screen to graphically display valve application with integral real-time system information.
- D. An IP-68 enclosure shall be provided to house the controller for environmental protection. It shall be provided in a stainless steel NEMA enclosure. An anodized aluminum mounting bracket suitable for mounting on pipe or wall shall be supplied as standard. The controller shall feature a multi-PID loop control with local or remote set point input. The controller shall include six (6) configurable analog inputs; six (6) dry contact digital inputs; four (4) 4-20mA analog inputs; and two (2) solid-state relays. Electronic valve controller shall be designed with m16/ m20 cable IP-68 cable glands, IP-68 USB Type A and Type B connections, and IP-68 Ethernet port. Electronic Controller shall be connected to the Plant PLC via Ethernet communication.
- E. The controller shall be enable configurable set point ramping to protect against system surges and shall also include a configurable flow totalizer. High speed logging data (1000Hz) shall be downloadable to a portable memory device such as a USB drive. Security codes shall be provided to protect against unauthorized changes.
- F. The electronic controller shall be capable of data retransmission to SCADA or similar control systems and shall be capable of generating and sending signal loss warnings and other configurable control actions. Alarm outputs shall be provided as standard rather than an optional feature.
- G. Function
 - 1. Utilizing electronic digital control, solenoid pilots equipped onto the control valve(s) are actuated by electrical signals received from the Electronic Valve Controller which enables remote computer control over the diaphragm valve operations. The solenoids either add or relieve line pressure from the cover chamber of the diaphragm valve, causing it to open or close as directed by the Electronic Valve Controller. Each solenoid is controlled by a solid state relay with zero switching voltage. The total cycle time between each pulse shall be programmable.
 - 2. In either digital or analog control, the Electronic Valve Controller shall accept an analog 4-20mA feedback signal. Upon receiving the remote set-point command from the PLC system or local command from the operator, the Electronic Valve Controller shall provide a digital signal or 4-20 mA analog signal to the appropriate pilot(s) and maintain the desired set-point value. When the feedback signal is within a programmable dead band zone, the appropriate electronic pilot(s) on the control valve will not activate; control valve will maintain position. When the feedback signal deviates from or approaches the set-point, the appropriate electronic pilot(s) will be activated, smoothly modulating the valve to its setpoint. Preinstalled valve application templates allow the Electronic Valve Controller to be configured

01/2017

15101-3

91-0134.1

to perform a wide range of control valve functions, such as; pressure management, pressure reducing, pressure sustaining, rate of flow control, level control or valve position.

2.05 LABELS

- A. The main valve shall have an NSF 61 fusion bonded epoxy coating on all internal and external ferrous metal surfaces.

2.06 MATERIAL

- A. Fill valve shall be of ductile iron material with a stainless steel trim.

2.07 ACCEPTABLE MANUFACTURERS

- A. The valve shall be a model 16" 133-AK BCENPSYKC X117D D.S. SSB 150 ANSI as manufactured by Cia-Val, Costa Mesa, CA.
- B. The electronic valve controller shall be a model VC-22D ANSI as manufactured by Cia-Val, Costa Mesa, CA.
- C. No substitutions permitted.

2.08 SHIPPING

- A. Fill valve supplier shall ship two electronic controllers and mounting brackets to the PLC panel builder (Division 13) who will furnish a new Holly Lakes PLC control panel. Coordinate with panel builder for mounting requirements on the exterior right side of the PLC control panel so that Operator can operate the electronic controller without opening the PLC panel door.
- B. All packing and cost associated with shipment of two electronic controllers shall be responsible of the fill valve supplier.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Fill valves shall be installed in accordance with AWWA Standards and the Supplier's printed recommendations, and in accordance with the applicable provisions of Section 15100 entitled "Valves and Appurtenances".
- B. All valve exteriors shall be painted as specified in Section 09900 entitled "Protective Coatings." All exposed interior corrosive ferrous surfaces of valves 4 inches and larger, as well as the exterior surfaces of buried valves, shall receive a fusion bonded epoxy coating conforming to AWWA C550.

3.02 TESTING AND STARTUP

- A. The manufacturer shall provide a cavitation analysis to ensure that the valve will operate cavitation damage free throughout the entire flow range at the given pressure differential. The 16" flow control valve will be designed to handle 400-8500 gpm. The normal inlet pressure will be 50-55 psi with an outlet pressure of 5-10 psi. The hydraulic backpressure set point will be 45-55 psi.
- B. The manufacturer shall provide a direct factory employee during start-up of the system. The start-up of each fill valve may fall on a different date.
- C. The manufacturer shall provide a direct factory employee for training to the

01/2017

15101-4

91-0134.1

operations and maintenance personnel. A minimum of two sections of training shall be included, unless otherwise agree by the Owner.

3.03 WARRANTY

- A. The electronic controller and metering fill valve shall be warranted to be free of defects in material and workmanship for a period of one year from date of placing in service, provided it is installed and used in accordance with all applicable instructions.

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15101-5

91-0134.1

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01/2017

15101-6

91-0134.1

SECTION 15104

BUTTERFLY VALVES

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. The DESIGN BUILDER shall furnish and install Butterfly Valves, complete and operable, as shown and specified herein, including manual, operators, protective coating, and appurtenant work, all in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 15100 - Valves and Appurtenances

PART 2 - PRODUCTS

2.01 GENERAL

- A. All butterfly valves unless otherwise specified, shall be the product of one manufacturer and shall meet the full requirements of AWWA C504 except as modified or supplemented herein.
- B. Butterfly valves shall be Class 150B for valves with nominal pipe sizes (NPS) twenty (20) inches and smaller and Class 75B for valves with NPS twenty-four (24) inches and larger.
- C. Butterfly valves shall be flanged short body design for interior and exposed piping and mechanical joint body design for buried service. Bolt hole and bolt circle patterns shall conform to ANSI B16.1 Class 125.
- D. Actual port diameter shall not be less than 1-inch smaller than the nominal pipe size to which it is attached.
- E. Valves shall be equipped with adjustable mechanical stop limiting devices in the operator to prevent over travel of the valve disc in the open and closed position. Disc position stops located in the valve body are not acceptable.
- F. Valve bodies shall be constructed of ASTM A126 Class B cast iron and shall have two integrally cast trunnions for shaft bearings.

2.02 VALVE SEATS

- A. Valve seats shall be field adjustable around the full circumference of the valve body without interruption for valves with NPS 24-inches and larger.
- B. Valve seats shall be replaceable without dismantling operator, disc or shaft and without

01/2017

15104-1

91-0134.1

removing the valve from the line. Manufacturer shall certify that the valve seat is field replaceable as specified for valves with NPS 24-inches and larger.

- C. Valve seats shall have the bond with the valve body tested with a 75 pound pull in accordance with test procedures ASTM D429, method B for valves with NPS 20-inches and smaller. For valves larger than 20-inches, seats shall be retained in the body by mechanical means without retaining rings, segments, screws or hardware of any kind in the flow streams.

2.03 BEARINGS

- A. Valve bearings shall be sleeve type bearings, and shall be 100 percent (100%) nylon or teflon for valves with NPS 20-inches and smaller.
- B. Valve bearings shall be Teflon lining with fiberglass backing for valves with NPS 24-inches and larger. Valve bearings shall be self lubricating and bearings load shall not exceed 1/5 of the compressible strength of the bearing or shaft material.

2.04 VALVE DISCS

- A. Valve discs shall operate through a 90-1/4 degree angle from full closed to full open position.
- B. Valve discs for NPS 20-inches and smaller shall be alloy cast iron ASTM A436 Type 1, or ASTM A 48 or ASTM A 126 cast iron and for NPS 24-inches and larger shall be ASTM A 48 cast iron or ASTM A 536 ductile cast iron.
- C. Valve discs shall also be provided with a type 316 stainless steel seating edge for ASTM A 48, A 126 or A 536 cast iron discs, and shall not have any hollow chambers which can entrap water.

2.05 SHAFTS

- A. Valve shafts shall be Type 304 stainless steel for air service, and shall be Type 316 stainless steel for all other services. Shaft diameter shall meet minimum requirements established by AWWA Standard C504 for Class 150B.
- B. Valve shafts shall be one piece for valves with NPS 20-inches and smaller and two piece for valves with NPS 24-inches and larger.

2.06 SHAFT SEALS

- A. Valve shaft seals shall be self compensating split V-type, and shall be adjustable and replaceable without removing the operator and/ or the shaft.
- B. Valve shaft seals shall be the same elastomer as specified for the valve seats for the intended service.

2.07 BURIED SERVICE

- A. For buried service, valves shall be totally enclosed, fully gasketed, grease packed and

01/2017

15104-2

91-0134.1

shall be designed to operate indefinitely when submerged under 20-feet of water. Buried service operators shall be provided with a valve extension stem, AWWA Standard operating nut and valve box unless shown with an operator on the Contract Drawings. The extension stem for buried service shall be sufficiently long to extend to within 12 inches of the ground surface.

2.08 BUTTERFLY VALVES (DUCTILE IRON)

- A. Rubber-seated butterfly valves shall conform to Class 150B of AWWA Standard C504 and this Specification. If working pressure is greater than 150 psi, the butterfly valve shall conform to Class 250B of AWWA Standard C504.
- B. Valve bodies shall be ductile iron with mechanical joint ends for buried valves. Mechanical joint ends shall conform to AWWA Standard C111. All valve materials shall meet the requirements of NSF 61. For exposed or above ground valves, use flanged ends.
- C. Valve shafts shall consist of one-piece units extending through the discs of 18-8 stainless steel Type 303 or 304. Shaft diameter shall be in accordance with Table 3 of AWWA Standard C504.
 - 1. Valve discs shall be Ni-Resist, Type 1, or cast iron with stainless steel edges.
 - 2. Valve seats shall be hycar or natural rubber mounted in the valve body.
 - 3. Valve bearings shall be nylon or Teflon.
- D. The valve interior and exterior shall be epoxy coated at the factory by the valve manufacturer in accordance with AWWA Standard C550 (6-8 mil average, 4 mil minimum).
- E. All elastomers used in the butterfly valves must be suitable for service in the following water conditions:
 - 1. Chlorine concentration up to 12 mg/ L
 - 2. Chloramine concentrations up to 6 mg/ L
 - 3. Ozone concentrations up to 2.0 mg/ L (AWWA Standard says 0.5 ppm)
 - 4. pH range of 4-11
- F. Manual buried operators, if provided, shall be either worm gear or traveling nut type and shall be furnished with 2-inch AWWA nuts and extension shafts. Input required at nuts to produce specified output torque shall be less than 150 ft.-lbs. Operators shall be designed to withstand an input at the nut of 300 ft.-lb. without damage to any operator components.
- G. Exposed manual operators shall be same as for buried valves, except valve shall have operating hand wheel in lieu of AWWA nut.
 - 1. DeZurik Corporation
 - 2. Henry Pratt Co.
 - 3. Mueller Company

2.09 PVC BUTTERFLY VALVES

- A. Butterfly valves shall be manufactured from polyvinylchloride (PVC) compounds and shall be provided on PVC and fiberglass piping as indicated. Butterfly valves shall be wafer style with PVDF disc, Teflon or viton seal and 316 stainless steel shaft. Valves shall

01/2017

15104-3

91-0134.1

be GF. Plastics Type 367, Asahi/ America Type 75, or equal.

2.10 STAINLESS STEEL BUTTERFLY VALVES (PROCESS AIR)

- A. All butterfly valves to be installed in all stainless steel piping applications shall have a wafer or lug style Class 150 body. The valve shall meet ANSI B16.104 Class IV shut-off requirements and be suitable for 275 psi CWP. Valve materials shall be as follows:

Body: 316 stainless steel
 Disc: 316 stainless steel
 Shaft: 316 stainless steel
 Seat: PTFE
 Packing: PTFE

- B. Manufacturers:

4. DeZurik Corporation
 5. Neles – Jamesbury Inc.
 6. Henry Pratt Company
 7. Watts Regulator

2.11 MOTOR OPERATORS

- A. There are no motor operators in the scope of this project.

2.12 SUPPLIERS, OR EQUAL

- A. DeZurik Corporation
 B. Henry Pratt Co.
 C. Mueller Company

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All Butterfly valves shall be installed in accordance with AWWA Standards and the Supplier's printed recommendations, and in accordance with the applicable provisions of Section 15100 entitled "Valves and Appurtenances".
- B. All valve exteriors shall be painted as specified in Section 09850 entitled "Painting." All exposed interior corrosive ferrous surfaces of valves 4 inches and larger, as well as the exterior surfaces of buried valves, shall receive a fusion bonded epoxy coating conforming to AWWA C550.

END OF SECTION

01/2017

15104-4

91-0134.1

SECTION 15140

PIPE HANGERS AND SUPPORT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, and services to completely execute the pipe hanger and supports as described in this specification.

1.02 REFERENCES

- A. ASTM B633 – Specification for Electrodeposited Coatings of Zinc on Iron and Steel
- B. ASTM A123 – Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
- C. ASTM A653 – Specification for Steel Sheet, Zinc-Coated by the Hot-Dip Process
- D. ASTM A1011 – Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability (Formerly ASTM A570)
- E. MSS SP58 – Manufacturers Standardization Society: Pipe Hangers and Supports- Materials, Design, and Manufacture
- F. MSS SP69 – Manufacturers Standardization Society: Pipe Hangers and Supports- Selection and Application
- G. NFPA 13 – Standard for the Installation of Sprinkler Systems

1.03 QUALITY ASSURANCE

- A. Hangers and supports used in fire protection piping systems shall be listed and labeled by Underwriters Laboratories.
- B. Steel pipe hangers and supports shall have the manufacturer's name, part number, and applicable size stamped in the part itself for identification.
- C. Hangers and supports shall be designed and manufactured in conformance with MSS SP 58.
- D. Supports for sprinkler piping shall be in conformance with NFPA 13.

01/2017

15140-1

91-0134.1

1.04 SUBMITTALS

- A. Submit product data on all hanger and support devices, including shields and attachment methods. Product data to include, but not limited to materials, finishes, approvals, load ratings, and dimensional information.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Manufacturer – Subject to compliance with these specifications, pipe hanger and support systems shall be as manufactured by Cooper B-Line, Inc., or ENGINEER approved equal. All part numbers referenced in this specification are Cooper B-Line part numbers, and are included for reference and information only.

2.02 PIPE HANGERS AND SUPPORTS

A. Hangers

1. Uninsulated pipes 2 inches and smaller:
 - a. Adjustable steel swivel ring (band type) hanger, B-Line B3170.
 - b. Adjustable steel swivel J-hanger, B-Line B3690.
 - c. Malleable iron ring hanger, B-Line B3198R or hinged ring hanger, B3198H.
 - d. Malleable iron split-ring hanger with eye socket, B-Line B3173 with B3222.
 - e. Adjustable steel clevis hanger, B-Line B3104 or B3100.
2. Uninsulated pipes 2-1/2 inch and larger:
 - a. Adjustable steel clevis hanger, B-Line B3100.
 - b. Pipe roll with sockets, B-Line B3114.
 - c. Adjustable steel yoke pipe roll, B-Line B3110.
3. Insulated pipe – Hot or steam piping:
 - a. 2 inch and smaller pipes: use adjustable steel clevis with galvanized sheet metal shield. B-Line B3100 with B3151 series.
 - b. 2-1/2 inch and larger pipes:
 - 1) Adjustable steel yoke pipe roll with pipe covering protection saddle. B-Line B3110 with B3160-B3165 series.
 - 2) Pipe roll with sockets with pipe covering protection saddle, B-Line B3114 with B3160-B3165 series.
4. Insulated pipe – Cold or chilled water piping:
 - a. 5 inch and smaller pipes: use adjustable steel clevis with galvanized sheet metal shield. B-Line B3100 with B3151 series.
 - b. 6 inch and larger pipes:

01/2017

15140-2

91-0134.1

- 1) Pipe roll with sockets with pipe covering protection saddle, B-Line B3114 with B3160-B3165 series.
- 2) Adjustable steel yoke pipe roll with pipe covering protection saddle. B-Line B3110 with B3160-B3165 series.

B. Pipe Clamps

1. When flexibility in the hanger assembly is required due to horizontal movement, use pipe clamps with weldless eye nuts, B-Line B3140 or B3142 with B3200. For insulated lines use double bolted pipe clamps, B-Line B3144 or B3146 with B3200.

C. Multiple or Trapeze Hanger

1. Trapeze hangers shall be constructed from 12-gauge roll formed ASTM A1011 SS Grade 33 structural steel channel, 1-5/8 inch by 1-5/8 inch minimum, B-Line B22 strut or stronger as required.
2. Mount pipes to trapeze with 2 piece pipe straps sized for outside diameter of pipe, B-Line B2000 Series.
3. For pipes subjected to axial movement:
 - a. Strut mounted roller support, B-Line B3126. Use pipe protection shield or saddles on insulated lines.
 - b. Strut mounted pipe guide, B-Line B2417.

D. Wall Supports

1. Pipes 4 inches and smaller:
 - a. Carbon steel hook, B-Line B3191.
 - b. Carbon steel J-hanger, B-Line B3690.
2. Pipes larger than 4 inch:
 - a. Welded strut bracket and pipe straps, B-Line B3064, and B2000 series.
 - b. Welded steel brackets, B-Line B3066 or B3067, with roller chair or adjustable steel yoke pipe roll. B-Line B3120 or B3110. Use pipe protection shield or saddles on insulated lines.

E. Floor Supports

1. Hot piping under 6 inch and all cold piping:
 - a. Carbon steel adjustable pipe saddle and nipple attached to steel base stand sized for pipe elevation. B-Line B3093 and B3088T or B3090 and B3088. Pipe saddle shall be screwed or welded to appropriate base stand.
2. Hot piping 6 inch and larger:

01/2017

15140-3

91-0134.1

- a. Adjustable Roller stand with base plate, B-Line B3117SL [or B3118SL]
- b. Adjustable roller support and steel support sized for elevation, B-Line B3124

F. Vertical Supports

- 1. Steel riser clamp sized to fit outside diameter of pipe, B-Line B3373.

G. Copper Tubing Supports

- 1. Hangers shall be sized to fit copper tubing outside diameters.
 - a. Adjustable steel swivel ring (band type) hanger, B-Line B3170CT.
 - b. Malleable iron ring hanger, B-Line B3198RCT or hinged ring hanger B3198HCT.
 - c. Malleable iron split-ring hanger with eye socket, B-Line B3173CT with B3222.
 - d. Adjustable steel clevis hanger, B-Line B3104CT.
- 2. For supporting vertical runs use epoxy painted or plastic coated riser clamps, B-Line B3373CT or B3373CTC.
- 3. For supporting copper tube to strut use epoxy painted pipe straps sized for copper tubing, B-Line B2000 series, or plastic inserted vibration isolation clamps, B-Line BVT series.

H. Plastic Pipe Supports

- 1. V-Bottom clevis hanger with galvanized 18-gauge continuous support channel, B-Line B3106 and B3106V, to form a continuous support system for plastic pipe or flexible tubing.

I. Supplementary Structural Supports

- 1. Design and fabricate supports using structural quality steel bolted framing materials as manufactured by Cooper B-Line. Channels shall be roll formed, 12 gauge ASTM A1011 SS Grade 33 steel, 1-5/8 inch by 1-5/8 inch or greater as required by loading conditions. Submit designs for pipe tunnels, pipe galleries, etc., to engineer for approval. Use clamps and fittings designed for use with the strut system.

2.03 UPPER ATTACHMENTS

A. Beam Clamps

- 1. Beam clamps shall be used where piping is to be suspended from building steel. Clamp type shall be selected based on load to be supported, and load configuration.
- 2. C-Clamps shall have locknuts and cup point set screws, B-Line B351L, or B3036L. Top flange c-clamps shall be used when attaching a hanger rod to

01/2017

15140-4

91-0134.1

the top flange of structural shapes, B-Line B3034 or B3033. Refer to manufacturer's recommendation for setscrew torque. Retaining straps shall be used to maintain the clamps position on the beam where required.

3. Center loaded beam clamps shall be used where specified. Steel clamps shall be B-Line B3050, or B3055. Malleable iron or forged steel beam clamps with cross bolt shall be B-Line B3054 or B3291-B3297 Series as required to fit beams.

B. Concrete Inserts

1. Cast in place spot concrete inserts shall be used where applicable; either steel or malleable iron body, B-Line B2500 or B3014. Spot inserts shall allow for lateral adjustment and have means for attachment to forms. Select inserts to suit threaded hanger rod sizes, B-Line N2500, or B3014N series.
2. Continuous concrete inserts shall be used where applicable. Channels shall be 12 gauge, ASTM A1011 SS Grade 33 structural quality carbon steel, complete with Styrofoam inserts and end caps with nail holes for attachment to forms. The continuous concrete insert shall have a load rating of 2,000 lbs./ft. in concrete, B-Line B22I, 32I, or 52I. Select channel nuts suitable for strut and rod sizes.

2.04 VIBRATION ISOLATION AND SUPPORTS

- A. For refrigeration, air conditioning, hydraulic, pneumatic, and other vibrating system applications, use a clamp that has a vibration-dampening insert and a nylon-inserted locknut. For copper and steel tubing use B-Line BVT series Vibraclamps, for pipe sizes use BVP series.
- B. For larger tubing or piping subjected to vibration, use neoprene or spring hangers as required.
- C. For base mounted equipment use vibration pads, molded neoprene mounts, or spring mounts as required.
- D. Vibration isolation products as manufactured by B-Line, Vibratrol systems.

2.05 ACCESSORIES

- A. Hanger Rods shall be threaded both ends, or continuous threaded rods of circular cross section. Use adjusting locknuts at upper attachments and hangers. No wire, chain, or perforated straps are allowed.
- B. Shields shall be 180 degree galvanized sheet metal, 12 inch minimum length, 18 gauge minimum thickness, designed to match outside diameter of the insulated pipe, B-Line B3151.
- C. Pipe protection saddles shall be formed from carbon steel, 1/8 inch minimum thickness, sized for insulation thickness. Saddles for pipe sizes greater than 12 inch

01/2017

15140-5

91-0134.1

shall have a center support rib.

2.06 FINISHES

A. Indoor Finishes

1. Hangers and clamps for support of bare copper piping shall be coated with copper colored epoxy paint, B-Line Dura-Copper®. Additional PVC coating of the epoxy painted hanger shall be used where necessary.
2. Hangers for other than bare copper pipe shall be zinc plated in accordance with ASTM B633 OR shall have an electro-deposited green epoxy finish, B-Line Dura-Green®.
3. Strut channels shall be pre-galvanized in accordance with ASTM A653 SS Grade 33 G90 OR have an electro-deposited green epoxy finish, B-Line Dura-Green®.

B. Outdoor and Corrosive Area Finishes

1. Hangers and strut located outdoors shall be hot-dip galvanized after fabrication in accordance with ASTM A123. All hanger hardware shall be hot dip galvanized or stainless steel. Zinc plated hardware is not acceptable for outdoor or corrosive use.
2. Hangers and strut located in corrosive areas shall be type 316 stainless steel with stainless steel hardware.

PART 3 - EXECUTION

3.01 PIPE HANGERS AND SUPPORTS

- A. Pipe shall be adequately supported by pipe hanger and supports specified in PART 2 - PRODUCTS. Hangers for insulated pipes shall be sized to accommodate insulation thickness.
- B. Horizontal steel piping shall be supported in accordance with MSS SP-69 Tables 3 and 4, excerpts of which follow below:

01/2017

15140-6

91-0134.1

NOMINAL PIPE SIZE (INCHES)	ROD DIAMETER (INCHES)	MAXIMUM SPACING (FEET)
1/2 to 1-1/4	3/8	7
1-1/2	3/8	9
2	3/8	10
2-1/2	1/2	11
3	1/2	12
3-1/2	1/2	13
4	5/8	14
5	5/8	16
6	3/4	17
8	3/4	19
10	7/8	22
12	7/8	23
14	1	25
16	1	27

- C. Horizontal copper tubing shall be supported in accordance with MSS SP-69 Tables 3 and 4, excerpts of which follow below:

NOMINAL PIPE SIZE (INCHES)	ROD DIAMETER (INCHES)	MAXIMUM SPACING (FEET)
1/2 to 3/4	3/8	5
1	3/8	6
1-1/4	3/8	7
1-1/2	3/8	8
2	3/8	8
2-1/2	1/2	9
3	1/2	10
3-1/2	1/2	11
4	1/2	12
5	1/2	13
6	5/8	14
8	3/4	16

- D. Provide means of preventing dissimilar metal contact such as plastic coated hangers, copper colored epoxy paint, or non-adhesive isolation tape- B-Line Iso-pipe. Galvanized felt isolators sized for copper tubing may also be used, B-Line B3195CT.
- E. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.
- F. Install hangers to provide a minimum of 1/2 inch space between finished covering and adjacent work.
- G. Place a hanger within 12 inches of each horizontal elbow.
- H. Support vertical piping independently of connected horizontal piping. Support vertical pipes at every [other] floor. Wherever possible, locate riser clamps directly

01/2017

15140-7

91-0134.1

below pipe couplings or shear lugs.

- I. Where several pipes can be installed in parallel and at the same elevation, provide trapeze hangers as specified in section 2.02 C. Trapeze hangers shall be spaced according to the smallest pipe size, or install intermediate supports according to schedule in section 3.01B.
- J. Do not support piping from other pipes, ductwork, or other equipment that is not building structure.

3.02 CONCRETE INSERTS

- A. Provide inserts for placement in formwork before concrete is poured.
- B. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- C. Where concrete slabs form-finished ceilings, provide inserts to be flush with slab surface.
- D. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inch.

END OF SECTION

01/2017

15140-8

91-0134.1

SECTION 16001

GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. This section covers the work necessary for the construction of the electrical system shown on the accompanying Drawings. The work included under this section includes providing all materials, furnishing all labor and except as provided under other sections of these Specifications, by others or by the Owner, to install a complete functioning electrical system. This installation shall include all incidental items whether shown on the drawing, call for in these Specifications or not. It is not the intent for the Drawings or these Specifications to show or specify each and every required device, conduit, conductor, control device or other incidental items.

1.02 REFERENCES

- A. American National Standards Institute (ANSI):
1. C80.1, Rigid Steel Conduit-Zinc Coated.
 2. C80.3, Electrical Metallic Tubing-Zinc Coated.
 3. C80.5, Rigid Aluminum Conduit.
 4. C80.6, Intermediate Metal Conduit (MC)-Zinc Coated.
 5. Nema RN1, PVC Coated Rigid Steel.
 6. Z55.1, Gray Finishes for Industrial Apparatus and Equipment.
- B. Federal Specifications (FS):
1. W-C-596, Connector, Receptacle, Electrical.
 2. W-S-896E, Switches, Toggle, Flush Mounted.
- C. National Electrical Contractor's Association, Inc. (NECA): 5055, Standard of Installation.
- D. National Electrical Manufacturers Association (NEMA):
1. AB1, Molded Case Circuit Breakers and Molded Case Switches.
 2. ICS2, Standard for Industrial Control Devices, Controllers, and Assemblies.
 3. PB1, Panelboards.

01/2017

16001-1

91-0134.1
Hillers

4. ST20, Dry-Type Transformers for General Applications.
 5. TC2, Electrical Plastic Tubing (EB) and Conduit (EPC-40 and EPC-80).
 6. TC3, PVC Fittings for Use with Rigid PVC Conduit and Tubing.
 7. WD1, General Requirements for Wiring Devices.
 8. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
- E. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
- F. Underwriters Laboratories, Inc. (UL):
1. 1, Standard for Safety Flexible Metal Conduit.
 2. 651, Standard for Safety Schedule 40 and 80 PVC Conduit.
 3. 845, Standard for Safety Motor Control Centers.
 4. Standard for Dry-Type General Purpose and Power Transformers.

1.03 ELECTRICAL SUBCONTRACTOR QUALIFICATIONS

- A. The electrical subcontractor shall meet or exceed the criteria described below:
1. The electrical subcontractor shall be licensed in the State of Florida.
 2. The electrical subcontractor shall have successfully completed electrical construction on three water treatment plant or water booster pump station related projects within the past six years.
 3. The electrical subcontractor shall have, in their employ, the following full time employees that will be assigned to perform the electrical work of this contract:
 - a. A minimum of (1) Licensed Master Electrician who is overall responsible for the supervision of personnel performing the construction, installation startup and testing of all electrical related facilities and systems.
 - b. A minimum of (1) Licensed Journeyman Electrician responsible for the daily construction activities and guidance of the electrical contractor's on site employees. The Licensed Journeyman's primary assignment will be the construction of the electrical facilities of this project until project completion. The Licensed Journeyman shall be certified in local County of this project or shall meet the reciprocity standards of Florida State Statute 489 Part II.
 4. The electrical subcontractor shall not be involved in any current or pending litigation which may have a material negative impact on the ability to complete the

01/2017

16001-2

91-0134.1
Hillers

project. The electrical subcontractor shall provide a statement advising all current or pending litigations.

1.04 CODES AND PERMITS

- A. All work shall be performed in strict accordance with the current addition of National Fire Protection Association NFPA 70 (National Electrical Code), IEEE Standards, NECA Standards, NEMA Standards, local codes, Local County codes, Florida Building codes with amendments and shall comply with the Authority Having Jurisdiction (AHJ) over the project. Conflicts will be resolved at the discretion of the Engineer.
- B. Wherever the Specifications or Drawings exceed those of the applicable codes or authorities the requirements contained herein shall govern. Code compliance is mandatory. Nothing contained in these Contract Documents shall be construed as permitting work to be performed outside the requirements of the applicable codes or governing authorities.
- C. Obtain all required permits and pay all fees required by any agency having jurisdiction over this project. Upon completion of the work obtain from regulatory authorities signed permits indicating the work is acceptable to the authority having jurisdiction.

1.05 COMPLIANCE

- A. All the work executed under this section shall meet the General and Special Conditions sections of this Specification as if fully stated herein.

1.06 SUBMITTALS

- A. Furnish submittal and shop drawing information for minimum of the following:
 1. Conduit and wire
 2. Junction boxes
 3. Supports
 4. Electrical equipment, such as panelboard, breakers, disconnect, etc., as applicable.

1.07 INTENT OF DRAWINGS

- A. The electrical drawings show only general locations of equipment devices, and raceways, unless specifically dimensioned. The Contractor shall be responsible for the proper routing of raceways, final sizing of conductors, and location of equipment and connections. The control diagrams for the equipment are diagrammatic and intended to show the desired operation. The Contractor shall install the controls exactly as shown unless this operation will cause failure of the equipment due to unique operating characteristics of the supplied equipment not known to the Engineer. The Contractor shall notify the Engineer of such conflicts within 30 days of the Contract award and receive written resolution before proceeding with the Contract work. Any damages to Contractor-supplied equipment arising due to improper control shall be the responsibility of the Contractor.

01/2017

16001-3

91-0134.1

Hillers

1.08 PRE-BID SITE VISIT

- A. The Contractor shall familiarize himself with the site prior to bidding and verify that the specified new equipment can be implemented within his proposed Bid price.

1.09 PROJECT DESCRIPTION

- A. Provide and install all electrical equipment as shown on drawings and as describes in specifications complete in place.
- B. Provide and install new underground conduits, pull boxes/manholes and wiring indicated on drawings complete in place.
- C. Provide and install new lighting and convenience power systems, indicated on the drawings, complete in place.
- D. Provide and install all conduit and wire required for power, instrumentation, and control systems complete in place.
- E. Provide and install new lightning protection system and grounding system as shown in drawings and as specified in specification complete in place.
- F. Provide all miscellaneous electrical including disconnect switches, terminations, fittings, junction boxes, terminal junction boxes, mounting supports, etc. not specified but obviously necessary for complete working systems in place.

1.10 TEMPORARY POWER

- A. Provide temporary power for all office trailers and for all construction areas as needed. Coordinate with local power and telephone utility for temporary construction power and telephone service, if needed, during construction. Unless otherwise agreed by the Owner, no construction power shall be from the existing plant power distribution system.

1.11 ENVIRONMENTAL CONDITIONS

- A. All chemical rooms and areas shall be designated as corrosive.
- B. All indoor chemical and process equipment areas shall be considered wet locations.
- C. Electrical equipment in rooms designated as Classified by NFPA 70 (national electrical code) as Division 1 or Division 2 shall meet all requirements set forth for that classification as described in NEC article 500.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Use of new quality materials is required on this project.

01/2017

16001-4

91-0134.1

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- B. Only materials suitable for the space provided shall be used.
- C. Provide materials and equipment listed by Underwriter Laboratories (UL) wherever standards have been established by that agency.
- D. Where two or more units of the same class of material or equipment are required, provide products of a single manufacturer. Component parts of materials or equipment need not be products of the same manufacturer.

2.02 STANDARD PRODUCTS

- A. Unless otherwise indicated, provide materials and equipment which are the standard products of manufacturers regularly engaged in the production of such materials and equipment. Provide the manufacturer's latest standard design that conforms to these Specifications.

2.03 EQUIPMENT FINISH

- A. Provide materials and equipment with manufacturer's standard finish system. Provide manufacturer's standard finish color, except where specific color or materials are indicated. If manufacturer has no standard color, finish equipment in accordance with ANSI No. 61, light gray color.

2.04 RACEWAYS

- A. Rigid Aluminum Conduit: Use rigid aluminum conduit, including threaded type couplings, elbows, nipples, and other fittings, Type 6063, copper-free aluminum alloy and meeting the requirements of ANSI C80.5 and UL 6., and the NEC.
- B. Flexible Metal Conduit: Use UL listed liquid-tight flexible metal conduit consisting of galvanized steel flexible conduit covered with an extruded PVC jacket and terminated with nylon bushings or bushings with steel or malleable iron body and insulated throat and sealing O-ring.
- C. PVC Schedule 40 Conduit: Use UL listed for concrete encasement, underground direct burial, concealed or direct sunlight exposure, and 90 degrees C insulated conductors. Meet requirements of NEMA TC 2 and UL 651.

2.05 RACEWAY FITTINGS

- A. Fittings for Rigid Aluminum Conduit:
 1. Use insulated throat bushings of metal with integral plastic bushings rated for 105 degrees C. For insulated throat bushings for rigid aluminum conduit, use Thomas and Betts Nylon Insulated Metallic Bushings, or O.Z. Gedney Type B.
 2. Use Myers Scru-Tite hubs for rigid aluminum conduit.

01/2017

16001-5

91-0134.1
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3. Use conduit bodies for rigid aluminum conduit of metal and sized as required by the NEC (NFPA 70-1984). Use Appleton Form 35 threaded Unilets; Crouse-Hinds Mark 9 or Form 7 threaded condulets; Killark Series O Electrolets; or equal, for normal conduit bodies for rigid aluminum conduit. Where conduit bodies for rigid aluminum conduit are required to be approved for hazardous (classified) locations, use conduit bodies manufactured by Appleton, Crouse-Hinds, or Killark.
4. Use only couplings for rigid aluminum conduit supplied by the conduit manufacturer.
5. Use Appleton Type EYF, EYM, or ESU; Crouse-Hinds Type EYS or EZS; or Killark Type EY or EYS, sealing fittings for rigid aluminum conduit. Where condensate may collect on top of a seal, provide a drain by using Appleton Type SF or Crouse-Hinds Type EYD or EZD Drain Seal.
6. Use Appleton Type ECDB or Crouse-Hinds ECD drain fittings for rigid aluminum conduit.
7. Fittings for Liquid-Tight Flexible Metal Conduit: use insulated throat connectors for liquid-tight flexible metal conduit of metal with an integral plastic bushing rated for 105 degrees C, and of the long design type extending outside of the box or other device at least 2 inches. Use Thomas and Betts Super-Tite Nylon Insulated Connectors, or equal.
8. Fittings in Hazardous Areas: In hazardous areas, use only fittings approved for the atmosphere involved.
9. Use cable sealing fittings forming a watertight nonslip connection to pass cords and cables into conduit. Size cable sealing fitting for the conductor OD. For conductors with OD's of 1/2 inch or less, provide a neoprene bushing where the conductor enters the connector. Use Crouse-Hinds CGBS, Appleton CG Series, or equal, cable sealing fittings.

B. Fittings for PVC conduit:

1. Meet requirements of NEMA TC-3.
2. Type: PVC, slip-on.

2.06 CONDUCTORS 600 VOLTS AND BELOW

A. Cable shall be rated for 600 volts and shall meet the requirements below:

1. All conductors shall be stranded.
2. All wire shall be brought to the job in unbroken packages and shall bear the date of manufacturing; not older than 12 months.

01/2017

16001-6

91-0134.1
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3. Type of wire shall be XHHW rated 75 degrees C suitable for wet locations except where required otherwise by the Drawings. THHN/THWN shall only be used for above-ground dry locations at 120 volts or less phase to ground.
4. No wire smaller than No. 12 gauge shall be used for power circuits unless specifically indicated.
5. Conductor metal shall be copper. No aluminum will be allowed.
6. All conductors shall be meggered after installation and insulation must be in compliance with the Insulated Power Cable Engineers Association Minimum Values of Insulation Resistance.
7. Wire Color Identification: Neutral wire white; live wire black, red, blue on 120/ 208-volt system; live wire brown, purple, yellow on 277/ 480-volt system. Ground wire green.
8. Fixture Connection: Circuit wiring connections to fixture wire shall be made with pressure type solderless connectors. Buchanan, Scotch-lock, Wing Nut, or approved equal, complete with insulator and security ring.
9. Acceptable manufacturers:
 - a. Southwire
 - b. Rome Cable & Wire
 - c. Okonite Wire & Cable

B. INSTRUMENTATION CABLE TYPE "B", TWISTED SHIELDED PAIR (TSP)

1. General: The instrumentation cable shall consist of single or multiple shielded twisted pairs (tsp) with 600 volt insulation and a 105 degree C rating. The individual twisted pair of a multi-pair cable shall consist of copper conductors with an ethylene-propylene insulation, #16 AWG tinned stranded copper drain wire and an overall aluminum / mylar sheath. For the multiple pair cable assembly, a #16 AWG overall tinned copper stranded drain wire shall be provided together with an overall aluminum mylar shield and a chloro-sulfonated polyethylene compound jacket. The cable shall be flame retardant.
2. Insulation: Pair conductors shall be insulated with a heat, moisture, flame and chemically resistant mechanically rugged ethylene-propylene insulating compound. The insulation thickness shall be as follows:

<u>AWG</u>	<u>Minimum Insulation Thickness</u>
#16	45 mils

3. Conductors shall be tin coated stranded copper ASTM B-33 and B-8.

01/2017

16001-7

91-0134.1
Hillers

4. Jacket: Overall cable jacket shall be chloro-sulfonated polyethylene compound, exceeding the requirements of ICEA S-10-81. The cable shall be suitable for installation in cable tray, conduit in wet or dry location, and shall meet IPCEA Standards.
5. Shields: Aluminum mylar tape shields with tinned copper drain wire shall be applied over the individually twisted pairs prior to placement of the cable jacket. Another aluminum/mylar tape with tinned copper drain wire shall be applied over the assembled pairs prior to placement of the cable jacket. Grounding of shields shall be according to equipment manufacturer's recommendations.
6. The conductors shall be tested after installation and insulation must be in compliance with the manufacturer's equipment.
7. Acceptable manufacturers:
 - a. Southwire
 - b. Rome Cable & Wire
 - c. Belden Wire
 - d. Carol Wire & Cable.
 - e. Or Engineer Approved equal.

2.07 JUNCTION BOXES

- A. Box: 14-gauge, ASTM A240, Type 316 stainless steel, unless otherwise noted. For corrosive area, use FRP junction box if not direct exposed to sunlight.
- B. Cover: Hinged with screws.
- C. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.

2.08 COVER PLATES

- A. Provide plates fitting closely and tightly to the box on which they are to be installed. On surface-mounted boxes, provide plates which do not extend beyond the sides of the box unless the plates do not have sharp corners or edges.
- B. Provide stainless steel one-piece with smooth exterior faces and with oval head stainless steel metal mounting screws of a color matching that of the plate.
- C. Where weatherproof devices are indicated, provide a gasketed, weatherproof, cast metal, stainless steel or fiberglass reinforced plastic (FRP) cover plate with individual cap over each opening, and stainless steel mounting screws. Plates shall have caps held by stainless steel springs.

01/2017

16001-8

91-0134.1
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2.09 TERMINAL BLOCK (0 TO 600 VOLTS)

- A. UL 486E and UL 1059.
- B. Size components to allow insertion of necessary wire sizes.
- C. Capable of termination of all control circuits entering or leaving equipment, panels, or boxes.
- D. Screw clamp compression, dead front barrier type, with current bar providing direct contact with wire between the compression screw and yoke.
- E. Yoke, current bar, and clamping screw of high strength and high conductivity metal.
- F. Yoke shall guide all strands of wire into terminal.
- G. Current bar shall ensure vibration-proof connection.
- H. Terminals:
 - 1. Capable of wire connections without special preparation other than stripping.
 - 2. Capable of jumper installation with no loss of terminal or rail space.
 - 3. Individual, rail mounted.
- I. Marking system allowing use of preprinted or field-marked tags.
- J. Manufacturers:
 - 1. Weidmuller
 - 2. Ideal
 - 3. Electrovert

2.10 SWITCHES

- A. Rating: 20 amps, 120/277 volts.
- B. Enclosure NEMA rating: See drawings

2.11 RECEPTACLES

- A. Provide UL listed, specification grade receptacles meeting NEMA WD 1 performance standards and Federal Specification W-C-596 and having a contact arrangement such that contact is made on two sides of each inserted blade without detent. Use two-pole, three-wire grounding type receptacles rated 20 amps, 125 volts, NEMA Configuration 5-20R and with screw type wire terminals suitable for No. 10 AWG. Provide phenolic composition bases colored brown.

01/2017

16001-9

91-0134.1
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2.12 TERMINAL JUNCTION BOX

- A. Cover: Hinged, unless otherwise shown.
- B. Terminal Blocks: Provide separate connection point for each conductor entering or leaving box.
 - 1. Spare Terminal Points: 20 percent.
- C. Interior Finish: Paint with white enamel or lacquer.

2.13 SUPPORT AND FRAMING CHANNELS

- A. Material:
 - 1. Dry indoors - galvanized.
 - 2. All Other Areas: ASTM A167, Type 316 stainless steel. For corrosive area, use fiber glass-reinforced polyester (FRP) channels.
- B. Finish:
 - 1. Dry indoors - galvanized.
 - 2. All Other Areas: ASTM A167, Type 316 stainless. For corrosive area, use fiber glass-reinforced polyester (FRP) channels.
- C. Inserts: Continuous.
- D. Conduit Clamps: galvanized clamps in door. 316L stainless steel clamps for corrosive area.
- E. Manufacturers:
 - 1. B-Line.
 - 2. Unistrut.
 - 3. Or Engineer Approved

2.14 LIGHTING AND POWER DISTRIBUTION PANELBOARD

- A. NEMA PB I, NFPA 70, and UL 67, including panelboards installed in motor control equipment.
- B. Panelboards and Circuit Breakers: Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
- C. Short-Circuit Current Equipment Rating: Fully rated; series connected unacceptable.

01/2017

16001-10

91-0134.1
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- D. Rating: If not otherwise shown in plans. Applicable to a system with available short-circuit current of 25,000 amperes rms symmetrical at 208Y/120 or 120/240 volts and 65,000 amperes rms symmetrical at 480Y/277 volts.
- E. Where ground fault interrupter circuit breakers are indicated or required by code: 5 mA trip, 10,000 amps interrupting capacity circuit breakers.
- F. Cabinet: As shown on plans.
- G. Bus Bar:
1. Material: Copper, full sized throughout length.
 2. Provide for mounting of future circuit breakers along full length of bus regardless of number of units and spaces shown. Machine, drill, and tap as required for current and future positions.
 3. Neutral: Insulated, rated 150 percent of phase bus bars with at least one terminal screw for each branch circuit.
 4. Ground: Copper, installed on panelboard frame, bonded to box with at least one terminal screw for each circuit.
 5. Lugs and Connection Points:
 - a. Suitable for either copper or aluminum conductors.
 - b. Solderless main lugs for main, neutral, and ground bus bars.
 - c. Subfeed or through-feed lugs as shown.
 6. Bolt together and rigidly support bus bars and connection straps on molded insulators.
- H. Circuit Breakers:
1. NEMA AB 1 and UL 489.
 2. Thermal-magnetic, quick-make, quick-break, molded case, of the indicating type showing ON/ OFF and TRIPPED positions of operating handle.
 3. Noninterchangeable, in accordance with NFPA 70.
 4. Locking: Provisions for handle padlocking, unless otherwise shown.
 5. Type: Bolt-on circuit breakers in all panelboards.
 6. Multipole circuit breakers designed to automatically open all poles when an overload occurs on one pole.

01/2017

16001-11

91-0134.1
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7. Do not substitute single-pole circuit breakers with handle ties for multipole breakers.
8. Do not use tandem or dual circuit breakers in normal single-pole spaces.
9. Ground Fault Interrupter:
 - a. Equip with conventional thermal-magnetic trip and ground fault sensor rated to trip in 0.025 second for a 5-milliampere ground fault (UL 943, Class A sensitivity).
 - b. Sensor with same rating as circuit breaker and a push-to-test button.

I. Manufacturers:

1. Square D;
2. Eaton;
3. Siemens;
4. Or Engineer approved equal.

2.15 BACKFILL MATERIAL FOR CONDUIT ZONE

- A. The conduit zone shall include full trench width from a point 4 inches below the bottom of the conduit to a point 4 inches above the top of the conduit.
- B. Backfill material for the conduit zone shall be natural material from the trench excavation, structural excavation, or site grading, with a maximum particle size of 1/4-inch and free from organic matter, roots, construction debris, and excessive fines. Tamp and compact the conduit zone material to 90 percent relative compaction.

2.16 GROUNDING

- A. All equipment and enclosures, and the complete conduit system shall be grounded securely in accordance with pertinent sections of Article 250 of NEC. All electrically operated equipment shall be bonded to the grounding conduit system via bonding jumpers, grounding busses, and grounding bushings. Grounding shall include the grounding conductors shown on Drawings and additional grounding as required above. All enclosures shall contain a grounding buss tied to the conduit system and enclosure utilizing bonding jumpers #6 minimum.
- B. Ground Rods: Copper clad steel, minimum 3/4 inch diameter and 10 foot length minimum, unless otherwise noted on drawings.

PART 3 - EXECUTION

01/2017

16001-12

91-0134.1
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3.01 GENERAL

- A. Craftsmanship is the essence of the work in this project.
- B. Install materials and equipment in a workmanlike manner utilizing craftsmen skilled in the particular trade. Provide work that has a neat and finished appearance.
- C. Coordinate electrical work with Engineer and work of other trades to avoid conflicts, errors, delays, and unnecessary interference with operation of the plant during construction.
- D. Check the approximate locations of light fixtures, electrical outlets, equipment, and other electrical system components shown on Drawings for conflicts with openings, structural members, and components of other systems and equipment having fixed locations. In the event of conflicts, consult the Engineer. The Engineer's decision shall govern. Make modifications and changes required.

3.02 PROTECTION DURING CONSTRUCTION

- A. Throughout this Contract, Provide protection for materials and equipment against loss or damage in accordance with provisions elsewhere in these Contract Documents. Protect everything from the effects of weather. Prior to installation, store items in a clean, dry, indoor locations. Store items subject to corrosion under damp conditions and items containing electrical insulation, such as transformers, conductors, motors, and controls, in a clean, dry, indoor, heated location. Energize all space heaters furnished with equipment.
- B. Following installation, protect materials and equipment from corrosion, physical damage, and the effects of moisture on insulation. Cap conduit runs during construction with manufactured seals. Keep openings in boxes or equipment closed during construction. Energize all space heaters furnished with equipment.

3.03 MATERIAL AND EQUIPMENT INSTALLATION

- A. Follow manufacturer's installation instructions explicitly, unless otherwise indicated. Wherever any conflict arises between manufacturer's instructions, codes and regulations, and these Contract Documents, follow Engineer's decision. Keep copy of manufacturer's installation instructions on the jobsite available for review at all times.
- B. All outdoor panels shall be security fasted to meet the Florida Building Codes Wind Loading requirements, indicated or not on drawings.

3.04 CUTTING AND PATCHING

- A. Lay out work carefully in advance. Do not cut or notch any structural member or building surface without specific approval of Engineer. Carefully carry out any cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, paving, or other surfaces required for the installation, support, or anchorage of conduit, raceways, or other electrical materials and equipment. Following such work, restore surfaces neatly to original condition. Use skilled craftsmen of the trades involved.

01/2017

16001-13

91-0134.1

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3.05 LOAD BALANCE

- A. The Drawings and Specifications indicate circuiting to electrical loads and distribution equipment; however, after installation, if necessary, balance electrical load between phases as nearly as possible on switchboards, panelboards, motor control centers, etc.

3.06 MOTOR ROTATION

- A. After final service connections are made, check and correct, if necessary, the rotation of all motors.
- B. Coordinate rotation checks with the Engineer and the Contractor responsible for the driven equipment. Submit a written report to the Engineer for each motor verifying that rotation has been checked and corrected.

3.07 CLEANING AND TOUCH-UP PAINTING

- A. Keep the premises free from accumulation of waste material or rubbish. Upon completion of work, remove materials, scraps, and debris from premises and from interior and exterior of all devices and equipment. Touch up scratches, scrapes, or chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the type, color, consistency, and type of surface of the original finish.

3.08 CONDUIT APPLICATION

- A. Use PVC conduit for all corrosive areas and for direct buried applications. Use PVC conduit for concrete encased power applications and under slab conduits.
- B. Use Rigid Aluminum conduit in all above ground areas, except for corrosive areas.
- C. Conduits must be kept within the furring lines of building unless specifically noted to be exposed.
- D. Provide all necessary sleeves and chases required where conduits pass through floors or walls seal all openings and finish to match adjacent surfaces. Where exposed conduits pass through walls, floors or ceilings, provide fill of same materials as the penetrated surface. Coat all Rigid Aluminum conduit with asphalt coating or duct wrap to avoid direct contact with concrete.
- E. Conduits entering cabinets, pull boxes or outlet boxes shall be secured with double galvanized locknuts, one on inside and outside of box, and bushings.
- F. Conduit shall be sized in accordance with the NEC and shall be of such size and so installed that conductors may be drawn in without injury or excessive strain.
- G. Make final connection to motors and wall or ceiling-mounted fans where flexible connection is required to minimize vibration or where required to facilitate removal or adjustment of equipment, with 18-inch minimum, 60-inch maximum length of liquid-tight,

01/2017

16001-14

91-0134.1

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PVC jacketed, flexible steel conduit where the required conduit size is 4 inches or less. For larger sizes, use nonflexible conduit as specified.

- H. Flash and counterflash all conduits penetrating membrane. All roof penetration shall be sealed unless directed otherwise by the Engineer.
- I. Exposed Raceways: Exposed raceways shall be installed parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings.
- J. Changes in Direction of runs: Changes in direction of runs shall be made with symmetrical bends or cast metal fittings. Field made bends and offsets shall be made with an approved hickey or conduit bending machine. Crushed or deformed raceways shall not be installed. Trapped raceways in damp and wet locations shall be avoided where possible. Care shall be taken to prevent the lodgment of plaster, dirt, or trash in raceways, boxes fittings, and equipment during the course of construction. Clogged raceways shall be entirely freed of obstructions or shall be replaced.
- K. Supports: Raceways shall be securely and rigidly fastened in place at intervals of not more than 10 feet with approved pipe straps, wall brackets, conduit clamps, conduit hangers, threaded C-clamps with retainers, or ceiling trapeze. All conduit fasteners shall be 316 stainless steel.
- L. Provide rigid aluminum elbows with heat shrink wrap where conduit changes from direct buried to exposed.

3.10 INSTRUMENT GROUNDING- SURGE SUPPRESSION

- A. Connect all instrument surge protection with #6 insulated copper groundwire (in PVC conduit where above grade) to closest plant ground system.

3.11 CONDUCTORS

- A. No conductor shall be drawn into conduit until conduit system is complete. Lubricant shall be approved by wire manufacturer.

3.12 COLOR MARKINGS

- A. Where two or more conduits run to a single outlet box, each circuit shall be color coded as a guide in making connections. Colors shall be carried continuously throughout the system if more than one multiwire branch circuit is carried through a single raceway. All circuit conductors of the same color shall be connected to the same underground feeder conductor throughout the installation.

3.13 CIRCUITS

- A. Deviations from conduit runs will be permitted with the Engineer's approval. Combining circuits in single conduit is permitted with proper identification and wire size increase required by NEC.

01/2017

16001-15

91-0134.1
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3.14 CONNECTIONS TO EQUIPMENT

- A. Provide all conduits, wiring, and connections for equipment furnished by the Owner or under other sections, including line and low voltage wiring for all equipment. Connections to motors shall be with flexible liquid-tight conduit in accordance with NEC. Obtain required information from the other trades and rough-in to meet requirements of said equipment. No allowance will be made for failure to comply with obtaining complete information from other trades.

3.18 TOUCH UP

- A. After the equipment is installed, touch up any scratches, marks, etc., incurred during shipment or installation of equipment.

3.19 TESTS

- A. General: Carry out tests specified hereinafter and as indicated under individual items of materials and equipment specified in other sections.
- B. Operations: After the electrical system installation is completed and at such time as the Engineer may indicate, conduct an operating test for approval. Demonstrate that the equipment operates in accordance with the requirements of these Specifications and Drawings. Perform the test in the presence of the Engineer or his authorized representative. Furnish all instruments and personnel required for the tests. The Owner will furnish the necessary electric power. All power reading reports are required at this demonstration time.

- END OF SECTION -

01/2017

16001-16

91-0134.1
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SECTION 16670

LIGHTNING PROTECTION SYSTEM

PART 1 - GENERAL

1.01 REFERENCES

A. The following is a list of standards, which may be referenced in this section:

1. Lightning Protection Institute (LPI): 175, Installation Standard.
2. National Fire Protection Association (NFPA): 780, Lightning Protection Code.
3. Underwriters Laboratories, Inc. (UL):
 - a. 96, Standard for Safety Lightning Protection Components.
 - b. 96A, Standard for Safety Installation Requirements for Lightning Protection Systems.

1.02 DESIGN REQUIREMENTS

A. Provide lightning protection system design for all of the following facilities:

1. New Hypochlorite storage tank and metering pump structure at Academic Village and Holly Lakes Booster Pump Stations.

B. The work includes, but is not limited to, furnishing and installing air terminals, grounding conductors, connectors, fasteners, ground rods, and other materials necessary for a complete lightning protective system.

C. Lightning protection system design to comply with all applicable provisions of LPI 175 and 176, UL 96 and 96A, and NFPA 780.

1.03 SUBMITTALS

A. Shop Drawings:

1. Reproducible Mylar Drawings:
 - a. Lightning protection system layout.
 - b. Component locations.
2. Detailed plans.
3. Down conductor.

01/2017

16670-2

91-0134.1
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- 4. Connecting conductor.
- 5. Bond strap.
- 6. Air terminals.
- 7. Fittings.
- 8. Connectors.
- 9. Ground rods.

B. Quality Control Submittals: Field test report.

C. Contract Closeout Submittals: Submit to OWNER:

- 1. Ground Witness Certification-Form LPI-175A, if applicable.
- 2. Post-Installation System Certification
- 3. UL 96 Master Label "C" Certification, if applicable.

1.04 QUALITY ASSURANCE

- A. Designer: Lightning protection system design shall be prepared by an LPI-certified designer or recognized lightning protection manufacturer.
- B. Manufacturer: All system components shall be the product of a single manufacturer regularly engaged in the manufacturing of lightning protection components in accordance with LPI 176 and UL 96.
- C. Installer: Lightning protection system shall be installed under the direct supervision of an LPI 175 Certified Master Installer.
- D. Inspector: Final installation and grounding connection inspection of the System shall be performed by the owner representative or agent in accordance with LPI 177.
- E. UL Compliance: Materials manufactured within scope of Underwriters Laboratories, Inc. shall conform to UL Standards and have an applied UL listing mark.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Thompson Lightning.
- B. IPC Protection.
- C. AC Lightning Security.

01/2017

16670-3

91-0134.1
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- D. Lightning & Grounding Systems, Inc.
- E. Bonded Lightning.
- F. Robbins Lightning, Inc.
- G. Or Owner approved equal.

2.02 GENERAL

- A. Complete system shall bear UL 96 Master Label C, if applicable.
- B. System Material: Copper or high copper content, heavy-duty bronze castings, unless otherwise specified.
- C. All material shall comply in weight, size, and composition for the class of structure to be protected as established by UL 96 and 96A.

2.03 AIR TERMINAL

- A. Material: Solid copper rods, with tapered points.
- B. Length: Sufficient to extend minimum 10 inches above object being protected.
- C. UL 96 Label B applied to each terminal.

2.04 CONDUCTORS

- A. Copper Cable: Bare medium stranded, having 97.5 percent minimum conductivity.
- B. Main Down Conductor: Per UL and NFPA criteria and based on building height.
- C. Connecting Conductor: Secondary size per UL and NFPA criteria
- D. Bonding Conductor: Flexible strap, minimum 3/4-inch wide by 1/8-inch thick.
- E. All main down and connecting conductors shall bear the UL 96 Label A, applied every 10 feet.

2.05 CABLE FASTENER AND ACCESSORIES

- A. Capable of withstanding minimum pull of 100 pounds.

2.06 FITTINGS

- A. Heavy-duty Class II bolt pressure type.
- B. Bolts, Screws, and Related Hardware: Stainless steel.

01/2017

16670-4

91-0134.1
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2.07 GROUND RODS

- A. Material: Copper clad steel – 3/4" x 20' long UL469 listed.

2.08 GROUNDING CONNECTIONS

- A. Welds: Exothermic process.
- B. Fasteners: Bolted clamp type, corrosion-resistant copper alloy.
- C. Hardware: Stainless Steel.

2.09 CABLE CONNECTIONS AND SPLICERS

- A. Welds: Exothermic process (underground).
- B. Fasteners: Bolted clamp type, corrosion-resistant copper alloy (above grade).
- C. Through-Roof Connectors: Straight or right angle with lead flashing washer and other appurtenances to match existing roofing system.

2.10 CONDUIT

- A. Schedule 40 PVC, as specified in Section 16010.

PART 3 - EXECUTION

3.01 GENERAL

- A. Workmanship to comply with all applicable provisions of LPI 175, UL 96 and 96A, and NFPA 780.
- B. Installation of bare copper materials on aluminum surfaces will not be permitted.
- C. Provide waterproof seal of all roof or top surface penetrations.
- D. Install system in inconspicuous manner so that components blend with building or structural aesthetics.

3.02 EXAMINATION

- A. Verify conditions prior to installation. Actual conditions may require adjustments in air terminal and ground rod locations.

3.03 AIR TERMINALS

- A. Supports: Brackets or braces.
- B. Parapet Bracket Attachment: Lag or expansion bolts.

01/2017

16670-5

91-0134.1
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- C. Secure base to contactor structural top surface or handrail with adhesive or lag or expansion bolts.
- D. Provide terminal flashing at structural penetrations.
- E. Perimeter Terminals:
 - 1. Maximum Spacing: 20 feet.
 - 2. Maximum Distance From Outside Edge of Building: 2 feet.
- F. Top surface Terminals: Maximum spacing 20 feet.

3.04 CONDUCTORS

- A. Conceal whenever practical.
- B. Provide 1-inch PVC conduit in building walls or columns for main downleads and roof risers.
- C. Support: Maximum spacing for exposed conductors.
 - 1. Vertical and Horizontal: 3 feet.
- D. Maintain horizontal and vertical conductor courses free from dips or pockets.
- E. Bends: Maximum 90 degrees, with minimum 8-inch radius.
- F. Install air terminal conductors on the structural roof surface when applicable.

3.05 BONDING

- A. Bond to Main Conductor System:
 - 1. All top surface mounted pump, motors, tanks, towers, handrails, and other sizeable metal objects.
 - 2. All metal objects if located within 6 feet of main conductors or another grounded object.
 - 3. Provide air terminals as required.
- B. Bond steel columns or major framing members to grounding system per National Electrical Code.
- C. Bond each main down conductor to grounding system.

3.06 GROUNDING SYSTEM

- A. Refer to specification 16010 for grounding system.

01/2017

16670-6

91-0134.1
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3.07 FIELD QUALITY CONTROL

- A. Isolate lightning protection system from other ground conditions while performing tests.
- B. Resistance: Test ground resistance of grounding system by the fall-of-potential method.
 - 1. Test Resistance to Ground: Maximum 25 ohms per National Electric Code.
 - 2. Install additional ground rods as required to obtain maximum allowable resistance.
- C. Test Report: (minimum 4 copies)
 - 1. Description of equipment tested.
 - 2. Description of test.
 - 3. Test results.
 - 4. Conclusions and recommendations.
 - 5. Appendix, including appropriate test forms.
 - 6. Identification of test equipment used.
 - 7. Signature of responsible test organization authority.

END OF SECTION

01/2017

16670-7

91-0134.1
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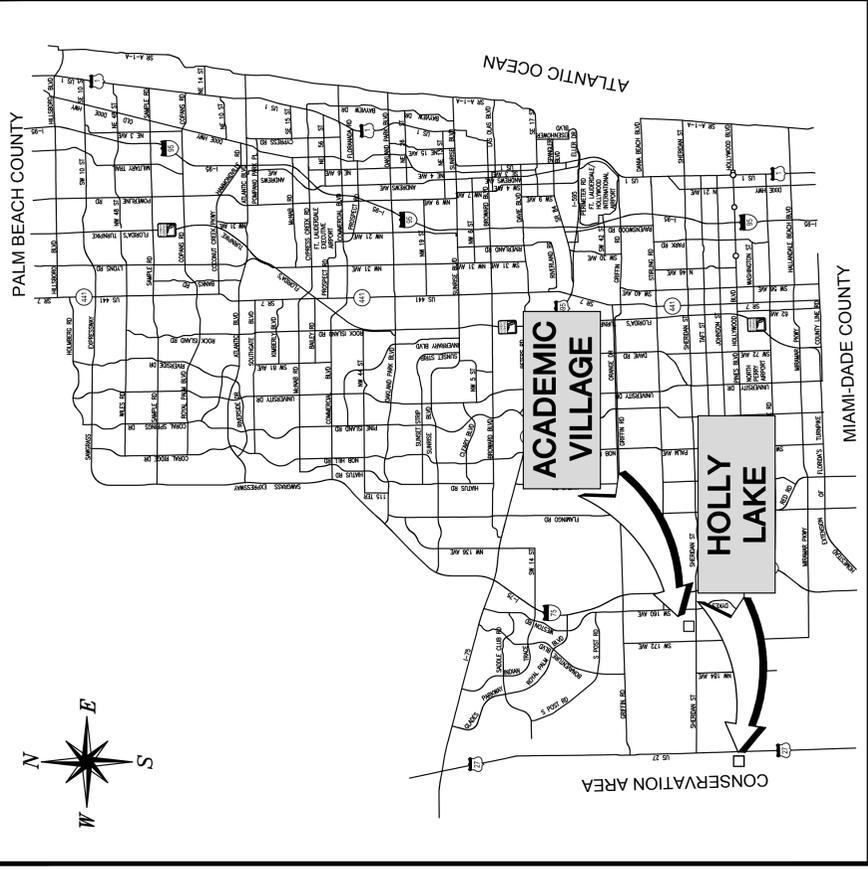
01/2017

16670-8

91-0134.1
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BOOSTER STATIONS DISINFECTION SYSTEM IMPROVEMENTS

HOLLY LAKES & ACADEMIC VILLAGE PEMBROKE PINES, FLORIDA



LOCATION MAP

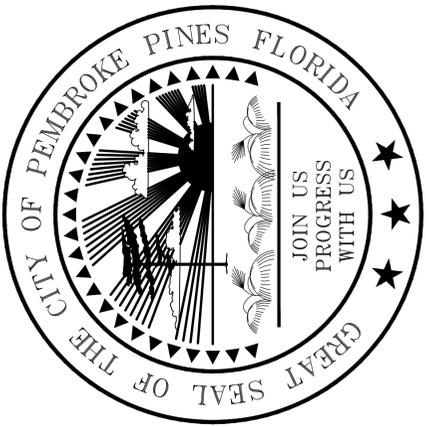
NO.	DRAWING INDEX	SHEET TITLE
G001	COVER	
G002	GENERAL NOTES & LEGEND	
G100	PROCESS FLOW DIAGRAM - HOLLY LAKES	
G200	PROCESS FLOW DIAGRAM - ACADEMIC VILLAGE	
C100	OVERALL SITE PLAN - HOLLY LAKES	
C101	DEMOLITION PLAN - HOLLY LAKES	
C200	OVERALL SITE PLAN - ACADEMIC VILLAGE	
C201	DEMOLITION PLAN - ACADEMIC VILLAGE	
C500	CIVIL DETAILS 1	
C501	CIVIL DETAILS 2	
M100	YARD PIPING PLAN - HOLLY LAKES	
M101	SODIUM HYPOCHLORITE SYSTEM PLAN VIEW - HOLLY LAKES	
M102	TANK ELEVATION & ISOMETRIC VIEWS - HOLLY LAKES	
M200	YARD PIPING PLAN - ACADEMIC VILLAGE	
M201	SODIUM HYPOCHLORITE SYSTEM PLAN VIEW - ACADEMIC VILLAGE	
M202	ELEVATIONS - ACADEMIC VILLAGE	
M500	MECHANICAL DETAILS 1	
M501	MECHANICAL DETAILS 2	
S100	SECONDARY CONTAINMENT DIKE - HOLLY LAKES	
S101	SECONDARY CONTAINMENT DIKE CANOPY	
S200	SECONDARY CONTAINMENT DIKE - ACADEMIC VILLAGE	
S201	SECONDARY CONTAINMENT DIKE CANOPY - ACADEMIC VILLAGE	
S501	STRUCTURAL GENERAL NOTES	
E001	ELECTRICAL LEGEND AND NOTES	
E100	ELECTRICAL SITE PLAN - HOLLY LAKES	
E101	BOOSTER PUMP STATION ELECTRICAL PLAN - HOLLY LAKES	
E-102	EXISTING PLC AND PUMP STATION PANEL REPLACEMENT - HOLLY LAKES	
E200	BOOSTER PUMP STATION ELECTRICAL PLAN - ACADEMIC VILLAGE	
E501	RISER, SCHEDULES AND DETAILS	
I001	P&ID LEGEND	
I100	PIPING & INSTRUMENTATION DIAGRAM - HOLLY LAKES	
I101	INSTRUMENTATION DETAILS - HOLLY LAKES	
I102	EXISTING PLC PANEL DETAILS - HOLLY LAKES	
I103	EXISTING PLC INPUT-OUTPUT CONNECTION POINTS - HOLLY LAKES	
I104	PROPOSED PLC PANEL DETAILS - HOLLY LAKES	
I200	PIPING & INSTRUMENTATION DIAGRAM - ACADEMIC VILLAGE	
I201	INSTRUMENTATION DETAILS - ACADEMIC VILLAGE	
I202	EXISTING PLC PANEL DETAILS - ACADEMIC VILLAGE	
I203	PLC INPUT-OUTPUT CONNECTION POINTS - ACADEMIC VILLAGE	

PERMITTING AGENCIES	DATE SUBMITTED	CGA INITIALS	DATE APPROVED	PERMIT NUMBER
BROWARD COUNTY HEALTH DEPARTMENT - HOLLY LAKES	1/25/16	DS	5/05/16	0125162-286-WC
BROWARD COUNTY HEALTH DEPARTMENT - ACADEMIC VILLAGE	1/25/16	DS	3/28/16	0125162-282-WC

NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY



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CITY OFFICIALS

- MAYOR:** FRANK C. ORTIS
- VICE MAYOR:** ANGELO CASTILLO
- COMMISSIONERS:** CARL SHECHTER
 JAY SCHWARTZ
 IRIS A. SIPLE
- CITY MANAGER:** CHARLES F. DODGE

NOTE:

- RESPONSIBILITY FOR THE USE OF THESE PLANS FOR ANY PURPOSE PRIOR TO SECURING PERMITS FROM ALL AGENCIES HAVING JURISDICTION OVER THIS PROJECT WILL FALL SOLELY UPON THE USER.

BENCHMARK:

NOT AVAILABLE

FOR BIDDING PURPOSES ONLY
ELEVATIONS SHOWN ARE NGVD 29

CURRENT REV No.: - - - - -

DAVID STAMBAUGH, P.E.
 STATE OF FLORIDA PROFESSIONAL ENGINEER
 LICENSE No. 70757

DATE: 7/26/17

SHEET: 1

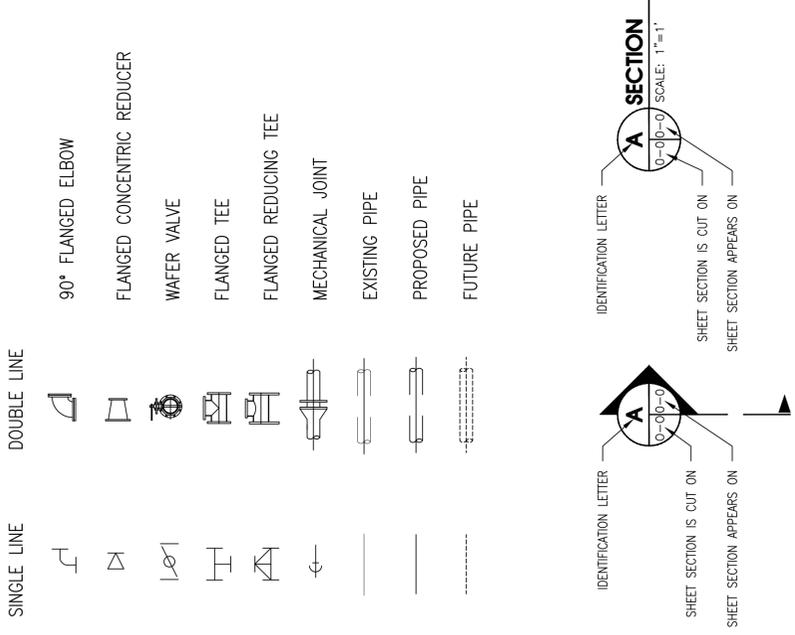
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OF 39 SHEETS

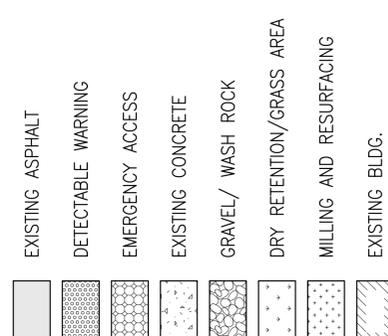
GENERAL NOTES

- BOOSTER STATION GENERAL NOTES
1. MAINTAIN ACCESS TO AND OPERATION OF ALL EXISTING PLANT OPERATIONS UNTIL NEW OPERATIONS HAVE BEEN ACCEPTED.
 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ACTUAL TIE-IN CONNECTIONS TO ALL EXISTING WATER MAINS AND SEWERS.
 3. THE EXISTING TOPOGRAPHICAL FEATURES SHOWN ON THE HOLLY LAKES SITE DRAWINGS WERE OBTAINED FROM BERRY & CALVIN DESIGN PLANS AND REPRESENT CONDITIONS AS THEY EXIST AS OF AUGUST 1980. THE EXISTING TOPOGRAPHICAL FEATURES SHOWN ON THE "ACADEMIC VILLAGE" DRAWINGS WERE OBTAINED FROM CALVIN, GIORDANO & ASSOCIATES DESIGN PLANS AND REPRESENT CONDITIONS AS THEY EXISTED AS OF AUGUST 1989, AS PART OF THE BID PROCESS. AND PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXAMINE THE SITE OF THE PROPOSED WORK AND MAKE ALL NECESSARY INVESTIGATIONS TO THOROUGHLY DEFINE ALL DIFFICULTIES INVOLVED IN THE COMPLETION OF ALL WORK REQUIRED PURSUANT TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.
 4. THE INFORMATION PROVIDED IN THESE PLANS IS SOLELY TO ASSIST THE CONTRACTOR IN ASSESSING THE NATURE AND EXTENT OF CONDITIONS WHICH WILL BE ENCOUNTERED DURING THE COURSE OF THE WORK. THE CONTRACTOR(S) ARE DIRECTED, PRIOR TO CONSTRUCTION, CONDUCT WHATEVER INVESTIGATIONS THEY DEEM NECESSARY TO ARRIVE AT THEIR OWN CONCLUSIONS REGARDING THE ACTUAL CONDITIONS THAT WILL BE ENCOUNTERED.
 5. ALL BURIED PIPING SHALL BE RESTRAINED.
 6. CONTRACTOR SHALL USE EXISTING BOOSTER PUMP STATION BUILDING FINISHED FLOOR ELEVATIONS AS PROJECT BENCHMARK.
 7. ALL PIPING AND/OR APPURTENANCES CONNECTING TO ADJACENT CONSTRUCTION SHALL BE PLUGGED IF ADJACENT WORK HAS NOT BEEN COMPLETED.
 8. THE DRAWINGS DEPICT APPROXIMATE LOCATIONS, ELEVATIONS, AND DIMENSIONS OF EXISTING UTILITIES AND STRUCTURES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL LOCATIONS, ELEVATIONS, AND DIMENSIONS BY USING EXPLORATORY INVESTIGATION AND EXCAVATIONS. VERIFICATION OF EXISTING UTILITY LOCATION SHALL BE CONDUCTED SUFFICIENTLY IN ADVANCE OF CONSTRUCTION TO ALLOW FOR RESOLUTION OF CONFLICTS IN A TIMELY MANNER. IF A POTENTIAL CONFLICT IS LOCATED, THE CONTRACTOR SHALL NOTIFY THE CITY'S REPRESENTATIVE IMMEDIATELY TO REPORT IN WRITING ANY CONFLICTS BETWEEN WHAT IS SHOWN HEREIN AND ACTUAL CONDITIONS DISCOVERED DURING CONSTRUCTION. ADDITIONALLY, THE CONTRACTOR SHALL NOTIFY THE ENGINEER'S PROJECT REPRESENTATIVE IMMEDIATELY. AT A MINIMUM, THE FOLLOWING INFORMATION SHALL BE PROVIDED BY CONTRACTOR TO THE ENGINEER'S PROJECT REPRESENTATIVE: A DIMENSIONED ILLUSTRATION NOTING LOCATION, ELEVATION, UTILITY TYPE, MATERIAL AND SIZE.
 9. ALL PRACTICABLE EFFORT SHALL BE TAKEN DURING CONSTRUCTION TO CONTROL AND PREVENT EROSION AND TRANSPORT OF SEDIMENT MATERIALS TO INLETS, SURFACE DRAINS, WETLANDS, AND LAKE AREAS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RESTORATION EFFORTS THAT MAY BE REQUIRED.
 10. THE CONTRACTOR SHALL CONTROL ALL FUGITIVE DUST ORIGINATING ON THIS PROJECT BY WATERING OR OTHER METHODS AS REQUIRED.
 11. ALL WORK INCLUDED IN THIS PROJECT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THESE CONSTRUCTION DRAWINGS AND THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.
 12. ALL PIPING SHALL BE PRESSURE AND LEAK TESTED IN ACCORDANCE WITH THE SPECIFICATIONS. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL TEMPORARY PLUGS, BLOCKING, TAPS, AND TESTING EQUIPMENT AS REQUIRED TO COMPLETE THE TESTING.
 13. THE CONTRACTOR SHALL PERFORM TRENCH EXCAVATIONS IN ACCORDANCE WITH APPLICABLE TRENCH SAFETY STANDARDS AND IS RESPONSIBLE TO DETERMINE ANY SAFETY OF SAFETY-RELATED STANDARDS THAT APPLY TO THE PROJECT. THE OWNER AND ENGINEER ARE NOT RESPONSIBLE TO REVIEW AND/OR ASSESS SAFETY PRECAUTIONS, PROGRAMS AND COSTS, AND THE MEANS, METHODS, TECHNIQUES OR TECHNIQUE ADOPTING REASONABLENESS OF COST, SEQUENCES AND PROCEDURES OF ANY SAFETY PRECAUTION, INCLUDING, BUT NOT LIMITED TO, COMPLIANCE WITH ANY AND ALL REQUIREMENTS OF FLORIDA TRENCH SAFETY ACT.
 14. CONTRACTOR IS TO NOTE ON THE AS-BUILT DRAWINGS THE LOCATION AND ELEVATION OF ALL UTILITIES ENCOUNTERED DURING CONSTRUCTION.
 15. A 36" MINIMUM DEPTH OF COVER SHALL BE PROVIDED UNLESS OTHERWISE SHOWN ON THESE DRAWINGS OR AS DIRECTED BY THE CITY'S REPRESENTATIVE.
 16. RESTORE ALL PROPERTY AND INFRASTRUCTURE INCLUDING UTILITIES DISTURBED BY CONSTRUCTION TO THE CONDITIONS WHICH EXISTED PRIOR TO CONSTRUCTION OR BETTER. THE COST OF SUCH RESTORATION SHALL BE INCLUDED IN THE BID. ANY DAMAGE TO EXISTING PROPERTY, UTILITIES, STRUCTURES, AND/OR SERVICES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE IN A MANNER DIRECTED BY THE ENGINEER AND OWNER. REMOVE AND REPLACE ALL PIPE, CONDUITS, AND COLLIMERS DAMAGED DURING CONSTRUCTION AT NO EXPENSE TO THE OWNER. CONTRACTOR SHALL REMOVE AND REPAIR OR TEMPORARILY RELOCATE STORM SEWERS, CULVERTS, AND OTHER UTILITIES AS REQUIRED DURING THE INSTALLATION OF PIPE. CONTRACTOR SHALL PROVIDE A TEMPORARY MEANS OF CONVEYING STORMWATER WHERE NECESSARY. WHERE TEMPORARY SUPPORT OF UTILITIES IS REQUIRED, CONTRACTOR SHALL PAY ALL ASSOCIATED COSTS AND COORDINATE WITH THE OWNER AND ENGINEER.
 17. ALL WORK SHALL BE IN ACCORDANCE WITH CITY OF PEMBROKE PINES AND PROJECT SPECIFICATIONS.
 18. ALL CONSTRUCTION SHALL CONFORM TO CURRENT FLORIDA BUILDING CODE.
 19. ALL CONSTRUCTION MATERIALS IN CONTACT WITH DRINKING WATER AND SODIUM HYPOCHLORITE SHALL BE NSF-61 CERTIFIED.
 20. DOSING STATIONS SHALL BE BLUE PLANET, PANEL MOUNTED AND WITH FULL COVER ENCLOSURES OR APPROVED EQUAL.
 21. NO DRAINS SHALL BE PROVIDED FOR THE CONCRETE CONTAINMENT STRUCTURE.
 22. CONCRETE PAD SHALL BE SLOPED TOWARDS SUMP AT 1 INCH PER 10 FT SLOPE.
 23. THE SODIUM HYPOCHLORITE TANK SHALL BE LABELED IN ACCORDANCE WITH OSHA 29CFR1910.1200 AND NFPA 704.
 24. ALL LABELS SHALL BE CONSTRUCTED OF WEATHER PROOF MATERIALS. THE TANK SHALL ALSO BE EQUIPPED WITH WEATHER PROOF "NO SMOKING" SIGNS.
 25. LIQUID CHEMICAL STORAGE TANK MUST HAVE A LIQUID LEVEL INDICATOR.
 26. OVERFLOW PIPES MUST BE TURNED DOWNWARD WITH SCREENED END, HAVE FREE FALL DISCHARGE, AND BE LOCATED WHERE NOTICEABLE.
 27. DOSING STATION SHALL HAVE A STANDBY UNIT OF SUFFICIENT CAPACITY TO REPLACE THE LARGEST UNIT DURING SHUT DOWNS.
 28. ALL NOZZLE PROJECTIONS - MINIMUM LENGTH FOUR (4) INCHES.
 29. ALL FLANGES AND MANWAYS SHALL BE BOLTED WITH 316 SS BOLTS AND NYLOC NUTS W/ NEVER-SEIZE APPLIED TO BOLT THREADS.

SYMBOL LEGEND



HATCHING LEGEND



ABBREVIATIONS

ARV	AIR RELEASE VALVE
BE	BURIED ELECTRIC
BFP	BACKFLOW PREVENTOR
BVF	BUTTERFLY VALVE
BM	BENCHMARK
BOP	BOTTOM OF PIPE
BSP	BACTERIOLOGICAL SAMPLING POINT
BV	BALL VALVE
CAP	CORRUGATED ALUMINUM PIPE
CB	CATCH BASIN
CI	CURB INLET
CP	CAST IRON PIPE
CLF	CHAIN LINK FENCE
OMP	CORRUGATED METAL PIPE
CO	CLEANOUT
CONC	CONCRETE
DE	DRAINAGE EASEMENT
DIP	DUCTILE IRON PIPE
E	EAST
EL	ELEVATION
EW	EDGE OF WATER
EXIST	EXISTING
EXFLT	EXFILTRATION
FF EL	FINISHED FLOOR ELEVATION
FH	FIRE HYDRANT
FM	FORCE MAIN
GALV	GALVANIZED
GV	GATE VALVE
HB	HOSE BB
HORZ	HORIZONTAL
INV	INVERT
JF	JUNCTION BOX
LB	LINEAR FEET
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MJ	MECHANICAL JOINT
N	NORTH
NGOC	SODIUM HYPOCHLORITE
NTS	NOT TO SCALE
NGVD	NATIONAL GEODETIC VERTICAL DATUM
NAMD	NORTH AMERICAN VERTICAL DATUM
OE	OVERHEAD ELECTRIC
PCAP	PERFORATED CORRUGATED ALUMINUM PIPE
PRB	POLLUTION RETARDANT BAFFLE
PROP	PROPOSED
PSI	POUNDS PER SQUARE INCH
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
RCW	RECLAIMED WATER
RED	REDUCER
R/W	RIGHT-OF-WAY
S	SOUTH
SAN	SANITARY
SB	SOIL BORING
STA	STATION
TOB	TOP OF BANK
TOP	TOP OF PIPE
TYP	TYPICAL
UE	UTILITY EASEMENT
VERT	VERTICAL
W	WEST
WM	WATER MAIN

BOOSTER STATIONS DISINFECTION SYSTEM IMPROVEMENTS

HOLLY LAKES & ACADEMIC VILLAGE
PEMBROKE PINES, FLORIDA

GENERAL NOTES & LEGEND

FOR BIDDING PURPOSES ONLY
ELEVATIONS SHOWN ARE NGVD 29

SCALE	NTS	SHEET 2
PROJECT No.	910734.1	
PURPOSE OF THIS SET	BID	

DAVID STAMBAUGH, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 70757

DATE: 7/26/17

811
CALL BEFORE YOU DIG
ALWAYS CALL 811
BEFORE YOU DIG
811.MI.FL.PIN 811.MI.FL

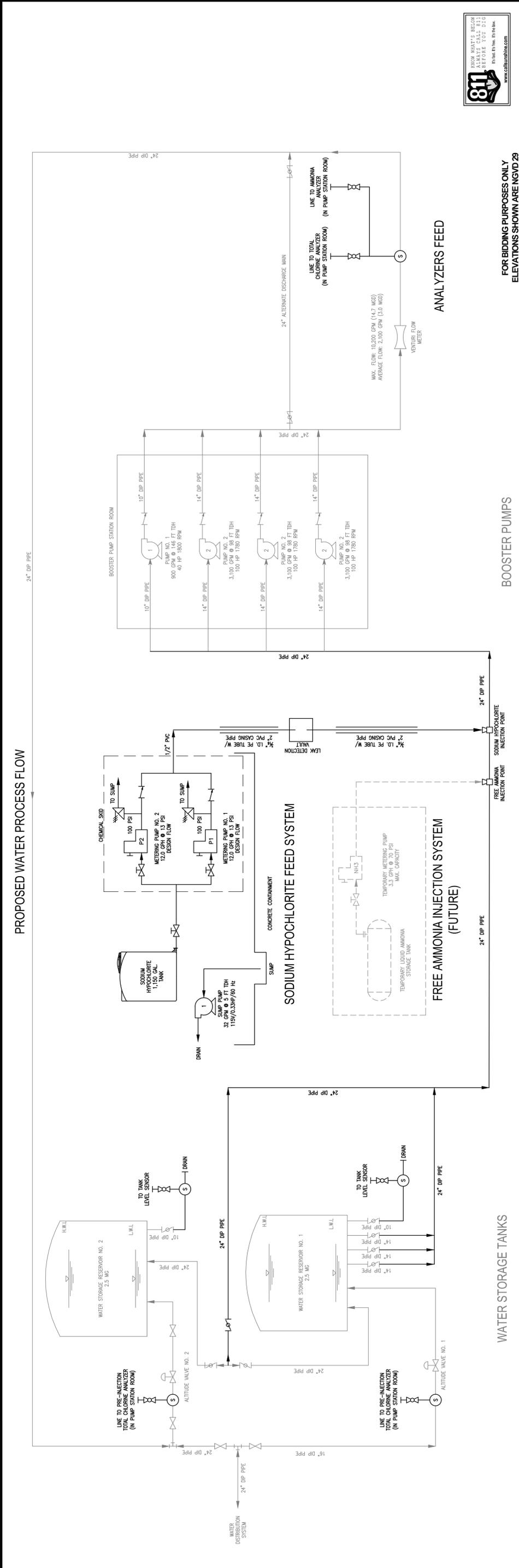
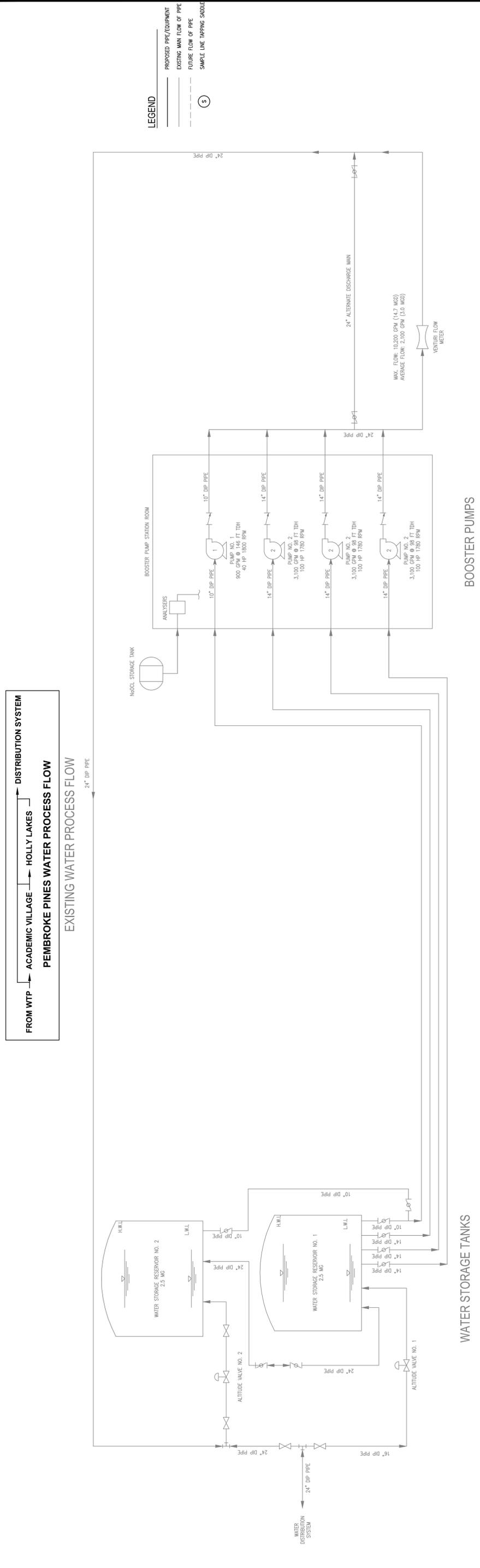
Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS
1800 Eller Drive, Suite 600, Fort Lauderdale, Florida 33316
Phone: 954-921-7781 • Fax: 954-921-8807
Certificate of Authorization 514

DESIGNED	FR
DATE	09/28/16
CHECKED	JC
DATE	01/30/17
ISSUED FOR	RD
DATE	7/26/17

NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY

9 OF 39 SHEETS

G002



NO.	DATE	BY	NO.	DATE	REVISION

DESIGNED	DATE	09/29/16	FP
CHECKED	DATE	01/30/2017	JC
ISSUED FOR	DATE		
REVIEW	DATE	7/26/17	

FOR BIDDING PURPOSES ONLY	ELEVATIONS SHOWN ARE NGVD 29
DAVID STAMBAUGH, P.E.	STATE OF FLORIDA PROFESSIONAL ENGINEER
PROJECT NO.	91-0134-1
PURPOSE OF THIS SET	BD
DATE	7/26/17

SCALE	NTS
SHEET	3
PROJECT	G100
PURPOSE OF THIS SET	BD

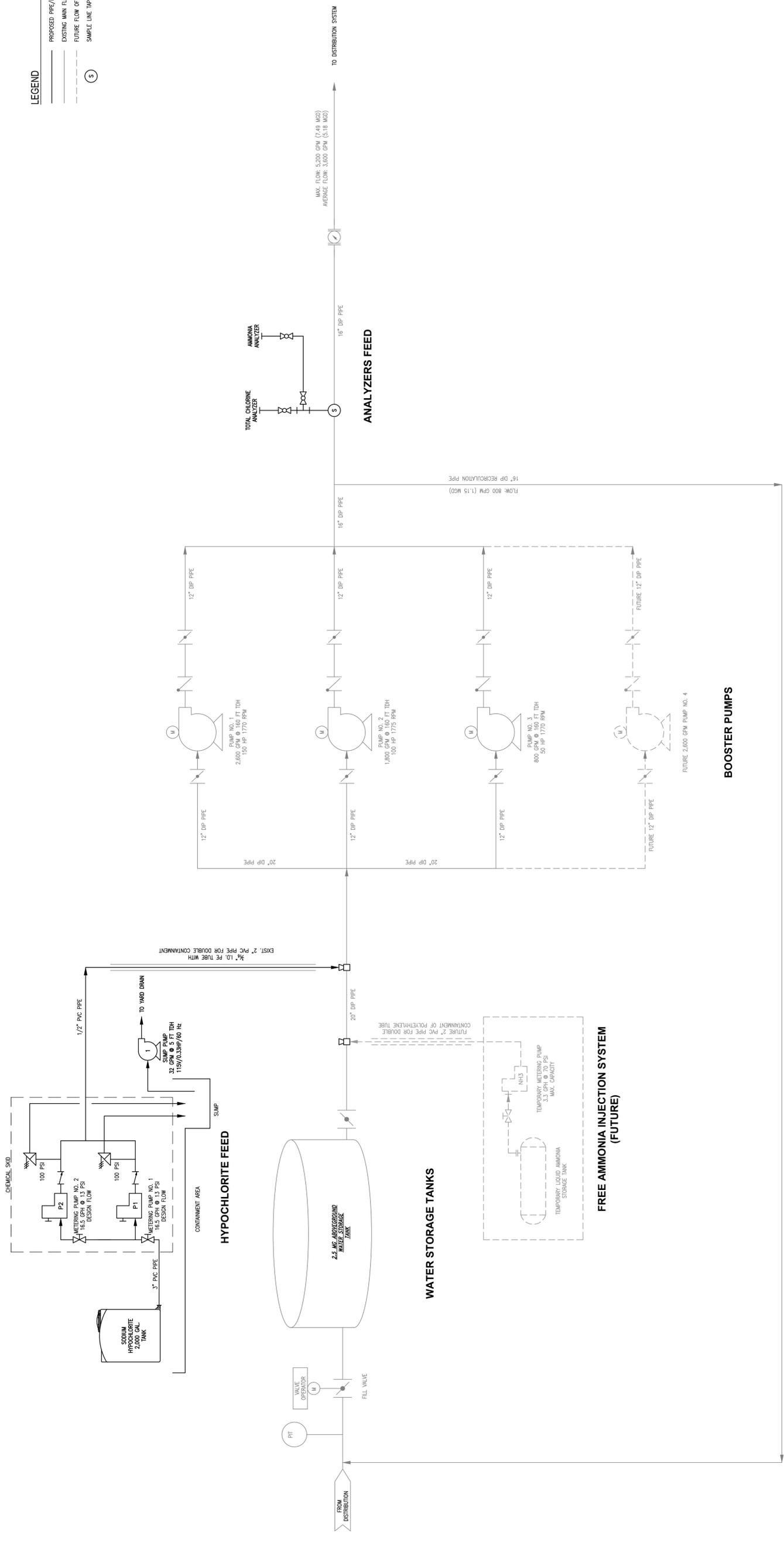
BOOSTER STATIONS DISINFECTION SYSTEM IMPROVEMENTS

HOLLY LAKES & ACADEMIC VILLAGE

PEMBROKE PINES, FLORIDA

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FROM WTP → ACADEMIC VILLAGE → HOLLY LAKES → DISTRIBUTION SYSTEM
PEMBROKE PINES WATER PROCESS FLOW



LEGEND

- PROPOSED PIPE/EQUIPMENT
- EXISTING MAIN FLOW OF PIPE
- - - FUTURE FLOW OF PIPE
- SAMPLE LINE TAPPING SADDLE



FOR BIDDING PURPOSES ONLY
 ELEVATIONS SHOWN ARE NGVD/29

SHEET: 4
 NTS
 PROJECT No. 91-0134.1
 PURPOSE OF THIS SET: BID

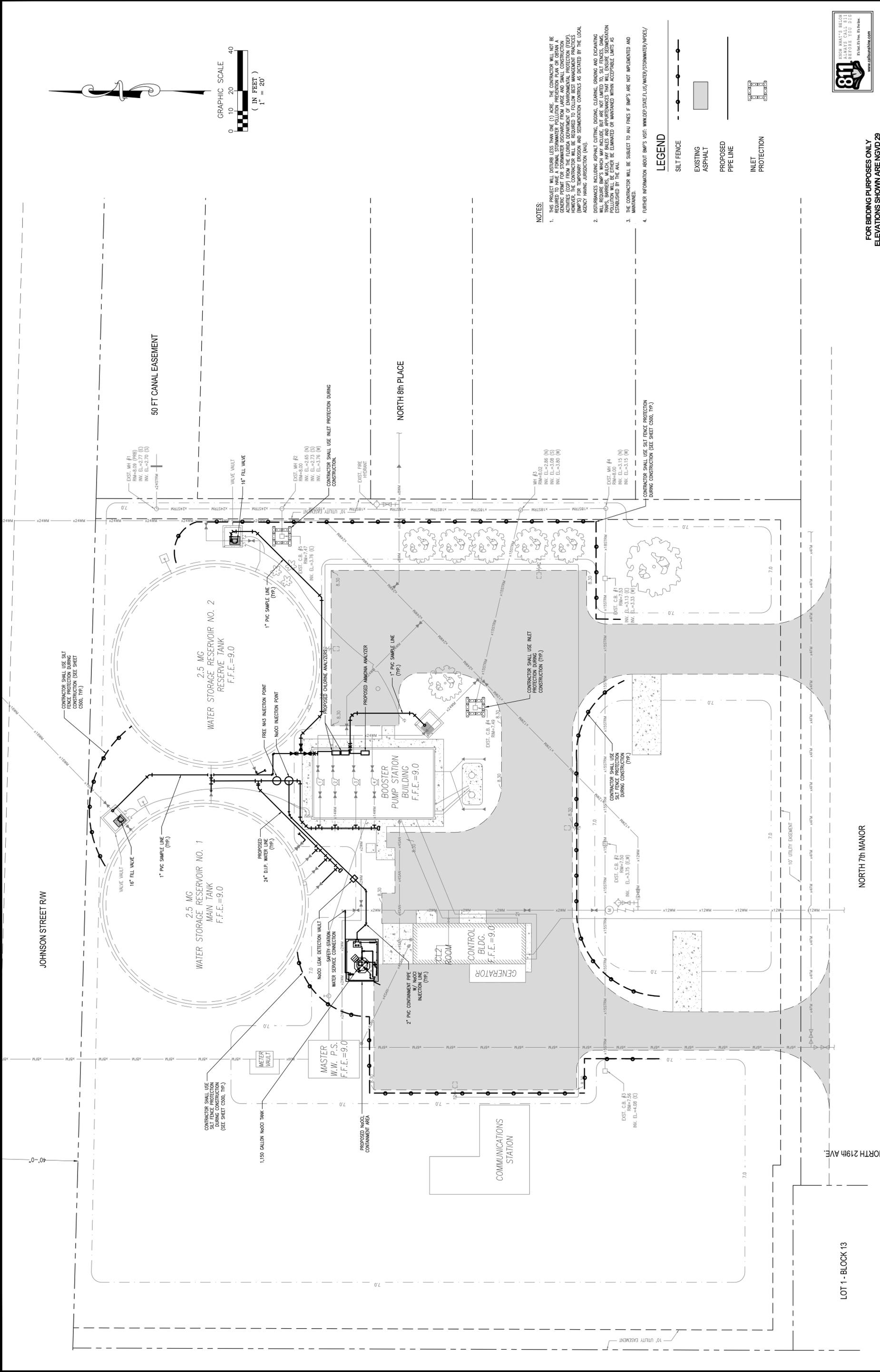
**PROCESS FLOW DIAGRAM -
 ACADEMIC VILLAGE**

**BOOSTER STATIONS DISINFECTION SYSTEM
 IMPROVEMENTS**
 HOLLY LAKES & ACADEMIC VILLAGE
 PEMBROKE PINES, FLORIDA

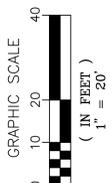
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DESIGNED	DATE	CHECKED	DATE	ISSUED FOR	DATE	BY	NO	DATE	REVISION
FP	09/29/16	DS	07/18/16	OAC	07/19/16				

G200
 OF 39 SHEETS



- NOTES:**
- THIS PROJECT WILL DISTURB LESS THAN ONE (1) ACRE. THE CONTRACTOR WILL NOT BE REQUIRED TO HAVE A FORMAL STORMWATER POLLUTION PREVENTION PLAN OR OBTAIN A GENERIC PERMIT FOR STORMWATER DISCHARGE FROM LARGE AND SMALL CONSTRUCTION ACTIVITIES (CSP) FROM THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP). THE CONTRACTOR SHALL OBTAIN A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) FROM THE DEP (BMP'S) FOR TEMPORARY EROSION AND SEDIMENTATION CONTROLS AS DICTATED BY THE LOCAL AGENCY HAVING JURISDICTION (AHJ).
 - DISTURBANCES INCLUDING ASPHALT CUTTING, DIGGING, CLEARING, GRADING AND EXCAVATING TRIMPS, BARRIERS, MUDHAY BALES AND APPURTENANCES THAT WILL ENSURE SEDIMENTATION CONTROLS ARE MAINTAINED OR MAINTAINED WITHIN ACCEPTABLE LIMITS AS ESTABLISHED BY THE AHJ.
 - THE CONTRACTOR WILL BE SUBJECT TO AHJ FINES IF BMP'S ARE NOT IMPLEMENTED AND MAINTAINED.
 - FURTHER INFORMATION ABOUT BMP'S VISIT: WWW.DEP.STATE.FL.US/WATER/STORMWATER/NPDES/



LOT 1 - BLOCK 13

NORTH 7th MANOR

NO.	DATE	BY	NO.	DATE	BY

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BOOSTER STATIONS DISINFECTION SYSTEM IMPROVEMENTS
 HOLLY LAKES & ACADEMIC VILLAGE
 PEMBROKE PINES, FLORIDA

OVERALL SITE PLAN - HOLLY LAKES

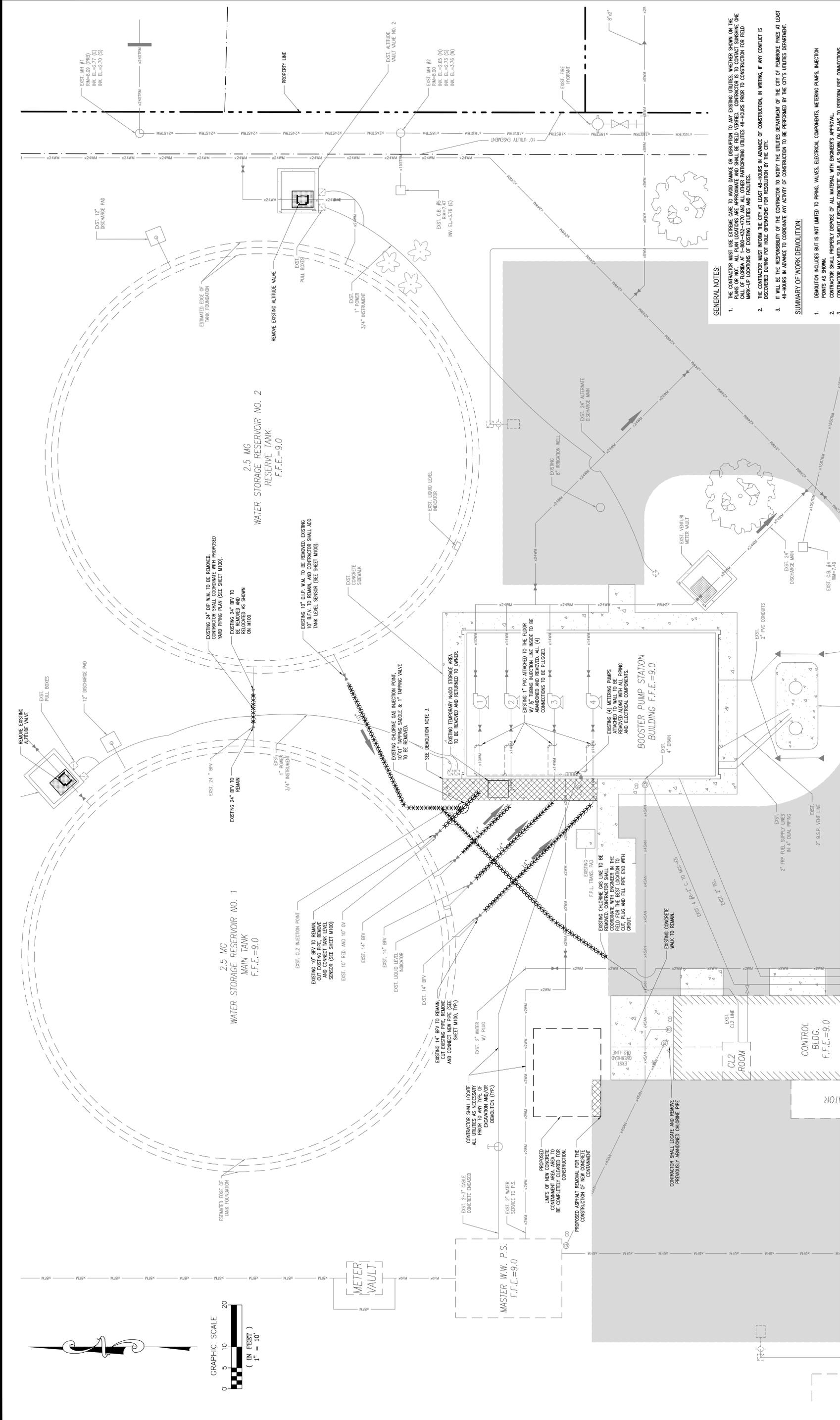
FOR BIDDING PURPOSES ONLY
 ELEVATIONS SHOWN ARE NGVD 29

DAVID STAMBAUGH, P.E.
 STATE OF FLORIDA PROFESSIONAL ENGINEER
 LICENSE No. 70757

PROJECT No. 91-0134.1
 PURPOSE OF THIS SET BID

SCALE 1"=20'
 SHEET: 5
C100
 OF 39 SHEETS





DEMOLITION PLAN
Scale: 1:10

- GENERAL NOTES:**
1. THE CONTRACTOR MUST USE EXTREME CARE TO AVOID DAMAGE OR DISRUPTION TO ANY EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT. ALL PLAN LOCATIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED. CONTRACTOR IS TO CONTACT SUNSHINE ONE CALL OF FLORIDA AT 1-800-432-7170 AND ALL OTHER PARTICIPATING UTILITIES 48-HOURS PRIOR TO CONSTRUCTION FOR FIELD MARK-UP LOCATIONS OF EXISTING UTILITIES AND FACILITIES.
 2. THE CONTRACTOR MUST INFORM THE CITY AT LEAST 48-HOURS IN ADVANCE OF CONSTRUCTION, IN WRITING, IF ANY CONFLICT IS DISCOVERED DURING POT HOLE OPERATIONS FOR RESOLUTION BY THE CITY.
 3. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE UTILITIES DEPARTMENT OF THE CITY OF PEMBROKE PINES AT LEAST 48-HOURS IN ADVANCE TO COORDINATE ANY ACTIVITY OF CONSTRUCTION TO BE PERFORMED BY THE CITY'S UTILITIES DEPARTMENT.
- SUMMARY OF WORK DEMOLITION:**
1. DEMOLITION INCLUDES BUT IS NOT LIMITED TO PIPES, VALVES, ELECTRICAL COMPONENTS, METERING PUMPS, INJECTION POINTS AS SHOWN.
 2. CONTRACTOR SHALL PROPERLY DISPOSE OF ALL MATERIAL WITH ENGINEER'S APPROVAL.
 3. CONTRACTOR MAY NEED TO SAWCUT EXISTING CONCRETE SLAB AS SHOWN ON PLANS TO PERFORM PIPE CONNECTIONS. IF NEED TO REMOVE, CONTRACTOR SHALL RESTORE IT AFTER THE PROJECT IS COMPLETED.
 4. CONTRACTOR SHALL RECEIVE APPROVAL FROM THE ENGINEER BEFORE COMMENCING DEMOLITION.
 5. SEE SPEC NO. 02050 FOR MORE INFORMATION.



FOR BIDDING PURPOSES ONLY
ELEVATIONS SHOWN ARE NGVD 29

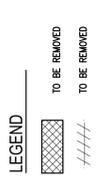
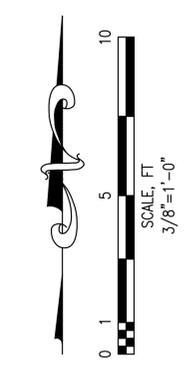
DAVID STAMBAUGH, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE NO. 70757

SCALE AS SHOWN
PROJECT NO. 91-0134-1
PURPOSE OF THIS SET BID

SHEET: 6
C101
OF 38 SHEETS

BOOSTER STATIONS DISINFECTION SYSTEM IMPROVEMENTS
HOLLY LAKES & ACADEMIC VILLAGE
PEMBROKE PINES, FLORIDA

DESIGNED	DATE	09/28/16	FR
CHECKED	DATE	01/30/17	JC
ISSUED FOR APPROVAL	DATE	7/28/17	
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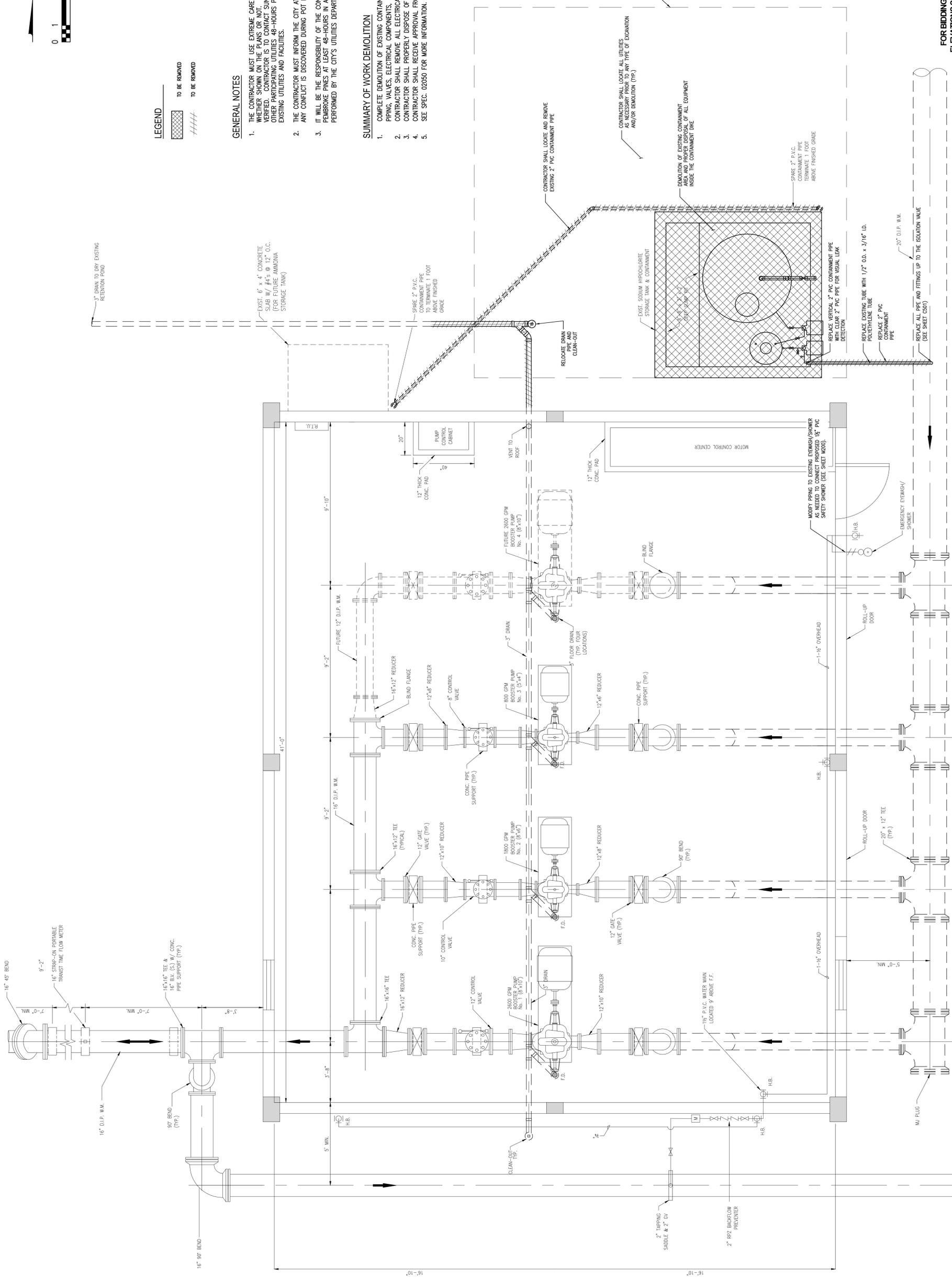


GENERAL NOTES

1. THE CONTRACTOR MUST USE EXTREME CARE TO AVOID DAMAGE OR DISRUPTION TO ANY EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT. ALL PLAN LOCATIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED. CONTRACTOR IS TO CONTACT SUNSHINE ONE CALL OF FLORIDA AT 1-800-432-4770 AND ALL OTHER PARTICIPATING UTILITIES 48-HOURS PRIOR TO CONSTRUCTION FOR FIELD MARK-UP LOCATIONS OF EXISTING UTILITIES AND FACILITIES.
2. THE CONTRACTOR MUST INFORM THE CITY AT LEAST 48-HOURS IN ADVANCE OF CONSTRUCTION, IN WRITING, IF ANY CONFLICT IS DISCOVERED DURING POT-HOLE OPERATIONS FOR RESOLUTION BY THE CITY.
3. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE UTILITIES DEPARTMENT OF THE CITY OF PEMBROKE PINES AT LEAST 48-HOURS IN ADVANCE TO COORDINATE ANY ACTIVITY OF CONSTRUCTION TO BE PERFORMED BY THE CITY'S UTILITIES DEPARTMENT.

SUMMARY OF WORK/DEMOLITION

1. COMPLETE DEMOLITION OF EXISTING CONTAINMENT DIKE INCLUDING BUT NOT LIMITED TO ALL PIPING, VALVES, ELECTRICAL COMPONENTS, BEAMS, HOOKS, HANGERS AND APPURTENANCES.
2. CONTRACTOR SHALL REMOVE ALL ELECTRICAL CONNECTIONS INSIDE EXISTING DIKE.
3. CONTRACTOR SHALL PROPERLY DISPOSE OF ALL MATERIAL WITH ENGINEERS APPROVAL.
4. CONTRACTOR SHALL RECEIVE APPROVAL FROM THE ENGINEER BEFORE COMMENCING DEMOLITION.
5. SEE SPEC. 02050 FOR MORE INFORMATION.



FOR BIDDING PURPOSES ONLY
ELEVATIONS SHOWN ARE NGVD/29

DAVID STAMBAUGH, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 70757

DEMOLITION PLAN - ACADEMIC VILLAGE

BOOSTER STATIONS DISINFECTION SYSTEM IMPROVEMENTS
HOLLY LAKES & ACADEMIC VILLAGE
PEMBROKE PINES, FLORIDA

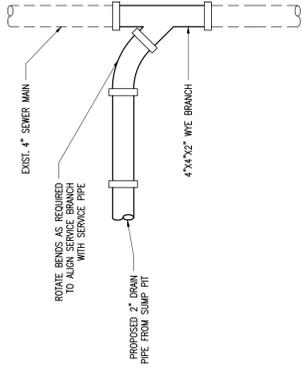
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NO	DATE	BY	NO	DATE	REVISION

DESIGNED	DATE	CHECKED	DATE	ISSUED FOR	DATE
FP	09/28/16	DS	01/09/17	OAC	7/26/17

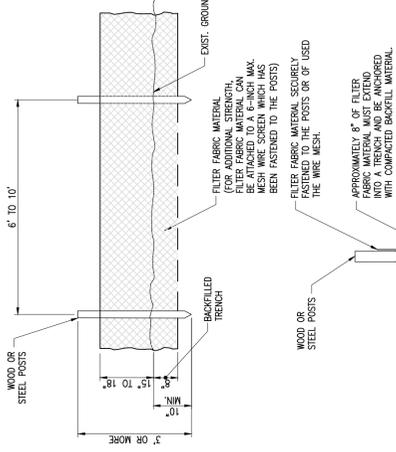
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HOLLY LAKE



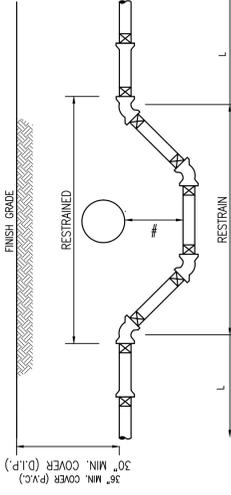
SANITARY SEWER BRANCH CONNECTION DETAIL

Scale: NTS



SILT FENCE DETAIL

Scale: NTS

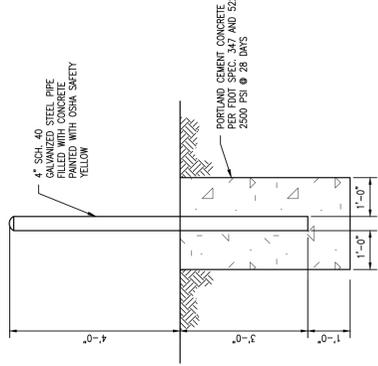


DIAMETER	RESTRAINED LENGTH L (FEET)	ANGLE
4"	11 X 22 1/2	45°
6"	10 X 20	41°
8"	14 X 28	58°
10"	18 X 36	75°
12"	21 X 43	90°
16"	25 X 50	105°
18"	32 X 64	133°
20"	35 X 70	147°
24"	38 X 77	159°
30"	44 X 89	185°
36"	52 X 105	219°
42"	59 X 120	250°
48"	66 X 134	278°
54"	73 X 147	306°

NOTES:
 (1) THE ABOVE REQUIREMENTS WERE CALCULATED IN ACCORDANCE WITH THRUST RESTRAINT FOR DUCTILE IRON PIPE WITH THE FOLLOWING ASSUMPTIONS:
 SOIL CONDITIONS: SAND/SILT
 LAYING CONDITION: 3' MIN. COVER
 SAFETY FACTOR: 1.5
 BARE PIPE
 (2) 18" MINIMUM CLEARANCE REQUIRED FOR WATER & SEWER MAIN CROSSINGS. 12" MIN. CLEARANCE REQUIRED FOR OTHER UTILITIES CROSSINGS.
 (3) INCLUDES WALKS, DEAD ENDS, AND TEES.
 IF FIELD CONDITIONS DIFFER FROM THE ABOVE, CONTRACTOR SHALL NOTIFY THE ENGINEER.

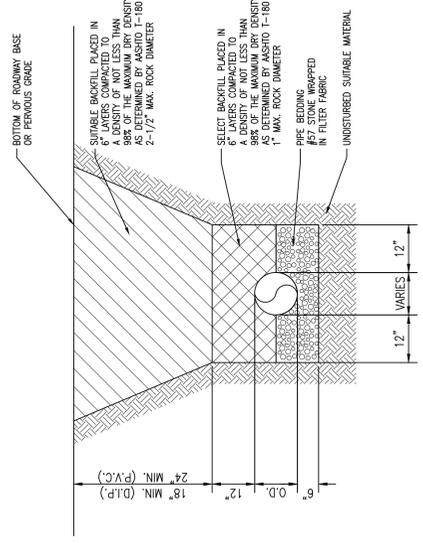
RESTRAINED JOINT REQUIREMENTS

Scale: NTS



4" BOLLARD DETAIL

Scale: NTS



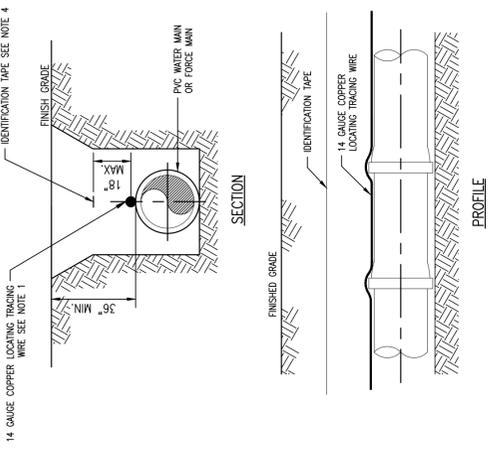
NOTES:
 1. ALL UNSATISFACTORY SOILS ENCOUNTERED ARE TO BE REMOVED AND PROPERLY DISPOSED OF BY THE CONTRACTOR AND REPLACED WITH SATISFACTORY SOILS.

PIPE TRENCH IN SATISFACTORY SOILS DETAIL

Scale: NTS

PVC PIPE LOCATION WIRE AND ID TAPE DETAIL

Scale: NTS



NOTES:
 1. PVC PIPE SHALL REQUIRE INSULATED METALLIC LOCATING TRACING WIRE (14 GAUGE COPPER) CAPABLE OF DETECTION BY A CABLE LOCATOR AND SHALL BE BURIED DIRECTLY ON TOP OF THE PIPE AT CENTERLINE.
 2. LOCATING WIRE SHALL TERMINATE AT THE TOP OF EACH VALVE BOX AND BE CAPABLE OF EXTENDING 12' ABOVE TOP OF BOX IN SUCH A MANNER SO AS NOT TO INTERFERE WITH VALVE OPERATION.
 3. USE PLASTIC CLIPS AS NECESSARY TO HOLD WIRE DIRECTLY ON TOP OF THE PIPE.
 4. DETECTABLE IDENTIFICATION TAPE SHALL BE INSTALLED DIRECTLY OVER CENTERLINE OF ALL PIPE AT 18-INCHES ABOVE THE TOP OF THE PIPE.

WATER MAIN SEPARATION IN ACCORDANCE WITH F.A.C. RULE 62-555.314

OTHER PIPE	HORIZONTAL SEPARATION	CROSSINGS (1) (5)	JOINT SPACING @ CROSSINGS (FULL JOINT CENTERED)
STORM SEWER, STORM WATER FORCE MAIN, RECLAIMED WATER (2)	Water Main 12 inches is the minimum, except for storm sewer, then 12 inches is preferred.	Water Main 12 inches is the minimum, except for storm sewer, then 12 inches is preferred.	Alternate 3 ft. minimum Water Main
VACUUM SANITARY SEWER	Water Main 12 inches preferred 6 inches min.	Water Main 12 inches preferred 6 inches min.	Alternate 3 ft. minimum Water Main
GRAVITY SANITARY SEWER (3), SANITARY SEWER FORCE MAIN, RECLAIMED WATER	Water Main 12 inches is the minimum, except for gravity sewer, then 12 inches is preferred.	Water Main 12 inches is the minimum, except for gravity sewer, then 12 inches is preferred.	Alternate 6 ft. minimum Water Main
ON-SITE SEWAGE TREATMENT & DISPOSAL SYSTEM	10 ft. minimum		

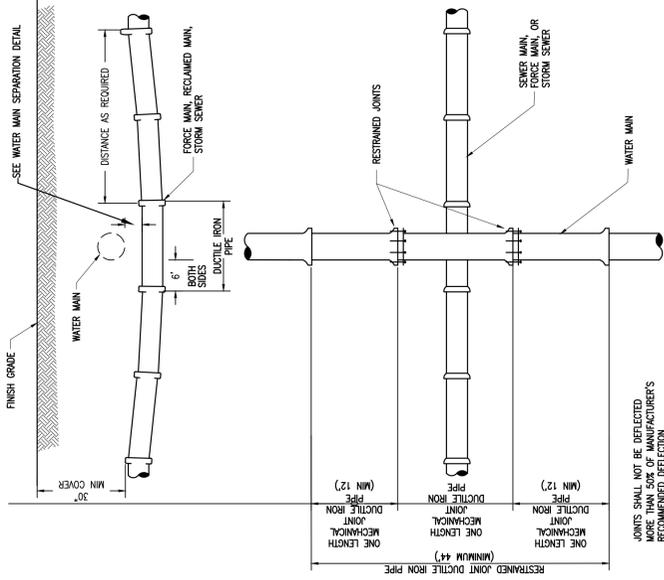
(1) WATER MAIN SHOULD CROSS ABOVE OTHER PIPE. WHEN WATER MAIN MUST BE BELOW OTHER PIPE, THE MINIMUM SEPARATION IS 12 INCHES.
 (2) RECLAIMED WATER REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C.
 (3) 3" VERTICAL SEPARATION REQUIRED BETWEEN SANITARY SEWER AND WATER MAIN.
 (4) 18" VERTICAL MINIMUM SEPARATION REQUIRED BY WWS, UNLESS OTHERWISE APPROVED.

WATER MAIN SEPARATION

Scale: NTS

STANDARD UTILITY CROSSING

Scale: NTS



JOINTS SHALL NOT BE DEFLECTED UNDER NORMAL LOADS UNLESS RECOMMENDED DEFLECTION

NO	DATE	BY	NO	DATE	REVISION
1					
2					
3					

DESIGNED DATE: 09/28/16
 CHECKED DATE: 01/20/17
 ISSUED FOR DATE: 7/26/17

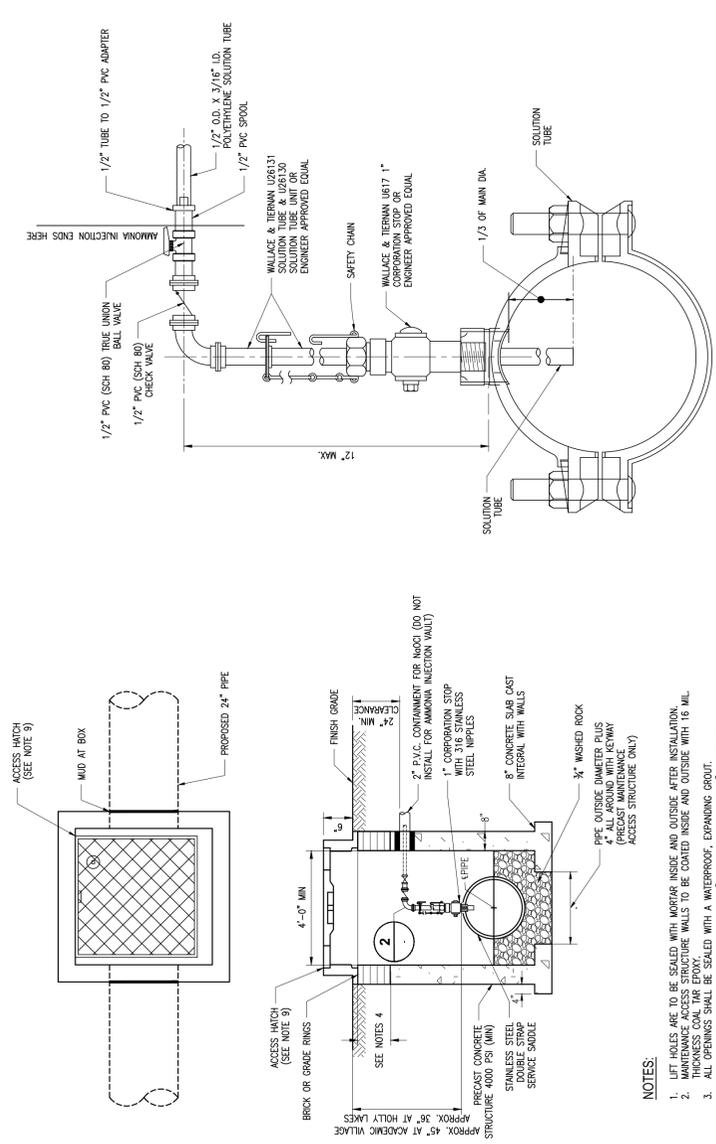
Calvin, Giordano & Associates, Inc.
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 1900 Eller Drive, Suite 600, Fort Lauderdale, Florida 33316
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 Certificate of Authorization 514

FOR BIDDING PURPOSES ONLY
 ELEVATIONS SHOWN ARE NGVD 29

DAVID STAMBAUGH, P.E.
 STATE OF FLORIDA PROFESSIONAL ENGINEER
 LICENSE NO. 70757
 DATE: 7/26/17

PROJECT NO: 91-0134.1
 PURPOSE OF THIS SET: C500
 SCALE: NTS
 SHEET 9 OF 39 SHEETS

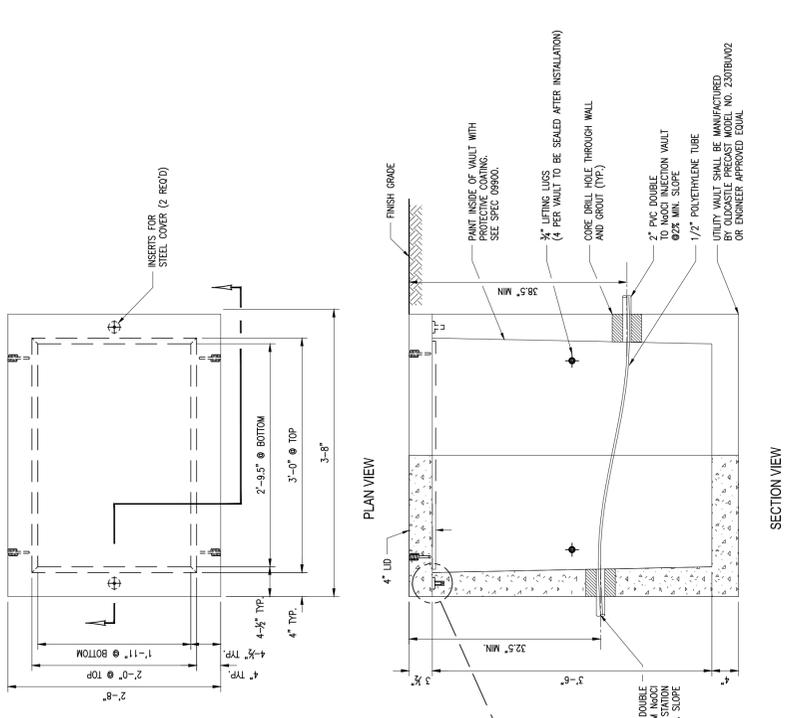




- NOTES:**
1. LIFT HOLES ARE TO BE SEALED WITH MORTAR INSIDE AND OUTSIDE AFTER INSTALLATION.
 2. MAINTENANCE ACCESS STRUCTURE WALLS TO BE COATED INSIDE AND OUTSIDE WITH 16 MIL THICKNESS COATING.
 3. ACCESS COLLAR SHALL BE SEALED WITH A WATERPROOF EXPANDING GROUT.
 4. THE CHIMNEY AREA SHALL BE MINIMUM OF 4' AND A MAXIMUM OF 12' IN HEIGHT. A MINIMUM OF 3 COURSES OF BRICK SHALL BE INSTALLED.
 5. SILICA SAND BRICK MORTAR IS TO COVER FRAME.
 6. ALL CONCRETE TO BE 4000 PSI IN 28 DAYS TYPE II CEMENT.
 7. REINFORCING BARS MUST MEET ASTM A618.
 8. ALL JOINTS TO BE FABRICATED WITH ALUMINUM DIAMOND PLATE DESIGNED TO SUPPORT 300 PSF. ACCESS HATCH SHALL BE AN APS 36"x36" FRAME OPENING EQUIPPED WITH SLAM LOCK, RECESSED LOCK BOX, FLUSH MOUNT LIFT HANDLE, HOLO-OPEN MARK AND 1/2" POLYETHYLENE TUBING TO BE INSTALLED PER SPEC 09900.
 9. ACCESS HATCH SHALL BE FABRICATED PER ASTM C1082-14 FOR A LOAD LEVEL OF 2. ACCESS HATCH SHALL BE MANUFACTURED BY USF FABRICATION OR ENGINEER APPROVED CONTRACTOR TO FIELD KERBY DEPTH OF VAULT.
 10. CONTRACTOR TO FIELD KERBY DEPTH OF VAULT.

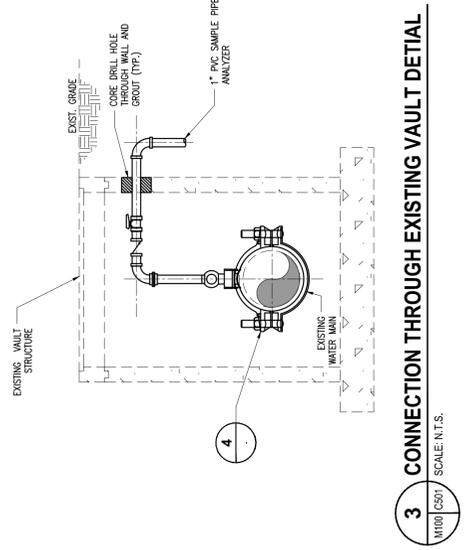
1 CHEMICAL INJECTION DOGHOUSE VAULT
SCALE: N.T.S.

2 CHEMICAL INJECTION DETAIL
SCALE: N.T.S.

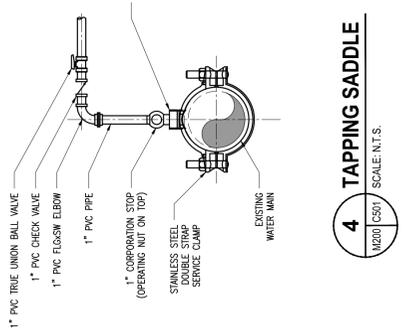


5 NaOCI INJECTION EXISTING
SCALE: N.T.S.

6 NaOCI INJECTION DETAIL
SCALE: N.T.S.

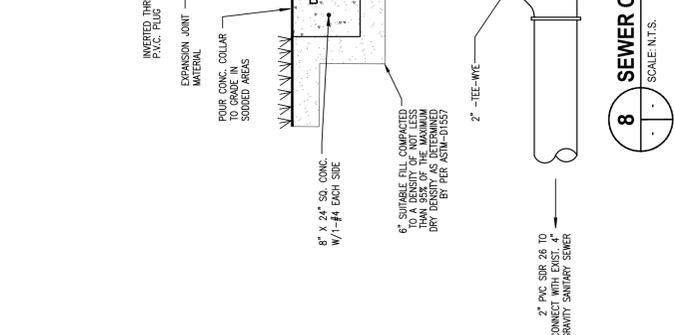


3 CONNECTION THROUGH EXISTING VAULT DETAIL
SCALE: N.T.S.

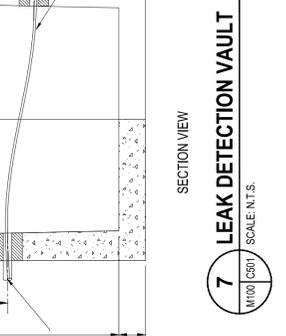


- NOTE:**
1. ALL PVC PIPE TO BE SCHEDULE 80 UNLESS OTHERWISE INDICATED

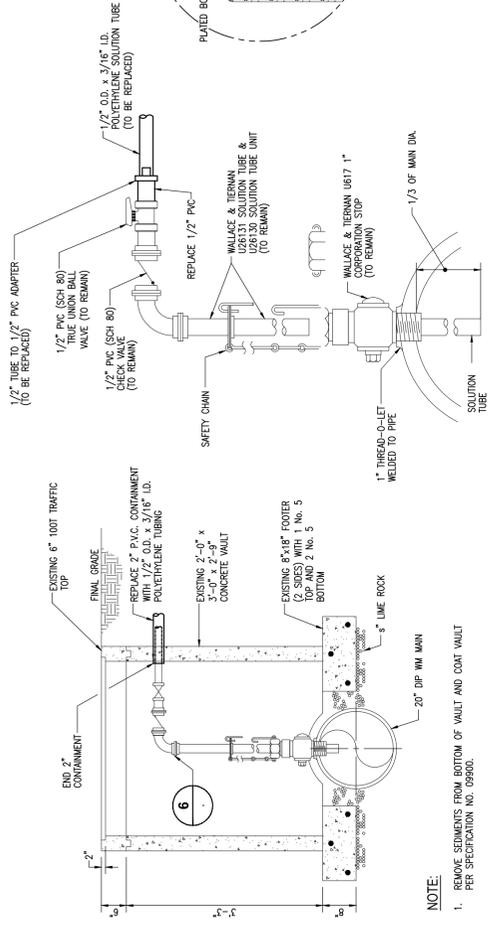
4 TAPPING SADDLE
SCALE: N.T.S.



8 SEWER CLEANOUT WITH HDPE CONNECTION
SCALE: N.T.S.



7 LEAK DETECTION VAULT
SCALE: N.T.S.



- NOTE:**
1. REMOVE STIMULANTS FROM BOTTOM OF VAULT AND COAT VAULT PER SPECIFICATION NO. 09900.

6 NaOCI INJECTION DETAIL
SCALE: N.T.S.

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY
1							
2							
3							
4							
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7							
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9							
10							

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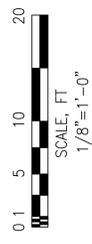
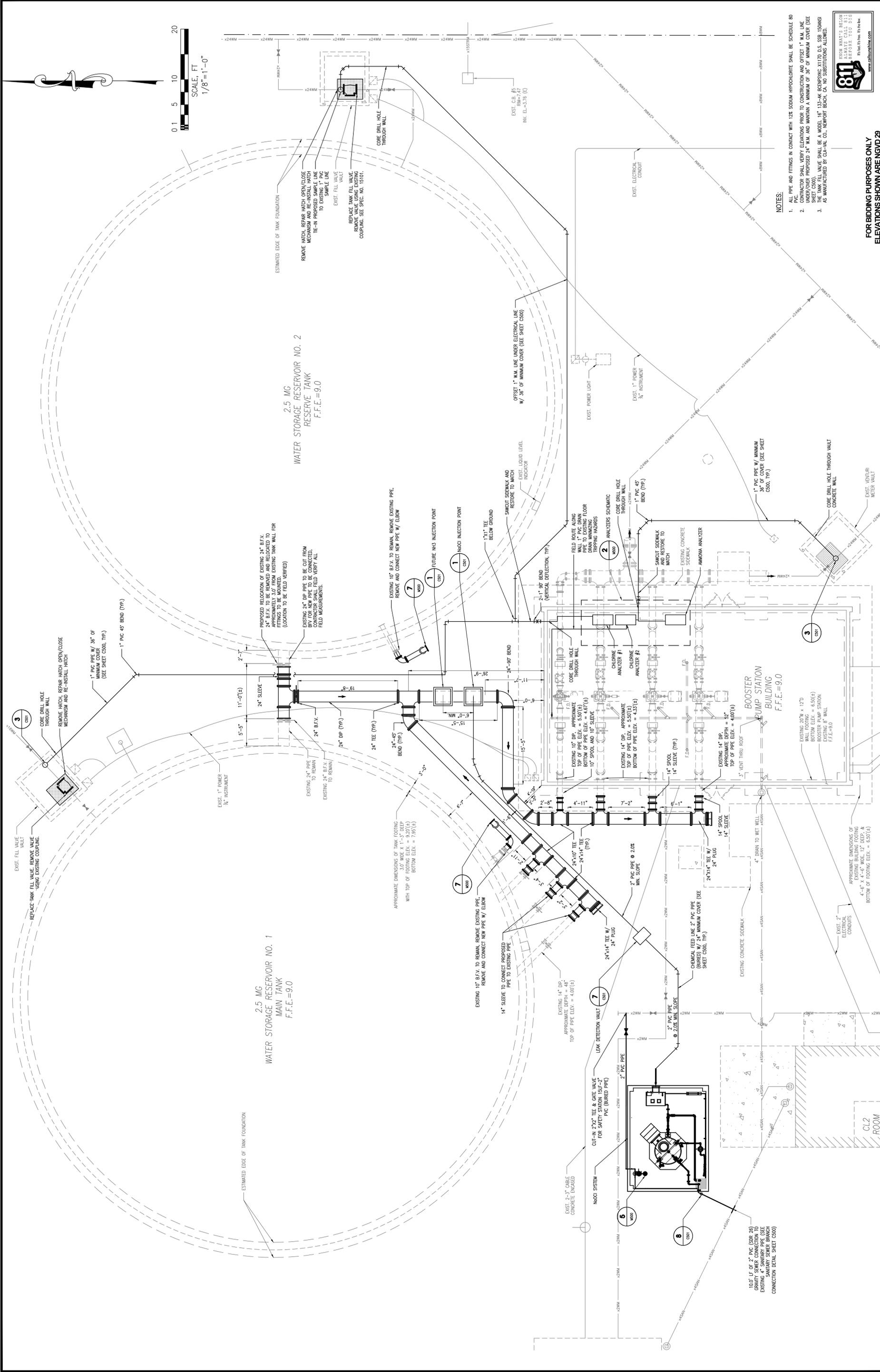
BOOSTER STATIONS DISINFECTION SYSTEM IMPROVEMENTS
HOLLY LAKES & ACADEMIC VILLAGE
PEMBROKE PINES, FLORIDA

CIVIL DETAILS 2

FOR BIDDING PURPOSES ONLY
ELEVATIONS SHOWN ARE NGVD 29

DAVID STAMBAUGH, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE NO. 70757





NO	DATE	BY	NO	DATE	REVISION

DESIGNED	DATE	DATE	DATE	DATE

FF	DATE	DATE	DATE	DATE

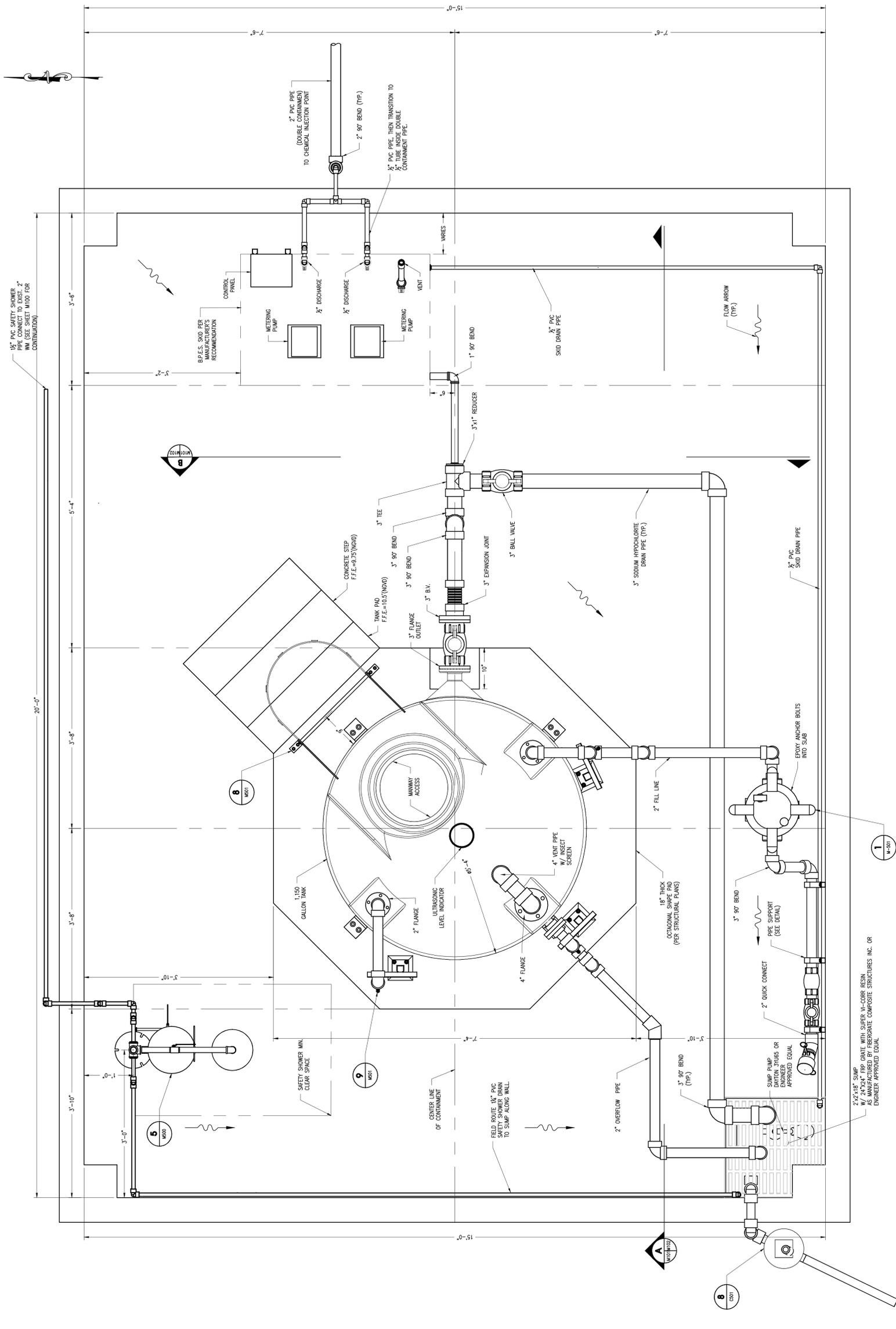
PROJECT NO.	SCALE	SHEET:
91-0134-1	1/8"=1'-0"	11
PURPOSE OF THIS SET		

ENGINEER	DATE
DAVID STAMBAUGH, P.E.	7/28/17
STATE OF FLORIDA PROFESSIONAL ENGINEER	
LICENSE NO. 70757	

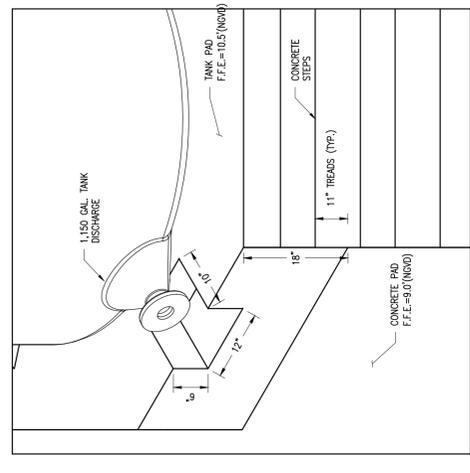
PROJECT	DATE
YARD PIPING PLAN - HOLLY LAKES	
HOLLY LAKES & ACADEMIC VILLAGE	
PEMBROKE PINES, FLORIDA	

PROJECT	DATE
BOOSTER STATIONS DISINFECTION SYSTEM IMPROVEMENTS	
HOLLY LAKES & ACADEMIC VILLAGE	
PEMBROKE PINES, FLORIDA	

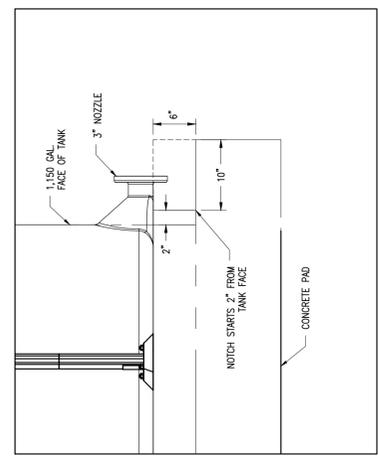
COMPANY	DATE
Calvin, Giordano & Associates, Inc.	
EXCEPTIONAL SOLUTIONS	
1800 Eller Drive, Suite 600, Fort Lauderdale, Florida 33316	
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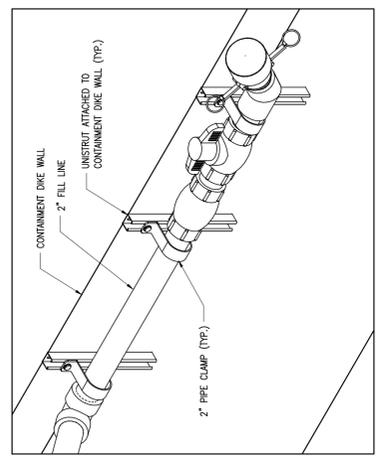
PLAN VIEW
SCALE: 1" = 1'-0"



NOZZLE BOXOUT DIMENSIONS DETAIL
SCALE: 1" = 1'-0"



NOZZLE BOXOUT LOCATION DETAIL
SCALE: 1/2" = 1'-0"



PIPE SUPPORT DETAIL
SCALE: 1-1/2" = 1'-0"

- NOTES**
1. ALL PIPE AND FITTINGS IN CONTACT WITH SODIUM HYPOCHLORITE SHALL BE SCHEDULE 80 PVC.
 2. ALL PIPE AND FITTINGS IN CONTACT WITH SODIUM HYPOCHLORITE SHALL BE VENTED. SEE SPEC 15.100.
 3. FLOOR, PADS, AND WALL SURFACES SHALL BE PAINTED WITH PROTECTIVE COATING.
 4. ALL WASHERS SHALL BE STAINLESS STEEL TYPE 316. IN ADDITION TO SS WASHERS, NYLON WASHERS SHALL BE PROVIDED WHERE DISSIMILAR METALS OCCUR.



FOR BIDDING PURPOSES ONLY
ELEVATIONS SHOWN ARE NGVD 29

SCALE	AS SHOWN	SHEET: 12
PROJECT No.	91-0134.1	
PURPOSE OF THIS SET	BID	

**SODIUM HYPOCHLORITE SYSTEM
PLAN VIEW - HOLLY LAKES**

**BOOSTER STATIONS DISINFECTION SYSTEM
IMPROVEMENTS**
HOLLY LAKES & ACADEMIC VILLAGE
PEMBROKE PINES, FLORIDA

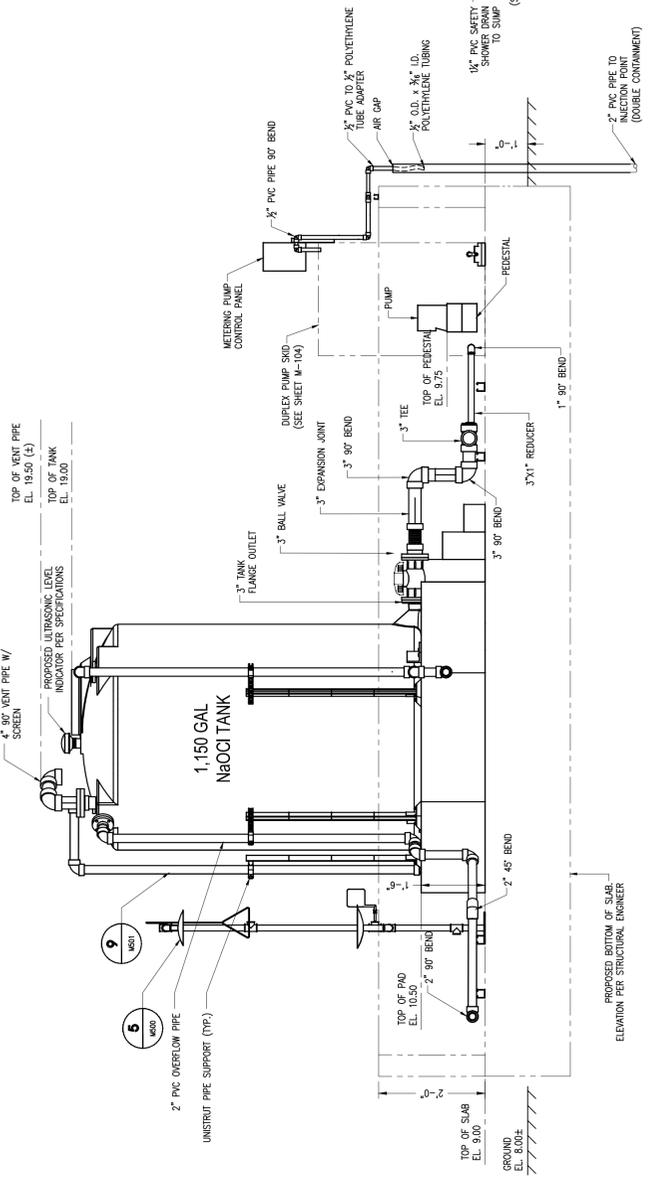
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NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY

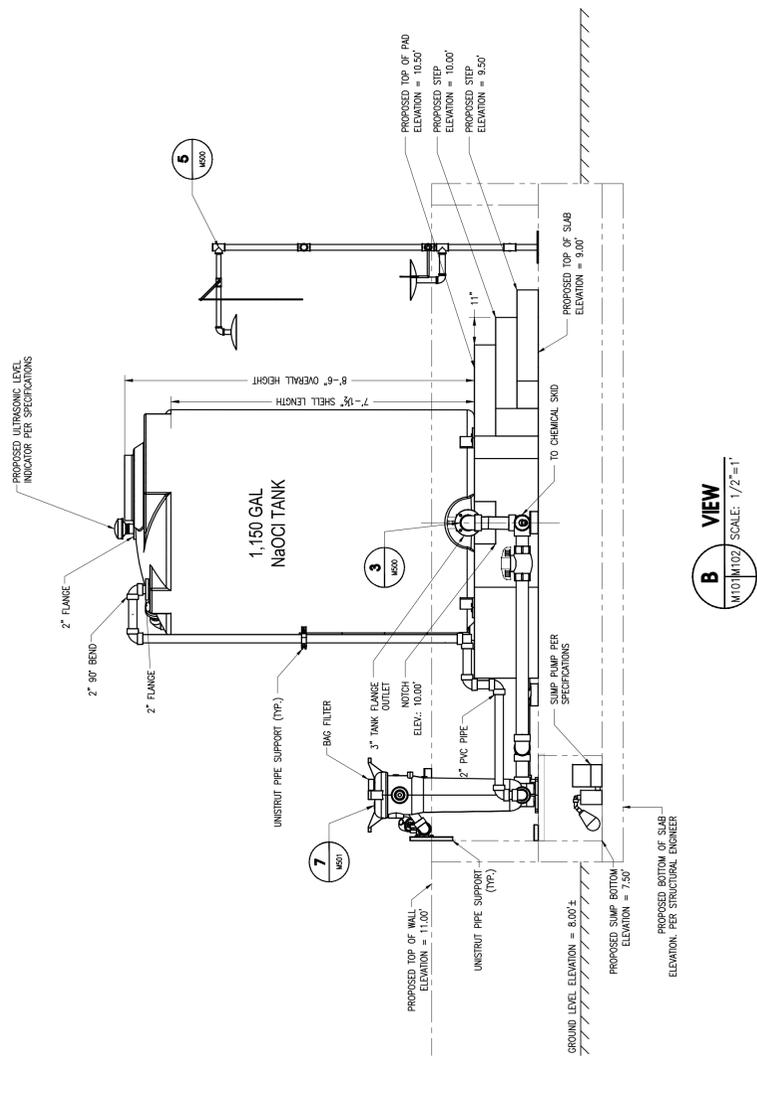
DESIGNED	DATE	09/28/16
CHECKED	DATE	01/30/17
ISSUED FOR APPROVAL	DATE	7/28/17

2'-0" x 18" SUMP
W/ 2' x 2' x 18" PIPE GRATE WITH SUPER V-CORR RESIN
AS MANUFACTURED BY FIBERGLASS COMPOSITE STRUCTURES INC. OR
ENGINEER APPROVED EQUAL

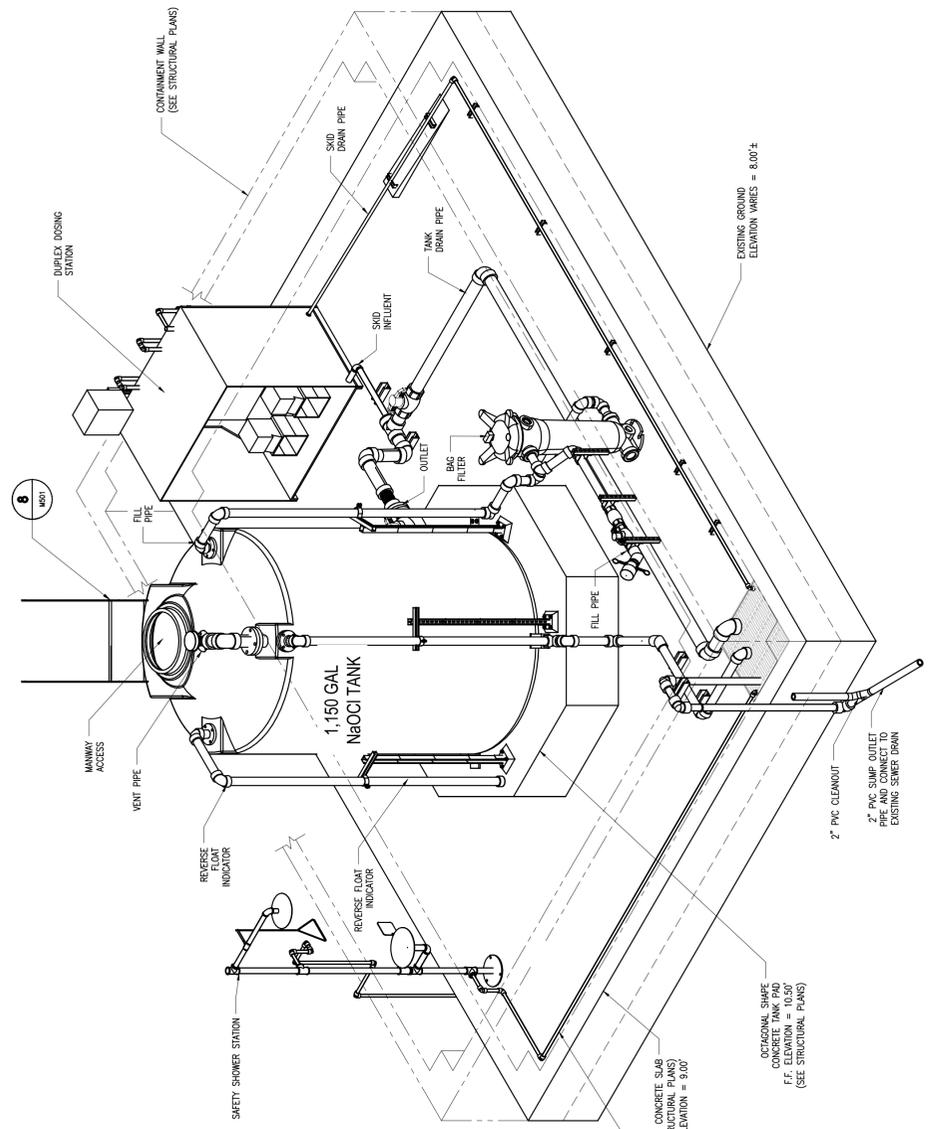
2" PVC (SR 26)
GRAVITY SEWER
CONNECTION TO
SANITARY PIPE



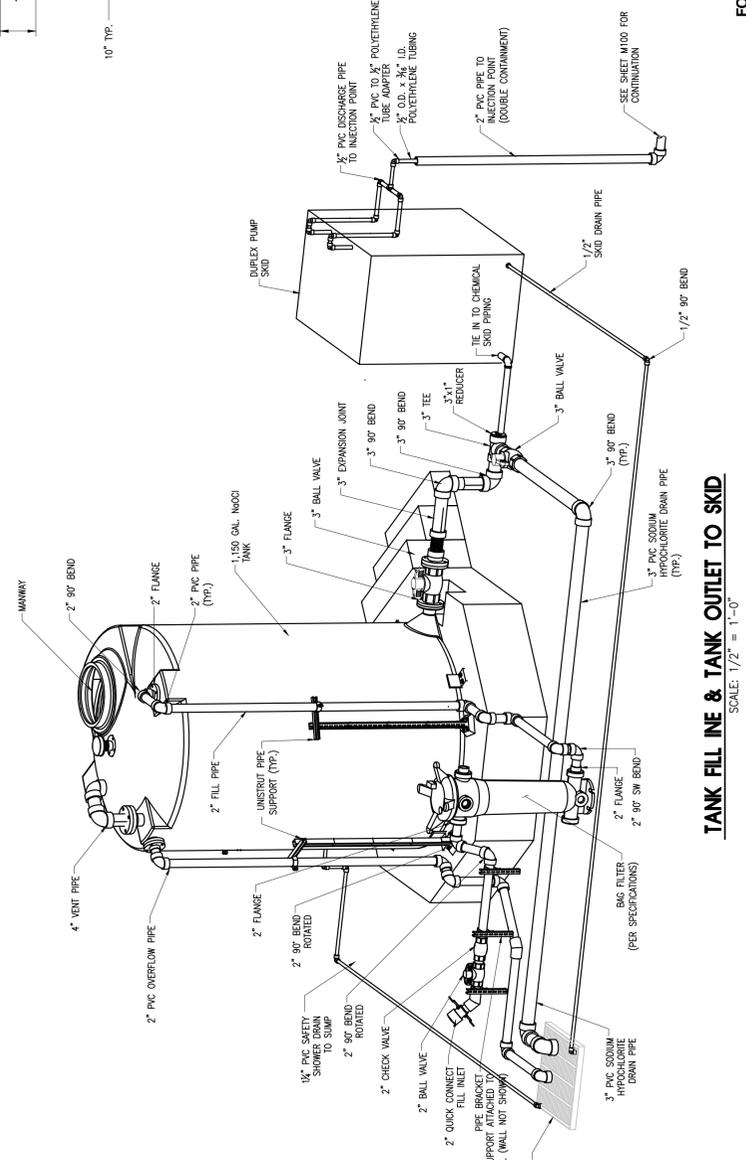
A VIEW
SCALE: 1/2" = 1'-0"



B VIEW
SCALE: 1/2" = 1'-0"

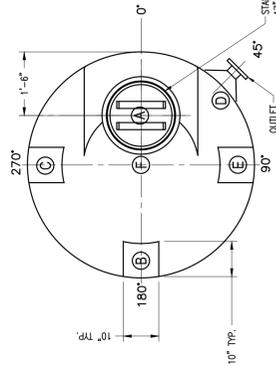


NORTHEAST VIEW
SCALE: 1/2" = 1'-0"



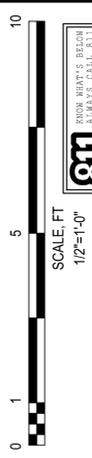
TANK FILL LINE & TANK OUTLET TO SKID
SCALE: 1/2" = 1'-0"

HOLLY LAKES NaOCl TANK				
NOZZLE	DESCRIPTION	SIZE	ORIENTATION	ELEVATION/POSITION
A	TOP MANWAY	17"	0°	TANK TOP
B	U-VENT/ OVERFLOW	4 7/8"	180°	TANK TOP
C	FLOAT INDICATOR	2"	270°	TANK TOP
D	TANK OUTLET TO DOSING	3"	0°	TANK BOTTOM
E	TANK INLET	2"	90°	TANK TOP
F	ULTRASONIC	2"	CENTER	TANK TOP



CALCULATED CAPACITY	
DESIGN CAPACITY	61
TOTAL VOL.	1242

- NOTES**
- ALL PVC PIPE SHALL BE SOLVENT WELDED UNLESS OTHERWISE NOTED.
 - TANK MADE IN GALVANNE MARKERS IN MANWAY AREA IN 100 GAL INCREMENTS UP TO 200 GAL. ADD WHEN PLACING FITTINGS.

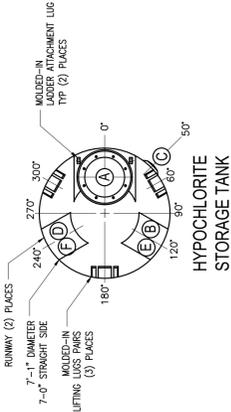


FOR BIDDING PURPOSES ONLY
ELEVATIONS SHOWN ARE NGVD 29

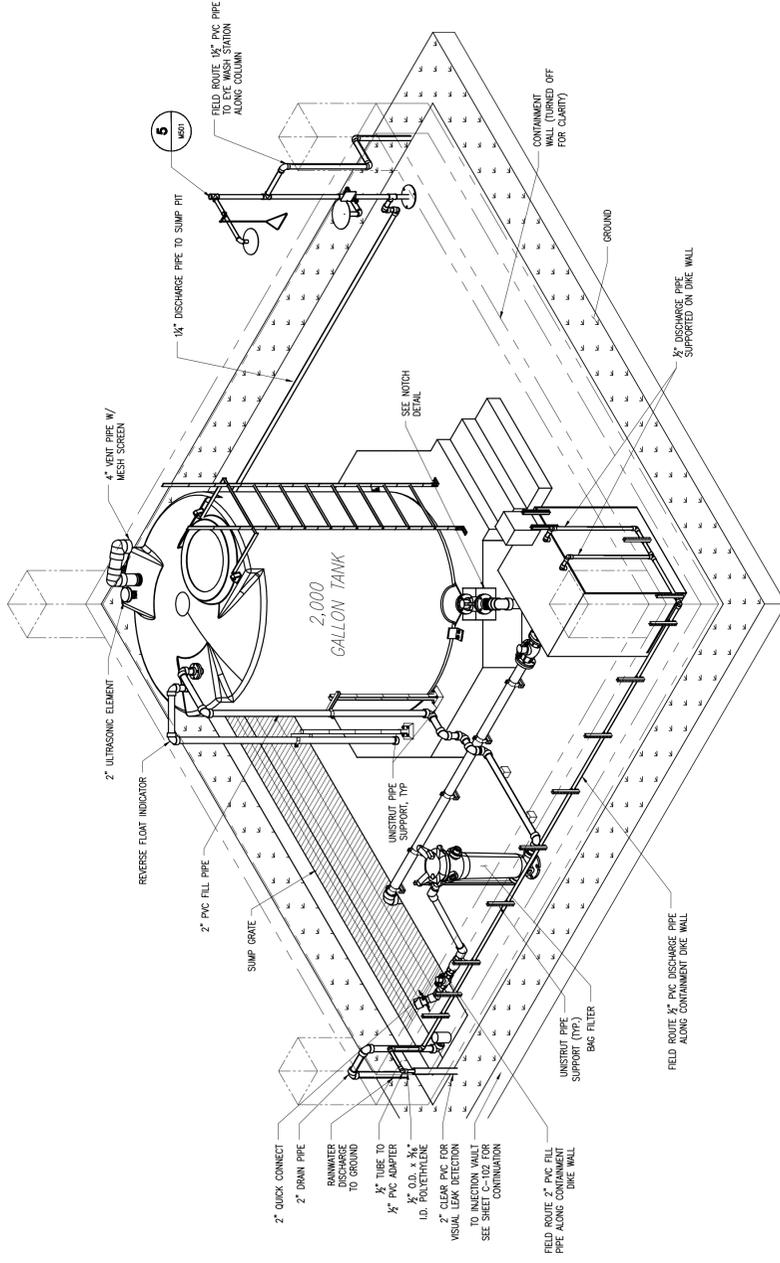
Calvin, Giordano & Associates, Inc. EXCEPTIONAL SOLUTIONS® 1800 Eller Drive, Suite 400, Fort Lauderdale, Florida 33316 Phone: 954-921-2791 • Fax: 954-921-8807		PROJECT No. 91-0134.1 PURPOSE OF THIS SET BID
Certificate of Authorization 514		SHEET: 13 SCALE: 1/2" = 1' PROJECT No. 91-0134.1 PURPOSE OF THIS SET BID
BOOSTER STATIONS DISINFECTION SYSTEM IMPROVEMENTS - HOLLY LAKES		
TANK ELEVATION & ISOMETRIC VIEWS - HOLLY LAKES		
DAVID STAMBAUGH, P.E. STATE OF FLORIDA PROFESSIONAL ENGINEER LICENSE No. 70757		
DATE: 7/28/17		

HYPOCHLORITE STORAGE TANK		
NOZZLE	DESCRIPTION	TO G.P. ELEV./NOZZLE ELEV.*
A	TOP MAINWAY	0'
B	TANK INLET	17.75 FT
C	TANK OUTLET TO ROSSING	17.75 FT
D	U-BENT/OVERFLOW	9.64 FT
E	REVERSE FLOAT INDICATOR	18.08 FT
F	ULTRASONIC SENSOR	17.50 FT
	TOP MAINWAY ACCESS	17.58 FT
	STRADDLING 0'	NA

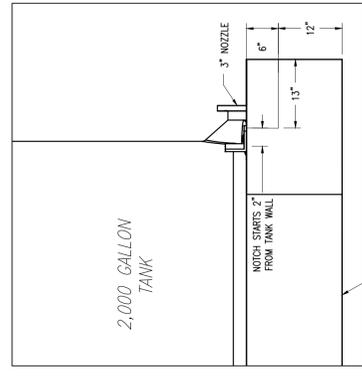
*ELEV. BASED FROM AN ASSUMED FINISHED GROUND ELEV. = 8.0 FT (NODD)



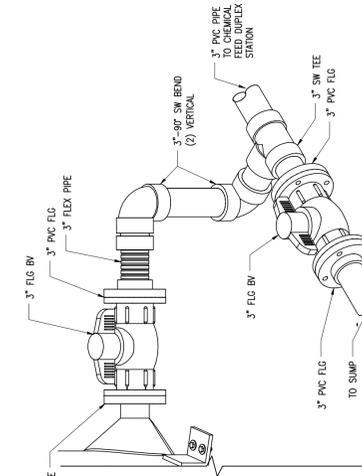
HYPOCHLORITE STORAGE TANK



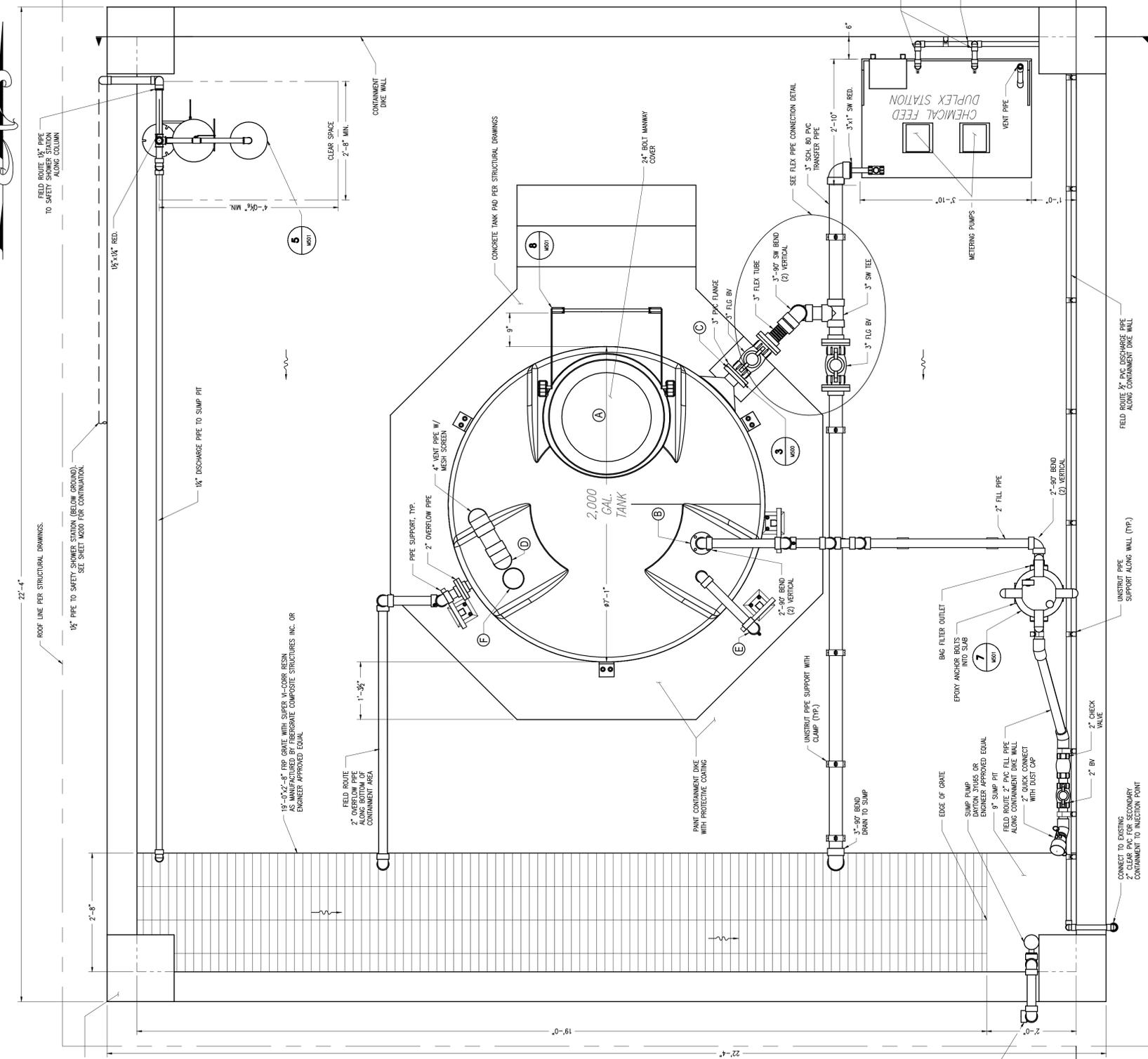
B SOUTHWEST VIEW
SCALE: 3/4" = 1'



NOTCH DETAIL
SCALE: N.T.S.



FLEX PIPE CONNECTION
SCALE: N.T.S.



A PLAN VIEW
SCALE: 3/4" = 1'

NOTES

1. ALL PIPE AND FITTINGS IN CONTACT WITH SODIUM HYPOCHLORITE SHALL BE SCHEDULE 80 PVC.
2. ALL BALL VALVES IN CONTACT WITH SODIUM HYPOCHLORITE SHALL BE VENTED.
3. FLOOR, PADS AND WALL SURFACES SHALL BE PAINTED WITH PROTECTIVE COATING. SEE SPEC 09000.
4. HARDWARE SHALL BE STAINLESS STEEL TYPE 316.

NO	DATE	BY	NO	DATE	REVISION
1					
2					
3					
4					

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Certificate of Authorization 514

BOOSTER STATIONS DISINFECTION SYSTEM IMPROVEMENTS
HOLLY LAKES & ACADEMIC VILLAGE
PEMBROKE PINES, FLORIDA

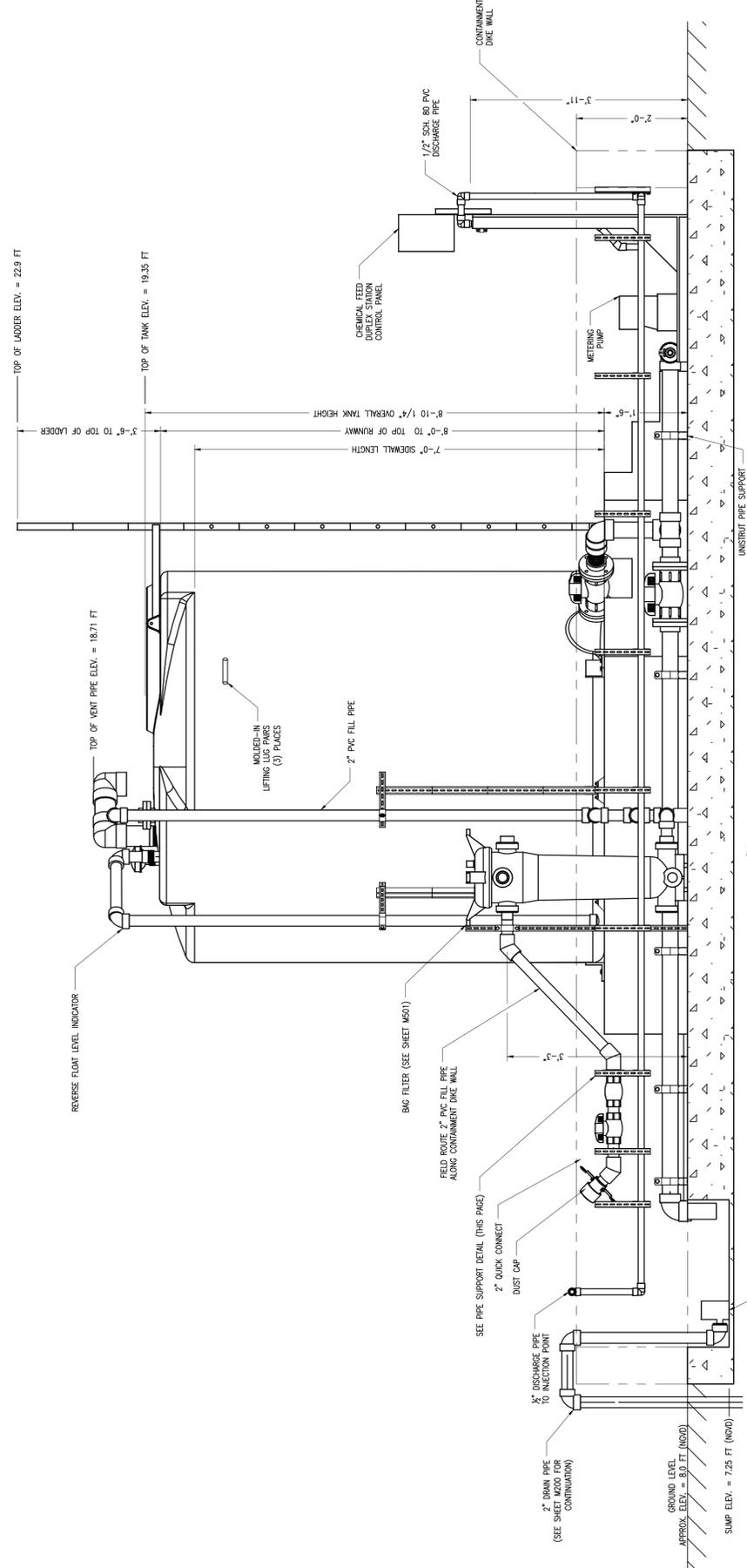
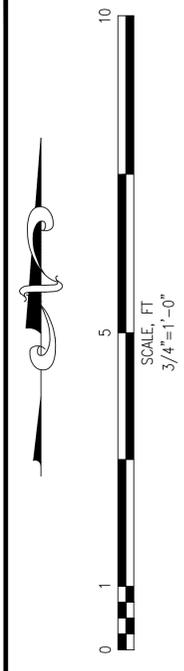
SODIUM HYPOCHLORITE SYSTEM PLAN VIEW - ACADEMIC VILLAGE

DAVID STAMBAUGH, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 70757

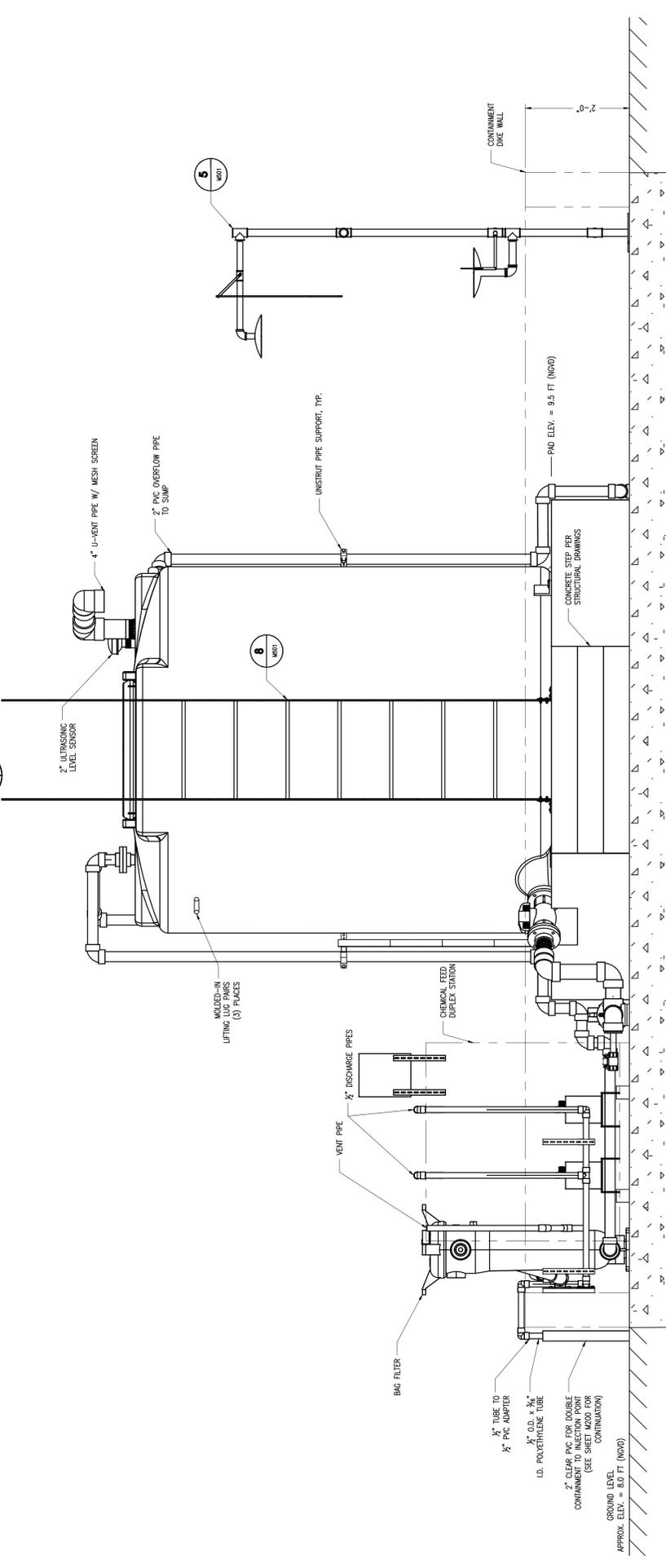
M201
OF 38 SHEETS



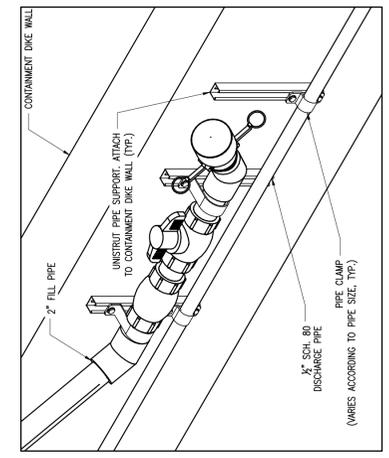
FOR BIDDING PURPOSES ONLY
ELEVATIONS SHOWN ARE NGVD/29



C WEST VIEW
SCALE: 3/4" = 1"



D SOUTH VIEW
SCALE: 3/4" = 1"



PIPE SUPPORT DETAIL
SCALE: 1-1/2" = 1'-0"

NOTES

1. ALL PIPE AND FITTINGS IN CONTACT WITH SODIUM HYPOCHLORITE SHALL BE 304 STAINLESS STEEL.
2. ALL BALL VALVES IN CONTACT WITH SODIUM HYPOCHLORITE SHALL BE VENTED.
3. ROOF STRUCTURE AND COLUMNS TURNED OFF FOR CLARITY. SEE STRUCTURAL DRAWINGS.

FOR BIDDING PURPOSES ONLY
ELEVATIONS SHOWN ARE NGVD 29

DAVID STAMBAUGH, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 70757

ELEVATIONS - ACADEMIC VILLAGE

BOOSTER STATIONS DISINFECTION SYSTEM IMPROVEMENTS
HOLLY LAKES & ACADEMIC VILLAGE
PEMBROKE PINES, FLORIDA

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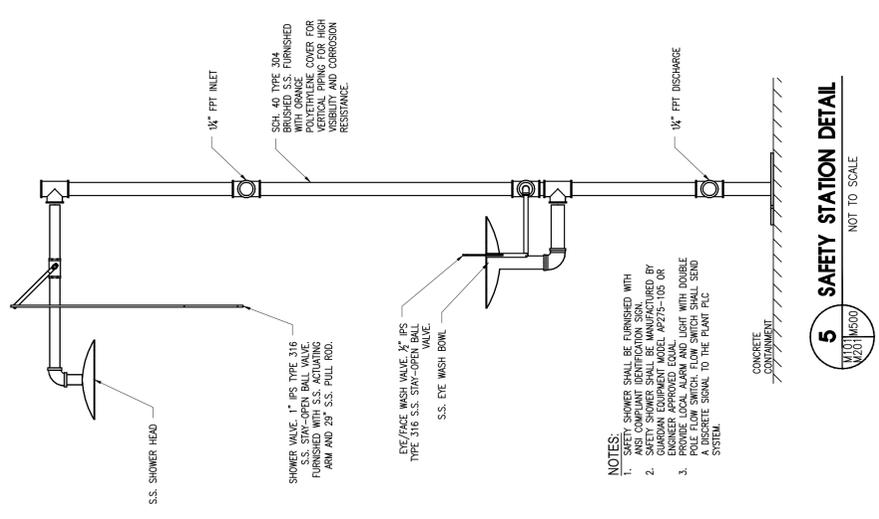
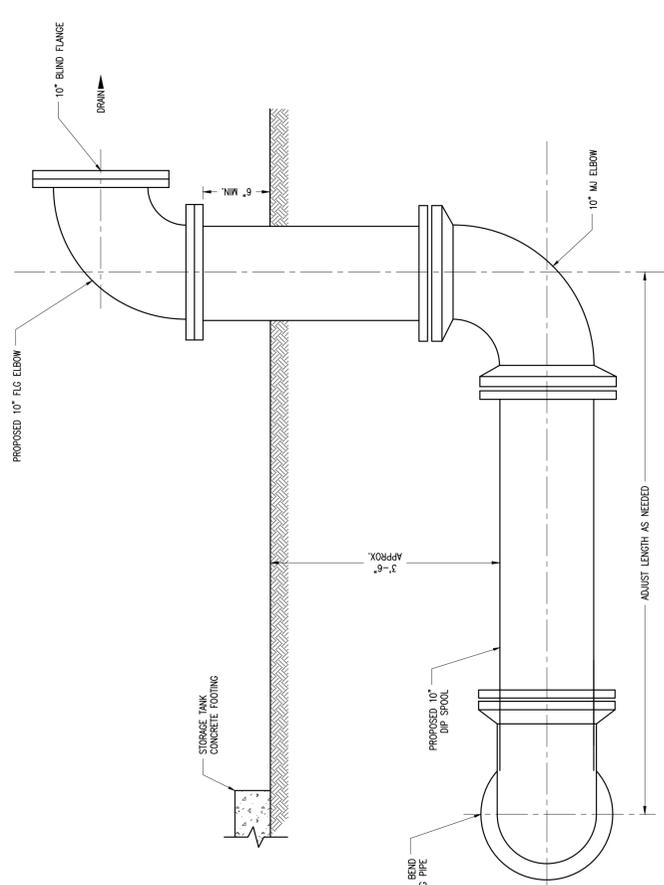
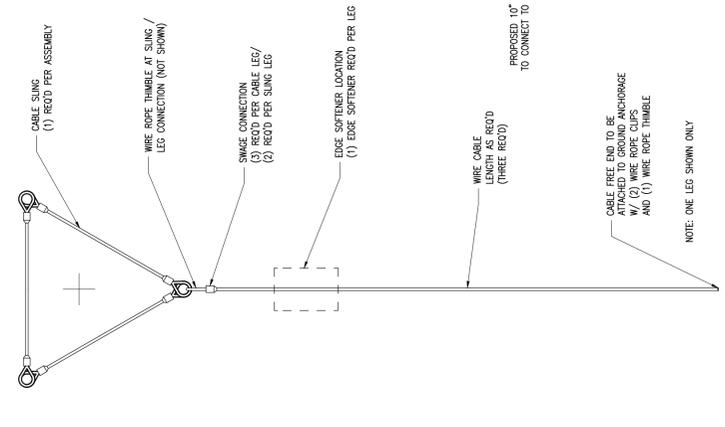
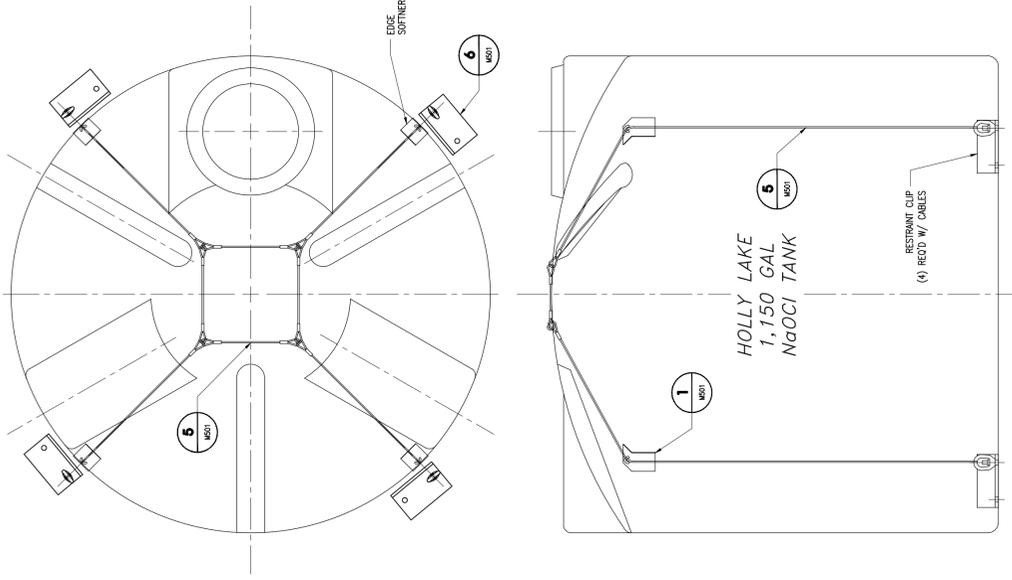
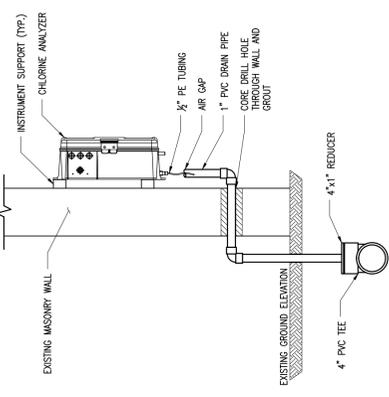
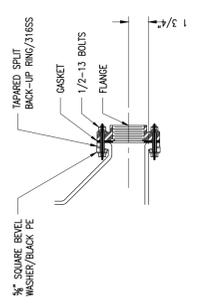
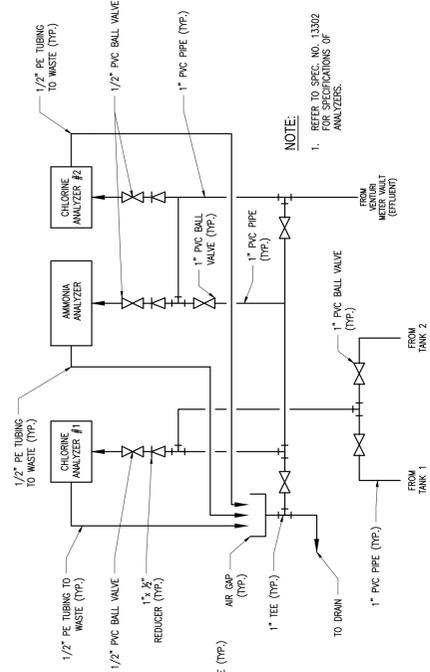
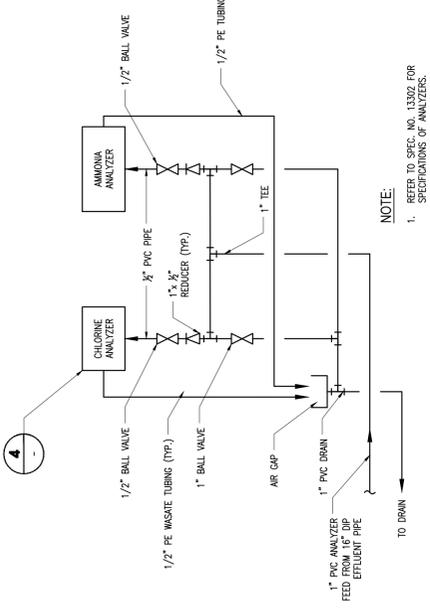
NO	DATE	BY	NO	DATE	REVISION

DESIGNED	DATE	CHECKED	DATE	ISSUED FOR	DATE
FP	09/28/16	DS	01/09/17	OAC	7/26/17

SCALE NTS PROJECT No. 91-0134.1 PURPOSE OF THIS SET BID

SHEET: 16 OF 39 SHEETS
M202





FOR BIDDING PURPOSES ONLY
ELEVATIONS SHOWN ARE NGVD 29

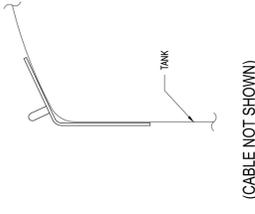
DAVID STAMBAUGH, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE NO. 70757
DATE: 7/26/17

BOOSTER STATIONS DISINFECTION SYSTEM IMPROVEMENTS
HOLLY LAKES & ACADEMIC VILLAGE
PEMBROKE PINES, FLORIDA

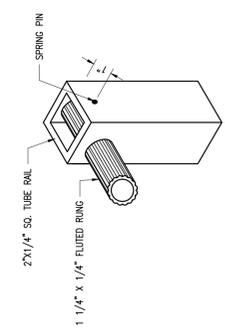
Calvin, Giordano & Associates, Inc.
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DESIGNED	DATE	FP	09/28/16
CHECKED	DATE	JC	01/20/17
ISSUED FOR	DATE	BID	7/26/17
BY	NO	DATE	REVISION

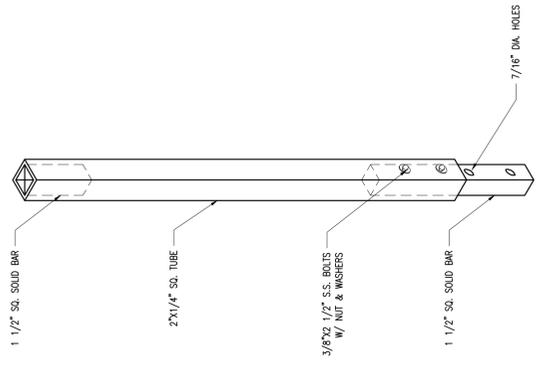
SHEET 17
PROJECT No. 91-0134.1
PURPOSE OF THIS SET
M500
OF 39 SHEETS



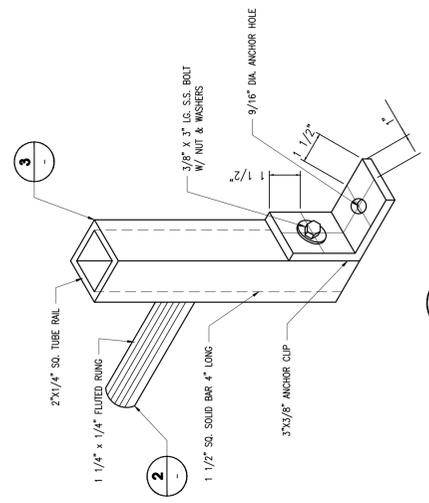
1 EDGE SOFTENER
SCALE: N.T.S.



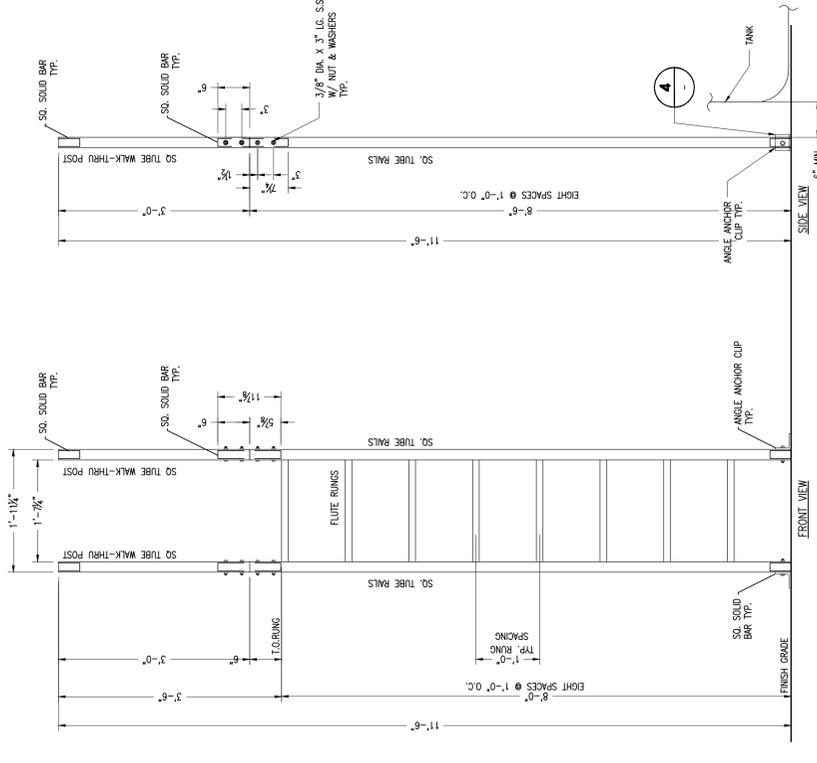
2 LADDER RING DETAIL
SCALE: N.T.S.



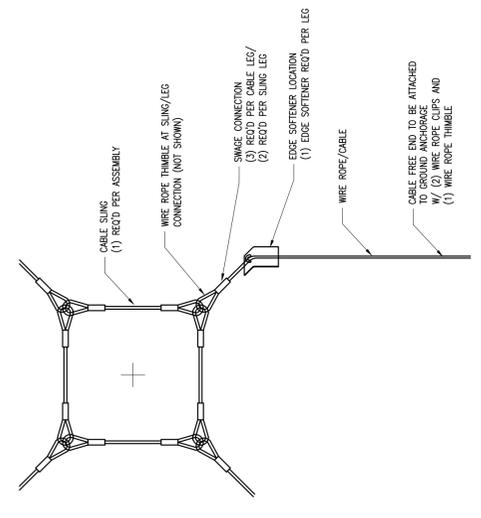
3 LADDER WALK-THRU POST DETAIL
SCALE: N.T.S.



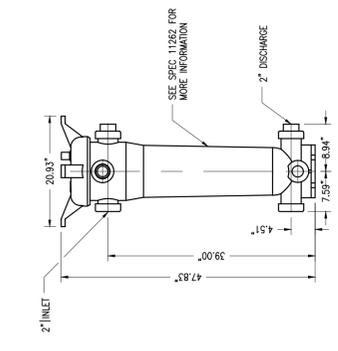
4 ANCHOR CLIP DETAIL
SCALE: N.T.S.



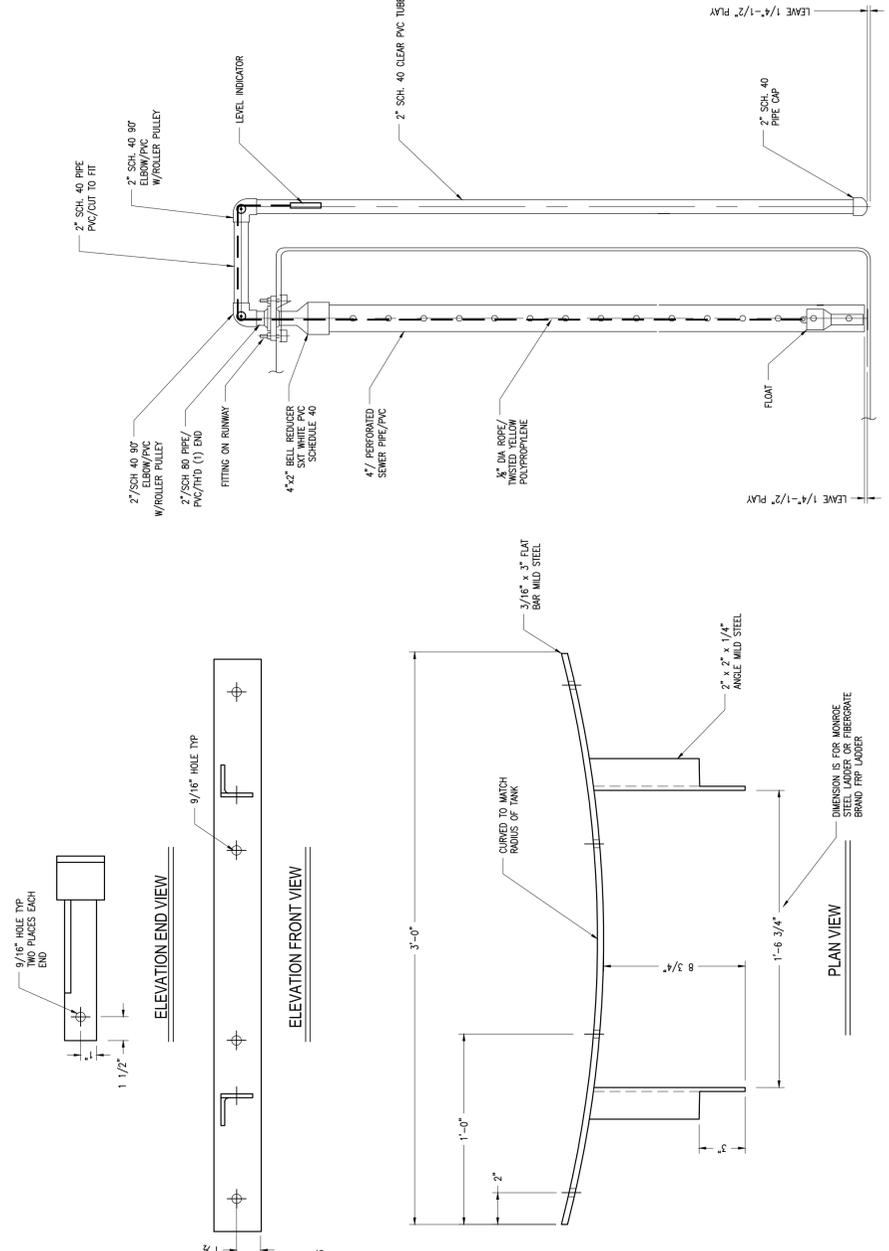
5 STEEL CABLE ASSEMBLY
SCALE: N.T.S.



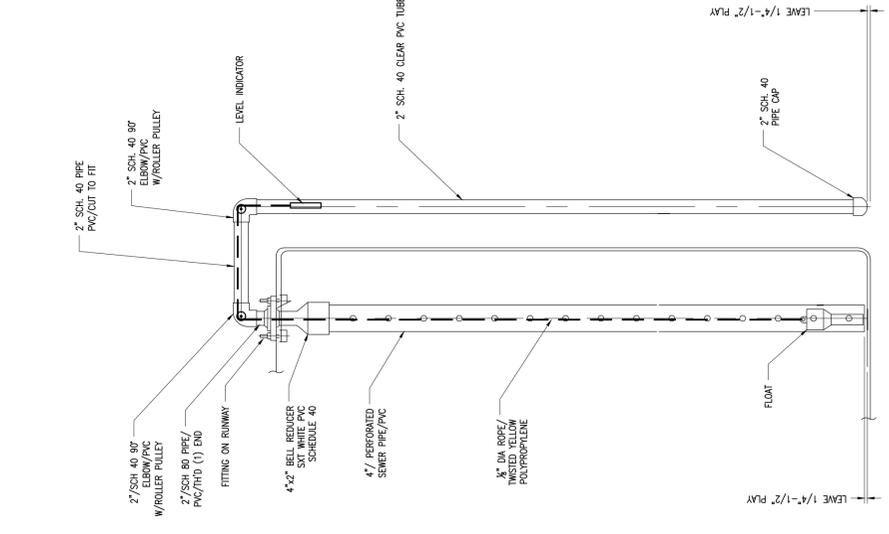
6 RESTRAINT CLIP/CABLE CONNECTION
SCALE: N.T.S.



7 BAG FILTER
SCALE: N.T.S.



8 FRP LADDER
SCALE: N.T.S.



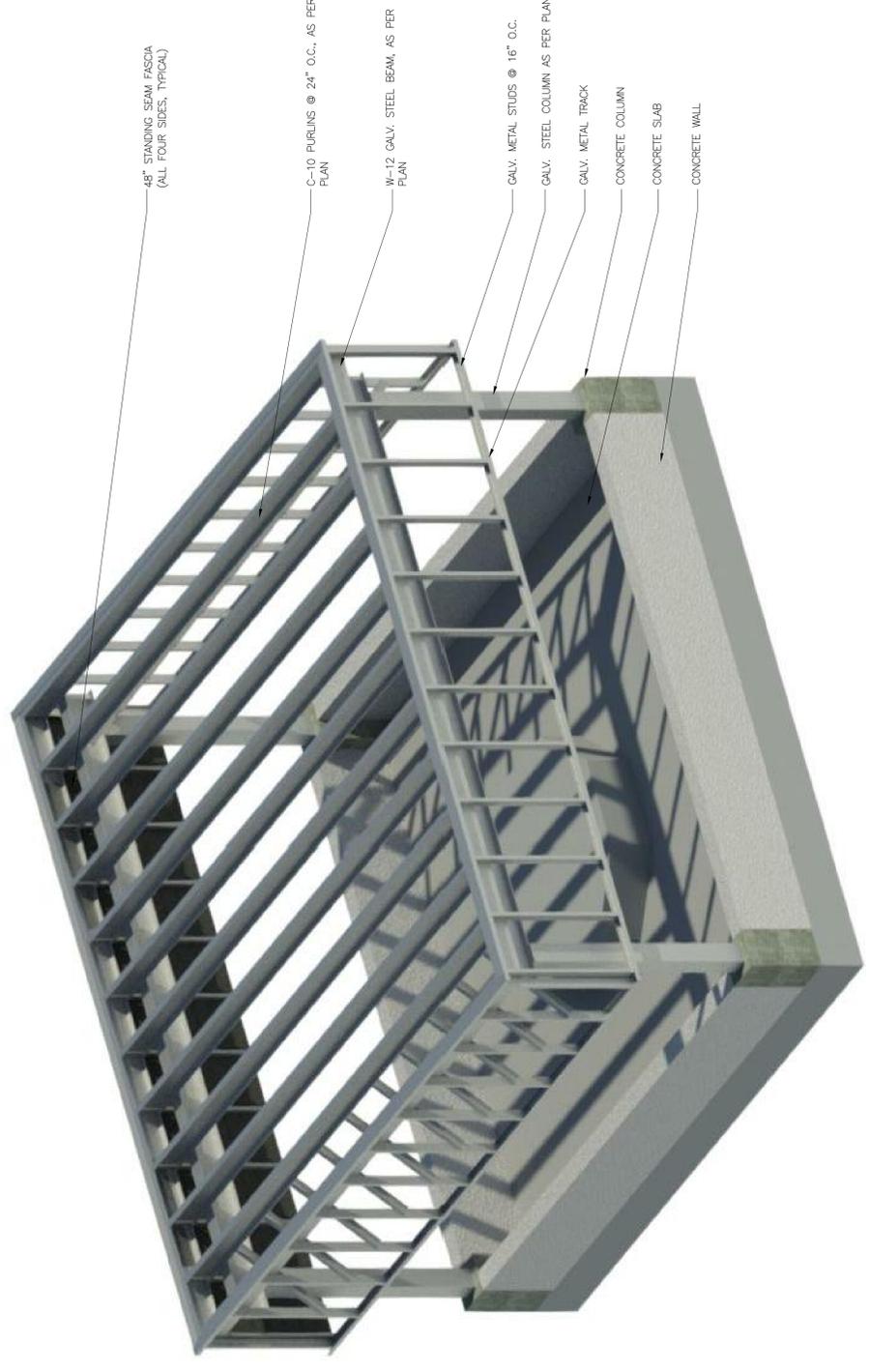
9 REVERSE FLOAT INDICATOR
SCALE: N.T.S.

NOTES
ALL STRUCTURAL COMPONENTS ARE SUBJECT TO THE DESIGN REQUIREMENTS OF THE PROFESSIONAL ENGINEER SPECIFIED IN 11410 (1.07)

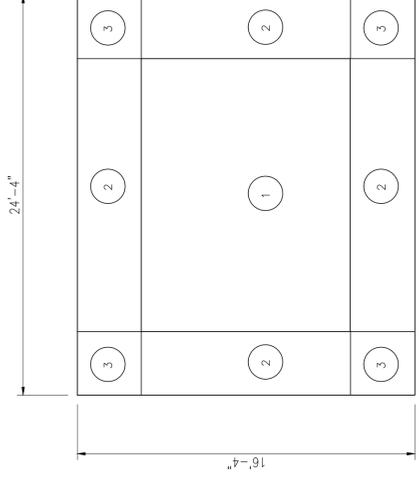
FOR BIDDING PURPOSES ONLY
ELEVATIONS SHOWN ARE NGVD/29

SHEET: 18		SCALE		PROJECT NO		PURPOSE OF THIS SET	
N.T.S.		N.T.S.		91-0134.1		BID	
DAVID STAMBAUGH, P.E.		STATE OF FLORIDA PROFESSIONAL ENGINEER		LICENSE No. 70757		DATE: 7/26/17	
MECHANICAL DETAILS 2				BOOSTER STATIONS DISINFECTION SYSTEM IMPROVEMENTS			
HOLLY LAKES & ACADEMIC VILLAGE				PEMBROKE PINES, FLORIDA			
CALVIN GIORDANO & ASSOCIATES, INC.		EXCEPTIONAL SOLUTIONS		1800 Eller Drive, Suite 600, Fort Lauderdale, Florida 33316		Phone: 954-921-7701 • Fax: 954-921-8807	
Certificate of Authorization 514		DESIGNED		DATE		BY	
09/28/16		JC		01/30/17		REVISION	
01/30/17		REVIEW		7/26/17		DATE	





2 CANOPY FRAME - ISOMETRIC VIEW
S-201 SCALE: N.T.S.

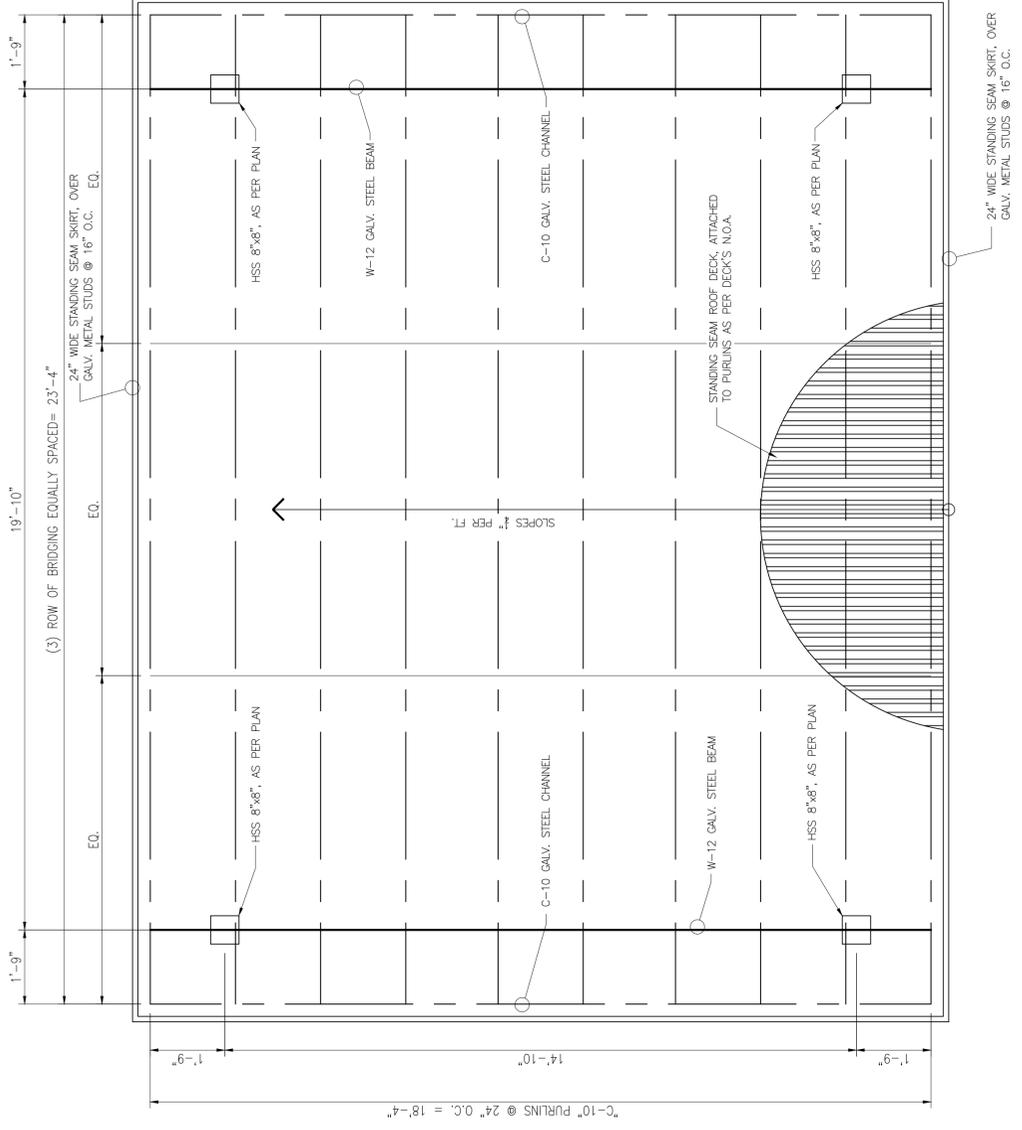


3 CANOPY WIND LOAD DIAGRAM
S-201 SCALE: N.T.S.

ZONE	WIND LOAD PRESSURES AS PER ASCE 7-10	
	POSITIVE (PSF)	NEGATIVE (PSF)
1	36	48
2	36	54
3	36	54
4 & 5	46	-23
o = 5'-0"		

NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY

Calvin, Giordano & Associates, Inc.
 EXCEPTIONAL SOLUTIONS
 1000 Billie Chase, Suite 600 Fort Lauderdale, Florida 33316
 Phone: 954.920.1700 • Fax: 954.920.1887
 Certificate of Authorization 514

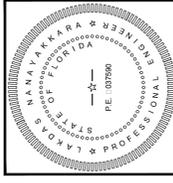


1 CANOPY FRAMING PLAN
S-201 SCALE: 1/2"=1'-0"



NOTES:

- ALL STRUCTURAL MEMBER SIZES ARE FOR REFERENCE ONLY.
- CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND DESIGN ANALYSIS, SIGNED AND SEALED BY A FLORIDA REGISTERED ENGINEER. SHOP DRAWINGS SHALL INDICATE CONNECTION TYPE, PLATES, BOLTS, WELDING, AND ANY OTHER ELEMENT REQUIRED FOR INSTALLATION, FABRICATION OR REQUIRED BY THE FLORIDA BUILDING CODE.
- STANDING SEAM COLOR AND PROFILE SHALL BE SELECTED BY THE OWNER OR HIS/HER REPRESENTATIVE.
- ALL STEEL MEMBER SHALL BE GALVANIZED (G90).
- CONTRACTOR SHALL VERIFY CANOPY DIMENSION PRIOR COMMENCING ANY FABRICATION.
- CANOPY ELEVATION SHALL BE 5'-0" CLEAR HEIGHT TO THE UNDERSIDE OF STRUCTURAL MEMBER, ABOVE TOP OF TANK.
- ALL ANCHOR BOLTS SHALL BE STAINLESS STEEL.
- ALL SOREMS OR FASTENERS SHALL BE STAINLESS STEEL.
- LOADS:
 SUPERIMPOSED DEAD LOAD SHALL BE: 15 PSF
 SUPERIMPOSED LIVE LOAD SHALL BE: 30 PSF
 WIND SPEED: 170 MPH
 EXPOSURE: D
 CATEGORY: IV
- WIND LOAD PER ASCE 7-10



NOT FOR CONSTRUCTION

SHEET: 20

SCALE: INDICATED

PROJECT NO: 164403

PURPOSE OF THIS SET: PROGRESS

DESIGNED: LN 07-1-16

CHECKED: LN

ISSUED FOR COMMENTS: LN

DATE: 07-1-16

REVISION: BY NO DATE

BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS
 HOLLY LAKES & ACADEMIC VILLAGE
 PEMBROKE PINES, FLORIDA

SECONDARY CONTAINMENT DIKE CANOPY
 HOLLY LAKES

DATE: 07-1-16

PROJECT NO: 164403

PURPOSE OF THIS SET: PROGRESS

SCALE: INDICATED

SHEET: 20

PROJECT NO: 164403

PURPOSE OF THIS SET: PROGRESS

DATE: 07-1-16

PROJECT NO: 164403

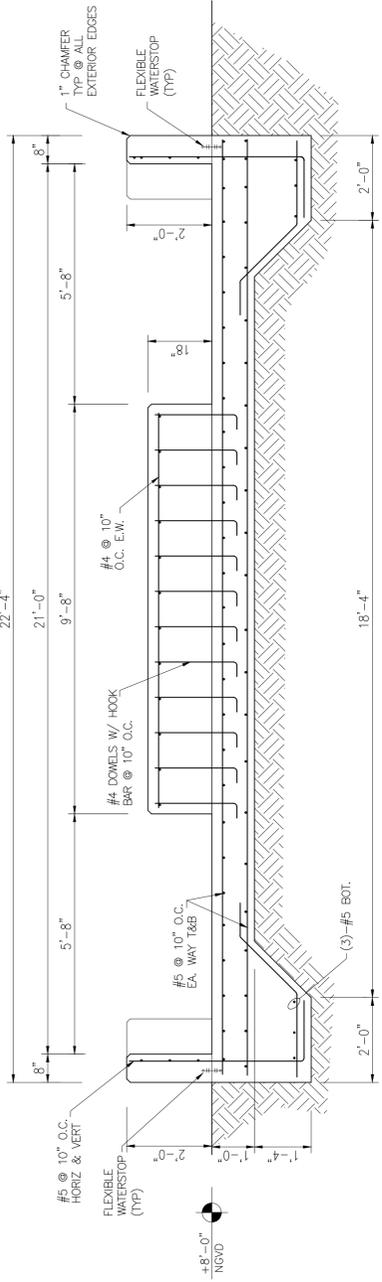
PURPOSE OF THIS SET: PROGRESS

DATE: 07-1-16

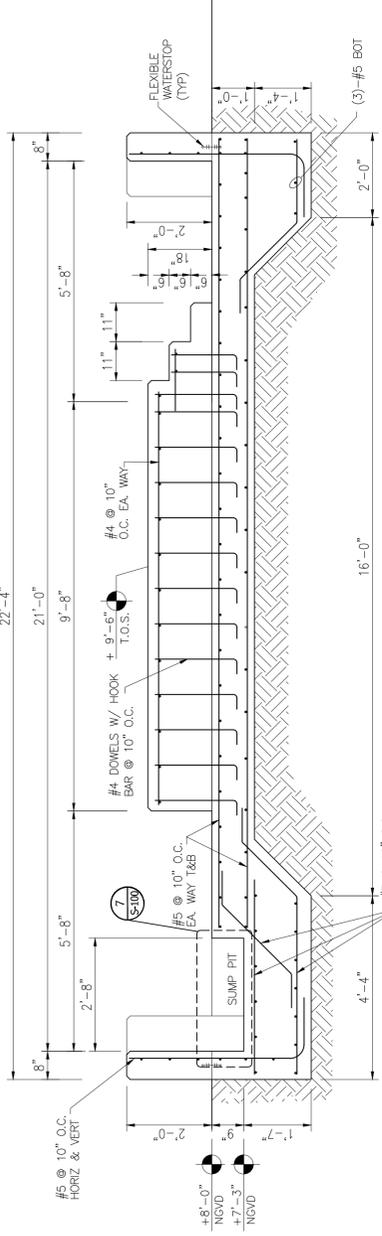
PROJECT NO: 164403

PURPOSE OF THIS SET: PROGRESS

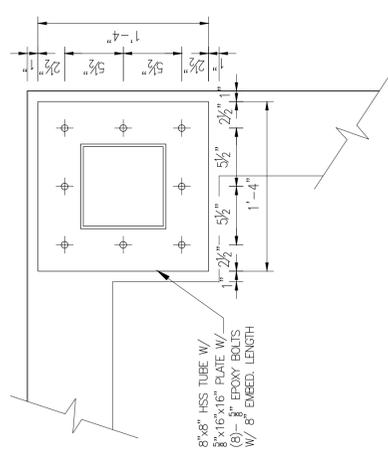
DATE: 07-1-16



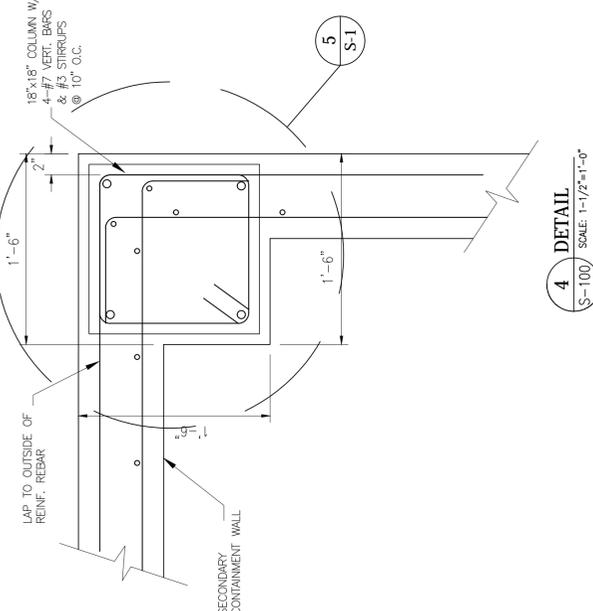
3 SECTION
S-100 SCALE: 1/2"=1'-0"



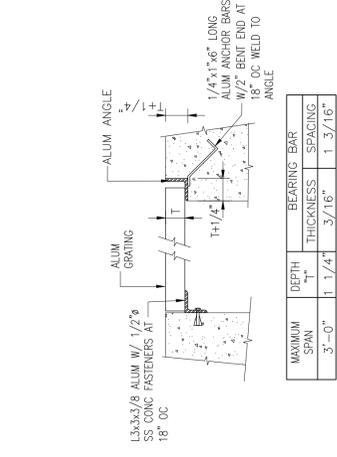
2 SECTION
S-100 SCALE: 1/2"=1'-0"



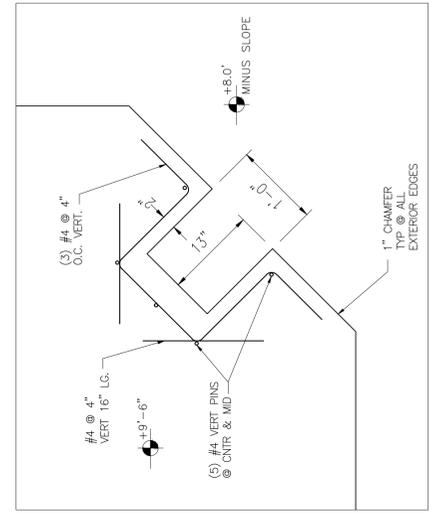
5 SECTION
S-100 SCALE: 1-1/2"=1'-0"



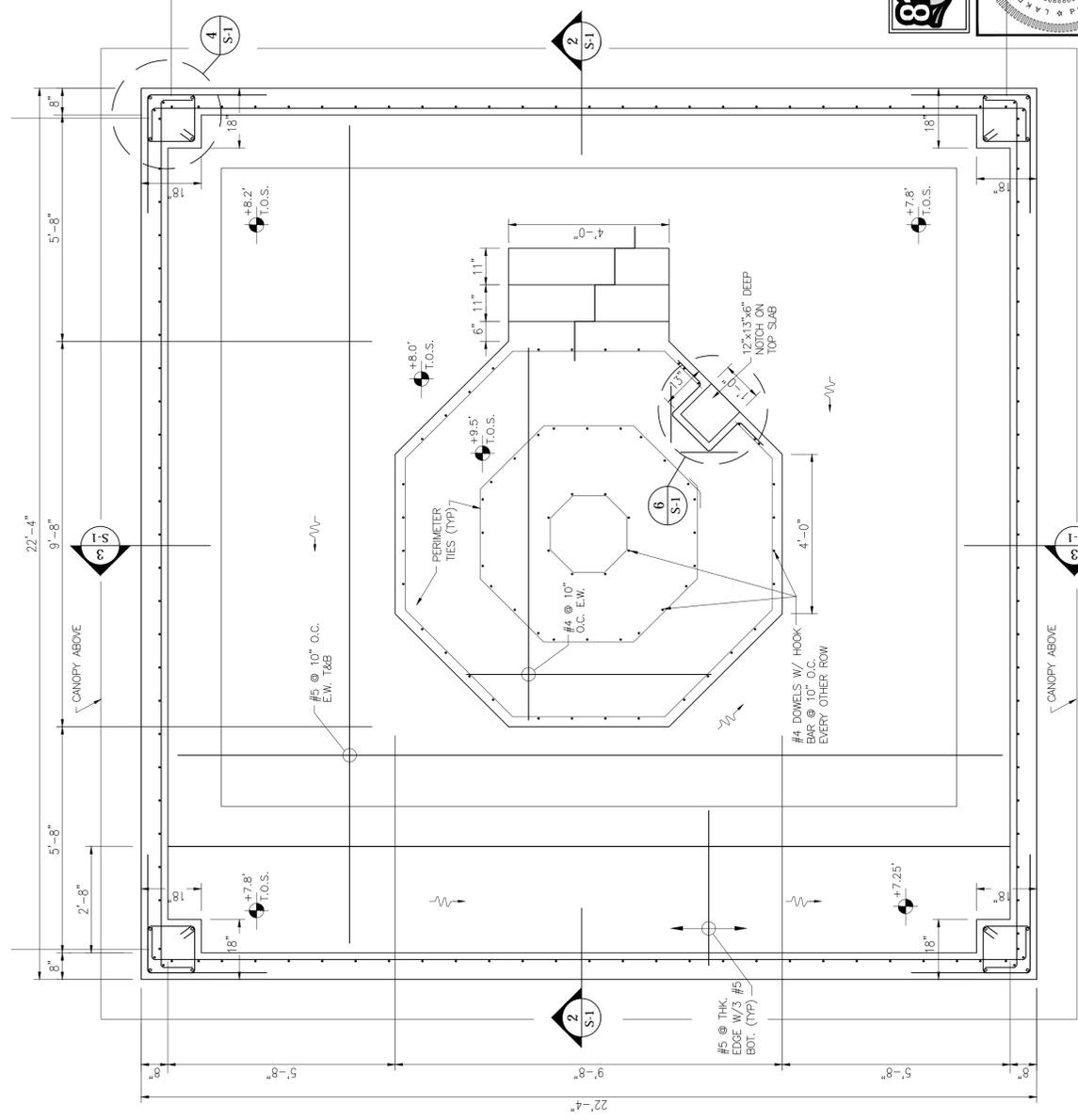
4 DETAIL
S-100 SCALE: 1-1/2"=1'-0"



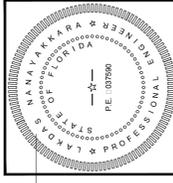
7 SECTION
S-100 SCALE: 1-1/2"=1'-0"



6 SECTION
S-100 SCALE: 1"=1'-0"



1 FOUNDATION PLAN
S-100 SCALE: 1/2"=1'-0"



NOT FOR CONSTRUCTION
SHEET: 21

SCALE: SHOWN
PROJECT NO: 164403
PURPOSE OF THIS SET: PROGRESS
SHEET: 21 OF 200

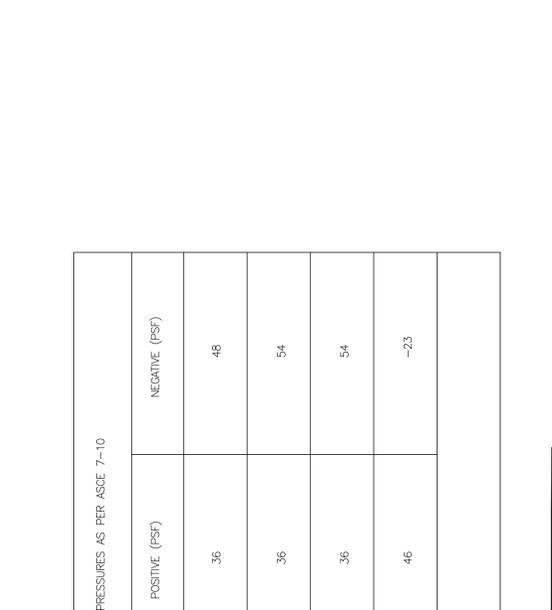
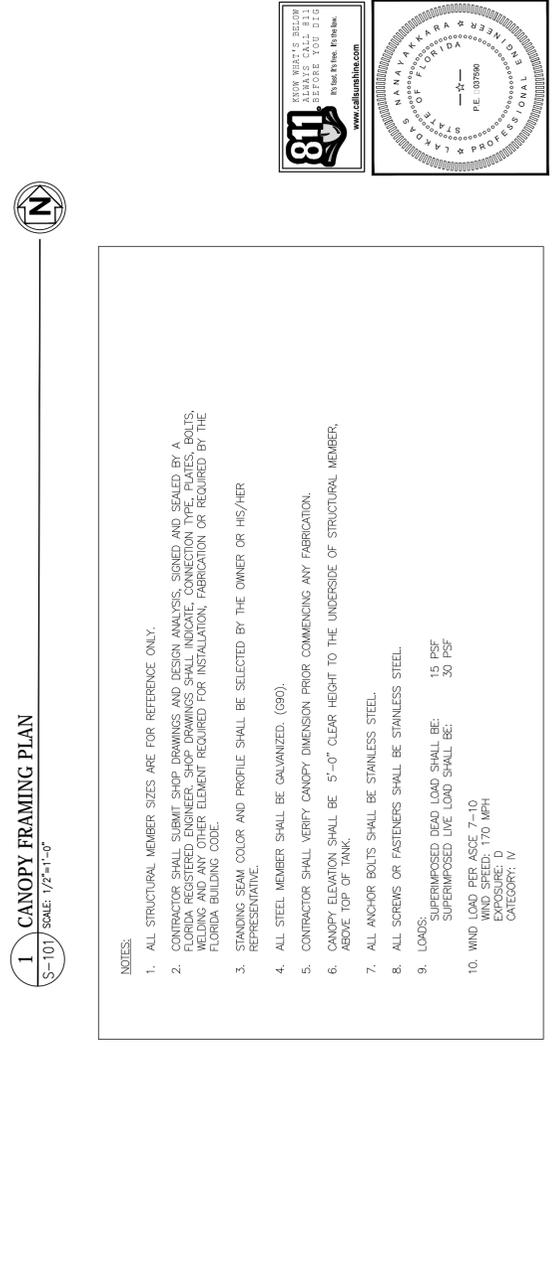
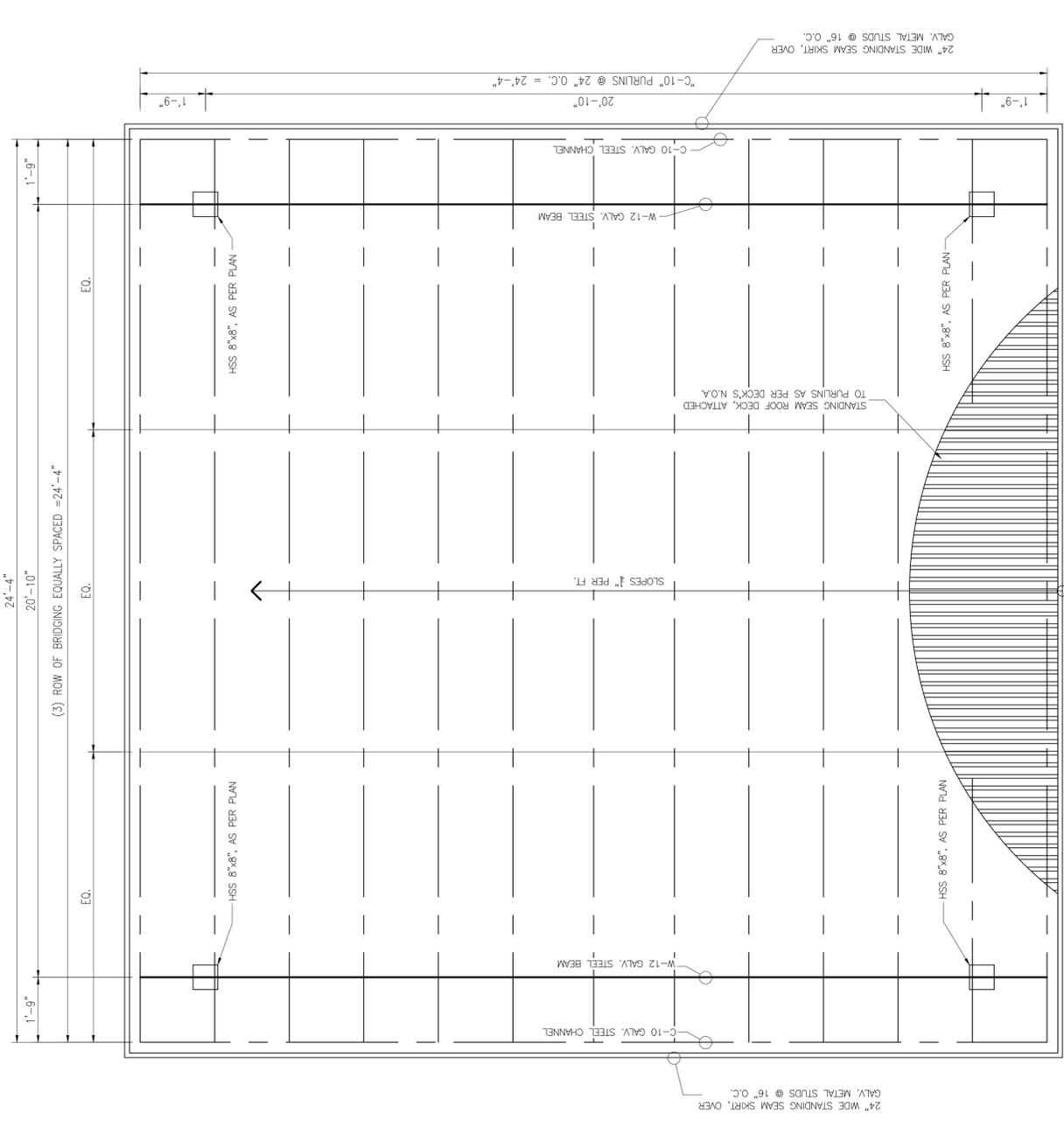
LAJONG J. JOHNSON ENGINEERING, INC.
1000 N. W. 10th St., Suite 100
Pembroke Pines, FL 33068
Tel: 305-885-1116

SECONDARY CONTAINMENT DIKE
ACADEMIC VILLAGE

BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS
HOLLY LAKES & ACADEMIC VILLAGE
PEMBROKE PINES, FLORIDA

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS
1000 Billie Childs, Suite 600 Fort Lauderdale, Florida 33316
Phone: 954.920.2700 • Fax: 954.920.8807
Certificate of Authorization 514

DESIGNED	DATE	LN	
	07-11-16		
CHECKED	DATE	LN	
ISSUED FOR COMMENTS	DATE	BY	
REVISION	DATE	BY	NO



WIND LOAD PRESSURES AS PER ASCE 7-10		
ZONE	POSITIVE (PSF)	NEGATIVE (PSF)
1	36	48
2	36	54
3	36	54
4 & 5	46	-23
α = 5'-0"		

NOT FOR CONSTRUCTION

SCALE: SHEET: 22

PROJECT No: 164403

PROJECT No: 164403

PURPOSE OF THIS SET: PROGRESS

DATE: 07-11-16

SECONDARY CONTAINMENT DIKE CANOPY
ACADEMIC VILLAGE

BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS
HOLLY LAKES & ACADEMIC VILLAGE
PEMBROKE PINES, FLORIDA

DESIGNED LN: 07-11-16

CHECKED LN: --

ISSUED FOR COMMENTS LN: --

DATE: 07-11-16

REVISION

NO. DATE BY NO. DATE

File Name: L:\E Projects\2016\2016 LPE PROJECTS\164403 ACADEMIC VILLAGE BOOSTER STATION\Structural\164403 S1 01-03-17.dwg

ALL WORK TO BE PERFORMED UNDER THIS CONTRACT SHALL COMPLY WITH THE MOST RECENT EDITION OF THE FLORIDA BUILDING CODE, CITY LABOR LAWS, CITY ORDINANCES, CITY/COUNTY ZONING CODES, RULES AND REGULATIONS, AND ANY APPLICABLE CODES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND CARRY OUT THE WORK DESCRIBED IN THE CONSTRUCTION DOCUMENTS.

STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH PROJECT SPECIFICATIONS, ARCHITECTURAL, MECHANICAL, ELECTRICAL, PLUMBING, CIVIL AND SITE DRAWINGS. CONSULT THESE DOCUMENTS FOR SLEEVES, BRASSINGS AND ANY OTHER DETAIL NOT SHOWN ON THE STRUCTURAL DOCUMENTS.

ALL DIMENSIONS AND CONDITIONS MUST BE VERIFIED IN THE FIELD. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT OR ENGINEER OF RECORD. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING AND PROCEEDING WITH THE AFFECTED PART OF THE WORK. CONTRACTOR(S) SHALL FAMILIARIZE HERSELF/HIMSELF WITH ALL THE EXISTING CONDITIONS.

AT THE SITE RELATIVE TO SCOPE OF WORK RELATING TO THIS PROJECT, MATERIALS HANDLING, STORAGE AND DELIVERY, WORKING SPACE AVAILABLE, SAFETY PRECAUTIONS REQUIRED, AND ALL OTHER CONDITIONS SHALL BE IDENTIFIED AND NOTED IN THE PROJECT COST COMPLETE PROJECT BID. NO INCREASE IN PROJECT COST WILL BE ALLOWED FOR FAILURE OF THE CONTRACTOR TO KNOW EXISTING SITE CONDITIONS.

THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE BUILDING IS COMPLETED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE ERECTION SEQUENCES AND METHODS TO MAINTAIN THE STABILITY OF THE BUILDINGS AND ITS COMPONENTS DURING ERECTION. THIS INCLUDES THE ADDITION OF NECESSARY SHORING, SHEETING, TEMPORARY BRACING, GUYS OR TIEDOWNS.

DO NOT SCALE DRAWINGS TO OBTAIN DIMENSIONS. ANY DIMENSIONS NOT INDICATED ON DRAWINGS SHALL BE CONFIRMED WITH THE ENGINEER PRIOR TO CONSTRUCTION. NO WORK SHALL BE PERFORMED OUTSIDE THE PROJECT LIMITS WITHOUT PRIOR WRITTEN APPROVAL FROM THE BUILDING OWNER AND/OR ENGINEER.

CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK OF ALL TRADES AS REQUIRED FOR COMPLETION OF WORK.

MATERIALS SHALL BE NEW, OF QUALITY SPECIFIED, AND SHALL BE SUBJECT TO INSPECTION AND TESTING. APPROVAL FROM THE ENGINEER OF RECORD IS REQUIRED PRIOR TO APPROVAL FROM THE ENGINEER.

THERE ARE NO SUBSTITUTIONS ALLOWED UNLESS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL SUBMIT WRITING ALL REQUESTS FOR SUBSTITUTIONS. THE CONTRACTOR SHALL SUBMIT WRITING TO THE ENGINEER OF RECORD PRIOR TO CONSTRUCTION. ANY SUBSTITUTIONS AFFECTING INSTALLATION ACCORDING TO SPECIFICATIONS.

ALL PLAN DETAILS AND WALL SECTIONS ARE ASSUMED TO BE AS SHOWN UNLESS OTHERWISE NOTED OR NOTED OTHERWISE.

CODES AND STANDARDS

THE PROJECT WAS DESIGNED IN ACCORDANCE WITH THE FOLLOWING CODES:

- A. FLORIDA BUILDING CODE / 2014 EDITION
- B. BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318-11).
- C. MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE - STRUCTURES (ACI 315 / LATEST EDITION).
- D. MANUAL FOR STANDARD PRACTICE FOR WELDING REINFORCED STEEL INSERTS & CONNECTIONS IN REINFORCED CONCRETE CONSTRUCTION AWS. D1.4 / LATEST EDITION.
- E. SPECIFICATION FOR THE DESIGN, FABRICATION & INSTALLATION OF STEEL CONNECTIONS (AISC 358 / AMERICAN INSTITUTE OF STEEL CONSTRUCTION) / AISC 13TH EDITION.
- F. SPECIFICATION FOR STRUCTURAL CONCRETE FOR BUILDINGS. ACI 301. LATEST EDITION.
- G. BUILDING CODE REQUIREMENTS AND SPECIFICATIONS FOR MASONRY STRUCTURES (ACI 530-06 & ACI 530.1-06).

DESIGN CRITERIA

ALL WORK SHALL CONFORM WITH THE MINIMUM STANDARDS AS SPECIFIED IN THE FLORIDA BUILDING CODE LATEST EDITION AND ASCE 7-10.

LOAD COMBINATIONS AS PER ASCE 7-10

- ASD
- 1. D (LL OR LR)
- 2. D + 0.75L₁ + 0.75LR
- 3. D + 0.75L₁ + 0.75W₁ + 0.75LR
- 4. D + 0.75L₁ + 0.75W₁ + 0.75(L₂ OR W₂) + 0.75LR
- LRFD
- 1. 1.2D + 1.6L₁ + 0.5L₂
- 2. 1.2D + 1.6L₁ + 1.0W₁ (W₁ OR W₂)
- 3. 1.2D + 1.6L₁ + 1.0W₁ + 1.6W₂
- 4. 1.2D + 1.6(W₁ OR W₂) + 1.6L₂ + 0.5L₁
- 5. 0.9D + 1.0(W₁ OR W₂)

- MISC. STRUCTURAL STEEL REINFORCEMENT - STEEL 36, 60,000 PSI
- CONCRETE MINIMUM 28 STRENGTH 3,000 PSI
- WALL 4,500 PSI
- FOUNDATION 4,500 PSI
- SOL BEARING STRUCTURE FOUNDATIONS ARE DESIGNED WITH SAFE BEARING CAPACITY OF 2000 PSF.

CONTRACTOR TO VERIFY AT SITE PRIOR TO CONSTRUCTION BEGIN.

COMPONENTS AND CLADDING DESIGN

ALL EXTERIOR WALLS, ROOFING COMPONENTS AND CLADDING SHALL BE DESIGNED FOR THE SPECIFIED WIND PRESSURES SHOWN HEREWITH THESE DOCUMENTS, OR HAVE A DEDUCT APPROVAL FOR THE APPLICABLE WIND PRESSURES.

THE WIND PRESSURES LISTED IN THE DRAWINGS HAVE BEEN OBTAINED FROM A WIND TUNNEL PROCEDURE I ACCORDANCE WITH SECTION 6.4.3 OF ASCE 7-10.

THRESHOLD INSPECTION

THE OWNER SHALL EMPLOY A QUALIFIED SPECIAL INSPECTOR TO PERFORM INSPECTIONS IN ACCORDANCE WITH THE "THRESHOLD INSPECTION GUIDELINES" ISSUED SEPARATELY BY THE ARCHITECT OR ENGINEER OF RECORD. THE SPECIAL INSPECTOR SHALL CERTIFY WITH HIS SEAL AND SIGNATURE THAT THE STRUCTURE HAS BEEN COMPLETED ACCORDING TO THE PROJECT PLANS AND SPECIFICATIONS.

SPECIAL INSPECTIONS SHALL BE PERFORMED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED TO PERFORM INSPECTIONS UNDER FLORIDA THRESHOLD LAW OR HIS QUALIFIED FULL TIME EMPLOYEE.

SHOP DRAWING REVIEW

SHOP DRAWINGS WILL BE REVIEWED FOR GENERAL COMPLIANCE WITH THE DESIGN INTENT OF THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTRACTOR TO VERIFY COMPLIANCE WITH THE CONTRACT DOCUMENTS AS TO QUANTITY, LENGTH, ELEVATIONS, DIMENSIONS, ETC.

ALL SHOP DRAWINGS SHALL BE REVIEWED BY THE CONTRACTOR PRIOR TO SUBMITTAL TO THE ARCHITECT/ENGINEER. DRAWINGS SUBMITTED WITHOUT REVIEW WILL BE RETURNED UNCHECKED.

IN ALL INSTANCES THE CONTRACT DOCUMENTS WILL GOVERN OVER THE SHOP DRAWINGS UNLESS OTHERWISE SPECIFIED IN WRITING BY THE ENGINEER OF RECORD.

REPRODUCTION OF STRUCTURAL DRAWINGS FOR USE AS SHOP DRAWINGS IS NOT PERMITTED.

ALL CHANGES AND ADDITIONS MADE ON RE-SUBMITTAL MUST BE CLEARLY FLAGGED AND NOTED THE PURPOSE OF THE RE-SUBMITTAL MUST BE CLEARLY NOTED ON THE LETTER OF SUBMITTAL. ALL CHANGES SHALL BE LIMITED TO THOSE ITEMS CAUSING THE RE-SUBMITTAL.

SHOP DRAWINGS REQUIRED ENGINEERING INPUT BY SPECIALTY ENGINEER

SUBMITTAL SHALL CLEARLY IDENTIFY THE SPECIFIC PROJECT AND APPLICABLE CODES, LIST DESIGN CRITERIA, AND SHOW ALL DETAILS AND PLANS NECESSARY FOR PROPER CONSTRUCTION. THE CONTRACTOR SHALL IDENTIFY SPECIFIC PRODUCT UTILIZED. GENERIC PRODUCT WILL NOT BE ACCEPTED.

SHOP DRAWINGS AND CALCULATIONS MUST BE PREPARED UNDER THE DIRECT SUPERVISION AND CONTROL OF THE SPECIALTY ENGINEER.

SHOP DRAWINGS AND CALCULATIONS REQUIRE THE SIGNATURE, SEAL AND STAMP OF THE SPECIALTY ENGINEER. COMPUTER PRINTOUTS ARE AN ACCEPTABLE SUBSTITUTE FOR MANUAL COMPUTATIONS PROVIDED THEY ARE ACCOMPANIED BY SUFFICIENT DESCRIPTIVE INFORMATION. SUCH DESCRIPTIVE INFORMATION SHALL BEAR THE IMPRESSED SEAL AND SIGNATURE OF THE SPECIALTY ENGINEER AS AN INDICATION THAT HE/SHE HAS ACCEPTED RESPONSIBILITY FOR THE RESULT.

DRAWINGS PREPARED SOLELY TO SERVE AS A GUIDE FOR FABRICATION AND INSTALLATION, (SUCH AS REINFORCING STEEL SHOP DRAWINGS OR STRUCTURAL STEEL ERECTION DRAWINGS) SHALL BE REVIEWED BY THE SPECIALTY ENGINEER. SUCH DRAWINGS SHALL NOT REQUIRE THE SEAL OF A SPECIALTY ENGINEER.

REVIEW BY THE STRUCTURAL ENGINEER OF RECORD OF SUBMITTAL IS LIMITED TO VERIFY THE FOLLOWING:

- THAT THE SPECIFIED STRUCTURAL SUBMITTAL HAVE BEEN FURNISHED.
 - THAT THE STRUCTURAL SUBMITTAL HAVE BEEN SIGNED AND SEALED BY THE SPECIALTY ENGINEER.
 - THAT THE SUBMITTAL IS UNDERSTOOD AND HAS BEEN UNDERSTOOD THE DESIGN INTENT AS HAS USED THE SPECIFIED STRUCTURAL CRITERIA. (NO DETAIL CHECK OF DIMENSIONS OR QUANTITIES WILL BE MADE.)
 - THAT THE CONFIGURATION SET FORTH IN THE STRUCTURAL SUBMITTAL IS CONSISTENT WITH THE CONTRACT DOCUMENTS. (NO DETAIL CHECK OF DIMENSIONS OR QUANTITIES WILL BE MADE.)
- SUBMITTAL NOT MEETING THE ABOVE REFERRED CRITERIA WILL NOT BE REVIEWED

FORMWORK (CONCRETE SLABS AND BEAMS)

NO STRUCTURAL CONCRETE SHALL BE STRIPPED UNTIL IT HAS REACHED AT LEAST TWO THIRDS OF THE 28 DAY DESIGN STRENGTH.

DESIGN, ERECTION AND REMOVAL OF ALL FORMWORK SHALL MEET REQUIREMENTS SET FORTH IN ACI STANDARDS 347 AND 301.

REINFORCING STEEL

SHALL BE ASTM A615 GRADE 60 DEFORMED BARS. FREE FROM OIL SCALE AND RUST AND PLACED IN ACCORDANCE WITH THE TYPICAL BENDING DIAGRAM AND PLACING DETAILS OF ACI STANDARDS AND SPECIFICATIONS. SECURE REMOVAL OF SHOP DRAWINGS PRIOR COMMENCING ANY FABRICATION.

WELDED WIRE FABRIC

TO CONFORM TO ASTM A-185. FREE FROM OIL, SCALE AND RUST AND PLACE IN ACCORDANCE WITH THE TYPICAL PLACING DETAILS OF ACI STANDARDS AND SPECIFICATIONS. MINIMUM LAP SHALL BE ONE SPACE PLUS TWO INCHES.

EMBEDDED ITEMS IN CONCRETE

CONCRETE COVERAGE OF REINFORCED STEEL REBARS SHALL BE 3" ON HORIZONTAL SURFACES EXPOSED TO WEATHER AND 2" ON THE VERTICAL SURFACES FACING SUCH MATERIAL.

EMBEDDED ITEMS INCLUDING BUT NOT LIMITED TO STEEL REBARS, ANCHORS, BOLTS, BRACKETS, WELDED WIRE FABRIC, RAILS, DOWNSPOUT PIPES IN COLUMNS SHALL BE COORDINATED BY THE CONTRACTOR IN A TIMELY MANNER WITH THE ARCHITECT AND ENGINEER OF RECORD. WALL FRAMING, ROOF FRAMING AND MISCELLANEOUS STEEL SHALL BE COORDINATED WITH WALL PANEL JOINTS AND OPENINGS. SUBMIT SHOP DRAWINGS AND OBTAIN ENGINEER APPROVAL PRIOR CONCRETE PLACEMENT.

CONCRETE SHALL BE PER AN APPROVED MIX DESIGN PROPORTIONED TO ACHIEVE A STRENGTH THAT EXCEEDS AS LISTED BELOW WITH A PLASTIC AND WORKABLE MIX:

4,000 PSI FOR COLUMN. WATER TO CEMENT RATIO BY WEIGHT SHALL NOT EXCEED 0.50

4,500 PSI FOR BEAM. WATER TO CEMENT RATIO BY WEIGHT SHALL NOT EXCEED 0.60

4,500 PSI FOR SLAB. WATER TO CEMENT RATIO BY WEIGHT SHALL NOT EXCEED 0.60

4,500 PSI FOR ALL OTHER STRUCTURAL CONCRETE. WATER TO CEMENT RATIO BY WEIGHT SHALL NOT EXCEED 0.50

CONCRETE SHALL BE PLACED AND CURED ACCORDING TO ACI STANDARDS AND SPECIFICATIONS.

SUBMIT PROPOSED MIX DESIGN WITH RECENT FIELD CYLINDERS OR LAB TEST FOR REVIEW PRIOR TO USE. MIX DESIGN SHALL BE APPROVED BY THE ARCHITECT OR OTHER POSITIVE IDENTIFICATION MIX SHALL MEET THE REQUIREMENTS OF ASTM C33 FOR COARSE AGGREGATE. CONCRETE SHALL COMPLY WITH ALL THE REQUIREMENTS OF ACI STANDARDS AND SPECIFICATIONS FOR MEASURING, MIXING, TRANSPORTING, ETC.

CONCRETE TICKETS SHALL BE TIME STAMPED WITH CONCRETE IS BATCHED. THE MAXIMUM TIME ALLOWED FROM THE TIME THE MIXING WATER IS ADDED UNTIL IT IS PLACED SHALL NOT EXCEED 90 MINUTES. CONCRETE SHALL BE PLACED AND ONE HALF (1/2) HOURS FOR ANY REASON THERE IS A LONGER DELAY THAN THAT STATED ABOVE. THE CONCRETES SHALL BE DISCARDED. IT SHALL BE THE RESPONSIBILITY OF THE TESTING LAB TO NOTIFY THE ARCHITECT, ENGINEER OF RECORD AND THE CONTRACTOR OF ANY NONCOMPLIANCE THE ABOVE.

ALL SLABS SHALL BE CURED USING A DISSIPATING CURING COMPOUND MEETING ASTM STANDARD C930 TYPE 1 AND TYPE 2. CURING COMPOUND SHALL BE APPLIED TO ALL SURFACES PLACED AS SOON AS THE FINISHING IS COMPLETED OR AS SOON AS THE WATER HAS LEFT THE UNFINISHED CONCRETE ALL SCUFFED OR BROKEN AREAS IN THE CURING MEMBRANE SHALL BE RECONCRETED DAILY.

ALL CONCRETE SHALL HAVE MID-RANGE WATER REDUCING ADMIXTURE CONFORMING TO ASTM C494 TYPE A. ADMIXTURES SHALL BE USED IN CONCRETE WITH A WATER REDUCING PERCENT BY WEIGHT IN THE ADMIXTURE SHALL NOT BE USED. OTHERS ADMIXTURES SHALL BE APPROVED BY THE ENGINEER OF RECORD. AIR-ENTRAINING ADMIXTURES SHALL NOT BE USED IN STRUCTURAL CONCRETE.

ALL CONCRETE MIX DESIGN DESIGNS SHALL INCLUDE A WRITTEN DESCRIPTION INDICATING WHERE EACH PARTICULAR MIX IS TO BE PLACED WITHIN THE STRUCTURE. ALL CONCRETE DESIGN MIX SUBMITTAL SHALL INCLUDE TESTED, STATISTICAL BACK-UP DATA AS PER CHAPTER 5 OF ACI 318.

A DCI ADMIXTURE RUST INHIBITOR ON A 5 GALLON PER CUBIC YARD RATIO (5 GAL/Y³) SHALL BE USED FOR THIS STRUCTURE.

CONCRETE TESTING

AN INDEPENDENT TESTING LABORATORY SHALL PERFORM THE FOLLOWING TEST ON CAST IN PLACE CONCRETE:

- COMPRESSIVE STRENGTH TESTS FOR ALL FORMWORK, PORTLAND AND GENERAL CONCRETE. MAXIMUM SLUMP SHALL BE 4" INCHES. CONCRETE CONTAINING MID-RANGE WATER REDUCED SHALL HAVE A MAXIMUM SLUMP OF 7.5 INCHES.
- ASTM C39 - STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS. A SEPARATE TEST SHALL BE CONDUCTED FOR EACH CLASS, CLASS AND TYPE OF CONCRETE. CYLINDERS SHALL BE PLACED PER DAY. REQUIRED CYLINDERS QUANTITIES AND TEST AGE AS FOLLOWS:
 - 1 AT 7 DAYS
 - 2 AT 28 DAYS

ONE (1) CYLINDER PER CLASS OF CYLINDERS TO BE TESTED UNDER THE DIRECTION OF THE ENGINEER OF RECORD. IF 28 DAY STRENGTH IS ACHIEVED, THE CYLINDER MAY BE DISCARDED.

PENETRATION

NO PENETRATING SHALL BE MADE IN ANY STRUCTURAL MEMBER OTHER THAN NOTED ON THESE DRAWINGS WITHOUT THE PREVIOUS APPROVAL OF THE ENGINEER.

CHEMICAL ANCHORS

SHALL BE TWO PART EPOXY POLYMER INJECTION SYSTEM, SUCH AS RAMISEP EPOXY, RAMI, "FOIL-FAST" CARTRIDGE MIXED EPOXY, EPOXY-100, EPOXY-1000, EPOXY-10000, HILTI HES411 EPOXY DOWELING SYSTEM, OR APPROVED EQUAL. INSTALL IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS. INSTALLERS SHALL BE TRAINED BY THE MANUFACTURERS REPRESENTATIVE.

WELDING

WELDING SHALL BE DONE BY A CERTIFIED WELDER USING E6010 OR E6011 ELECTRODES FOR ALL FIELD AND END JOINTS. ALL WELDS SHALL BE WELDED WITH E70X SERIES LOW HYDROGEN ELECTRODES FOR ALL WELDING OF HIGH STRENGTH STEELS AND FOR ALL FIELD WELDING.

WELDS SHOWN ON STRUCTURAL DRAWINGS ARE MINIMUM DESIGN REQUIREMENTS. THE FABRICATOR'S SHOP SHALL REFLECT WELDS IN ACCORDANCE WITH AWS REQUIREMENTS. FULL PENETRATION GROOVE WELDS SHALL BE INSPECTED BY ULTRASONIC TESTING. TWENTY-FIVE PERCENT OF THE WELDS SHALL BE INSPECTED AT RANDOM UNLESS NOTED OTHERWISE. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. THE CONTRACTOR SHALL OBTAIN ADDITIONAL TEST MAY BE ORDERED BY THE ENGINEER AT THE EXPENSE OF THE CONTRACTOR.

WHEN WELDS ARE NOT CALLED OUT ON DRAWINGS, THEY ARE MINIMUM SIZE CONTINUOUS. FILLET WELDS SHALL ACCORDANCE WITH AWS D1.1. FILLET WELDS NOT SPECIFIED AS TO LENGTH SHALL BE CONTINUOUS.

UNLESS NOTED OTHERWISE ON THE DRAWINGS ALL GROOVE WELDS SHALL BE FULL PENETRATION.

STEEL MEMBERS SUFFICIENT TO DEVELOP THE ALLOWABLE TENSILE STRENGTH SHALL BE WELDED TO THE MEMBER AT THE JOINT UNLESS DETAILED OTHERWISE.

CHAMFER

ALL EXPOSED CONCRETE SLABS, WALLS AND COLUMNS TO HAVE 1" X 1" CHAMFER

SLOPE

PROVIDE 1/4" / FT SLOPE TOWARDS SUMP PIT

STRUCTURAL GENERAL NOTES

BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS

HOLLY LAKES & ACADEMIC VILLAGE

PEMBROKE PINES, FLORIDA

NOT FOR CONSTRUCTION

SHEET 23

SCALE

SHOWING PROJECT No 164403

PURPOSE OF THIS SET PROGRESS

DATE 07-11-16

2311 WOODSIDE WAY #100
FORT LAUDERDALE, FLORIDA 33309
954771-6237 FAX 954771-0210
www.hillgroup.com
LIC# 14545

LAGOS CONSULTING ENGINEERS, LLC
CONSULTING ENGINEERS

07-11-16

DATE

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ELECTRICAL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	CONNECTION POINT TO EQUIPMENT SPECIFIED, FURNISHED AND INSTALLED UNDER OTHER SECTIONS, RACEWAY, CONDUCTOR AND CONNECTION IN THIS SECTION.		TRANSFORMER, VOLTAGES, PHASE AND RATING INDICATED AS APPLICABLE
	INDICATES RACEWAY AND CIRCUIT CONDUCTORS. FIRST NUMBER IS RACEWAY SIZE. THE FOLLOWING NUMBERS ARE THE CONDUCTOR QUANTITIES, SIZES, AND TYPES.		MOTOR, SQUIRREL CAGE INDUCTION - HORSEPOWER INDICATED
	LUMINAIRE AND POLE - SEE DRAWINGS FOR TYPE		WALL MOUNTED LUMINAIRE - SEE DRAWINGS FOR TYPE
	LIGHTING FIXTURE, POWER, AND SWITCHING LEGEND		X=FIXTURE TYPE Y=PANEL-CIRCUIT BRKR Z=SWITCH CRE-CORROSION RESISTANT
	GROUND ROD - 3/4" x 20' COPPER CLAD UNLESS OTHERWISE NOTED		GROUND ROD WITH TEST WELL - 3/4" x 20' COPPER CLAD UNLESS OTHERWISE NOTED
	WALL SWITCH: 2- DOUBLE POLE 3- KEY-OPERATED 4- FOUR WAY WP-WEATHERPROOF RESISTANT		MANUAL MOTOR STARTER SWITCH, NEMA 4X UNLESS OTHERWISE NOTED. NUMBER OF POLES AS REQUIRED
	GENERATOR		CONVENIENCE RECEPTACLE 20A RATED-DUPLEX UNLESS SPECIFIED OTHERWISE
	WP-WEATHERPROOF C- CLOCK HANGER CRE-CORROSION RESISTANT TL-TWIST LOCK GF-GROUND FAULT INTERRUPTER		JUNCTION BOX NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE. 4X = NEMA 4X SS
	TELEPHONE RECEPTACLE (OUTLET BOX, 18" AFF) W - WALL MOUNTED, 48" AFF		CONDUIT/CONDUCTOR - REFER TO CIRCUIT SCHEDULE HOME RUN - PANEL AND CIRCUIT NUMBER SHOWN
	EXPOSED CONDUIT AND CONDUCTORS*		UNDERGROUND CONDUIT AND CONDUCTORS*
	*ALL UNMARKED CONDUIT RUNS CONSIST OF 2#12, #126 IN 3/4"		YARD CONDUIT. REFER TO YARD CONDUIT SCHEDULE
	DIRECT BURIED CABLE		CONDUIT, STUBBED AND CAPPED AS SHOWN
	GROUND WIRE, #4 UNLESS OTHERWISE NOTED		NONFUSED DISCONNECT SWITCH, SIZE INDICATED, 3 POLE UNLESS INDICATED OTHERWISE, NEMA 12 ENCLOSURE, 4X = NEMA 4X 316 STAINLESS STEEL
	FUSED DISCONNECT SWITCH, SIZE INDICATED (60 = SWITCH RATING: 40 = FUSE RATING) 3 POLE UNLESS INDICATED OTHERWISE, NEMA 12 ENCLOSURE, 4X = NEMA 4X 316 STAINLESS STEEL		LIGHTING CONDUCTOR, CURRENT RATING INDICATED, NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE. SEE CONTROL DIAGRAM FOR NUMBER OF POLES.
	MAGNETIC STARTER, NEMA SIZE INDICATED, NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE. SEE CONTROL DIAGRAM. 4X = NEMA 4X 316 STAINLESS STEEL		COMBINATION (FUSE OR CIRCUIT BREAKER AS INDICATED), MAGNETIC STARTER, NEMA SIZE INDICATED, NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE. SEE CONTROL SCHEMATIC DIAGRAM. 4X = NEMA 4X 316 STAINLESS STEEL
	GROUND ROD, 3/4" x 20'		

ABBREVIATIONS	DESCRIPTION	ABBREVIATIONS	DESCRIPTION
AFF	ABOVE FINISHED FLOOR	HYAC	HEATING, VENTILATING & AIR CONDITIONING
AFG	ABOVE FINISHED GRADE	IC	INTERRUPTING CAPACITY
AIT	ANALYTICAL INSTRUMENT TRANSMITTER	I & C	INSTRUMENTATION AND CONTROL
AE	ANALYTICAL ELEMENT	IP	INSTRUMENT PANEL (PANELBOARD)
CB	CIRCUIT BREAKER	J, J-BOX	JUNCTION BOX
CKT	CIRCUIT	LC	LIGHTING CONTACTOR
CPT	CONTROL RELAY	LR	LOCAL REMOTE
CR	CURRENT TRANSFORMER	LS	LIMIT SWITCH
DIV	DIVISION	M	MAGNETIC CONTACTOR COIL OR MOTOR
ETM	ELAPSED TIME METER	MCC	MOTOR CONTROL CENTER
EXST	EXISTING	MDP	MAIN DISTRIBUTION PANEL
F, FU	FUSE	MH	MOTOR HEATER, MANHOLE
F, FI	FLOW INDICATOR	MLO	MAIN LOGS ONLY
FM	FLOW METER	MPZ	MINI POWER ZONE
F501	FLOW SWITCH 01	MTD	MOTOR TEMPERATURE DETECTOR
FT	FUTURE	N	NEUTRAL
FUT	FUTURE	NC	NORMALLY CLOSED
FVNR	FULL VOLTAGE NON-REVERSING STARTER	NEMA	NATIONAL ELECTRIC MANUFACTURER'S ASSOCIATION
GEN	GENERATOR	NO	NORMALLY OPEN
GFI	GROUND FAULT INTERRUPTER	NTS	NOT TO SCALE
GND	GROUND	OL	OVERLOAD RELAY
HH	HANDHOLE	SS	STAINLESS STEEL
HOA	HAND/OFF/AUTO		
HOR	HAND/OFF/REMOTE		
MSC	MAGNETIC STARTER, NEMA SIZE INDICATED, NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE. SEE CONTROL SCHEMATIC DIAGRAM.		
FRP	FIBERGLASS-REINFORCED POLYESTER		

ABBREVIATIONS	DESCRIPTION	ABBREVIATIONS	DESCRIPTION
PB	PULL BOX	SST	STAINLESS STEEL
PG	PRESSURE GAUGE	SV	SOLENOID VALVE SWITCH
PCM	EXISTING PLANT	T	THERMOSTAT
PH	PHASE MONITOR	TB	TERMINAL BOARD
PM	POWER MONITOR	TC3S	TERMINAL CUBICLE
PNL	POWER PANEL	TJ	TERMINAL JUNCTION BOX
PP	POWER PANEL (480VAC)	TS	THERMAL SWITCH
PS	PRESSURE SWITCH	TSP	TWISTED SHIELDED PAIR
PVC	POLYVINYL CHLORIDE CONDUIT	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
RTU	REMOTE TELEMETRY UNIT	TYP	TYPICAL
RGS	RIGID GALVANIZED STEEL	V	VOLTMETER, VOLT
SH	SUPPLY FAN	VD	VOLTAGE DROP
SF	SPACE HEATER	WP	WEATHERPROOF - NEMA 4X
SSRVS	SOLID STATE REDUCED VOLTAGE STARTER	XFMR	TRANSFORMER

GENERAL NOTES AND SPECIFICATIONS:

- THE SCOPE OF WORK SHALL BE AS SHOWN ON PLANS AND AS DESCRIBED IN SPECIFICATIONS.
- THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR TO INSTALL THE ELECTRICAL SYSTEMS AS INDICATED PER PLANS AND SPECIFICATIONS. ITEMS NOT SHOWN BUT OBVIOUSLY NECESSARY FOR COMPLETION OF THE WORK SHALL BE INCLUDED.
- THE INSTALLATION SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, NATIONAL ELECTRICAL SAFETY CODE, LOCAL CITY CODES, LOCAL COUNTY CODES, AND FLORIDA BUILDING CODE WITH AMENDMENTS.
- THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS, INSPECTIONS AND APPROVALS AND TO INCLUDE ALL FEES AS PART OF HIS BID IF NOT OTHERWISE NOTED. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE ENGINEER AND OWNER.
- THE CONTRACTOR SHALL, BEFORE SUBMITTING HIS BID, VISIT THE SITE OF THE PROJECT AND BECOME FAMILIAR WITH THE EXISTING CONDITIONS. NO ALLOWANCE WILL BE MADE FOR EXISTING CONDITIONS OR FAILURE OF THE CONTRACTOR TO OBSERVE THEM.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH ALL LOCAL UTILITIES, INCLUDING THE POWER UTILITY TO MEET ALL OF THEIR INSTALLATION REQUIREMENTS. ALL FEES, LABOR, EQUIPMENT OR MATERIALS NECESSARY TO MEET THESE REQUIREMENTS IS TO BE INCLUDED IN THE BID. THE CONTRACTOR SHALL OBTAIN, DELIVER AND INSTALL ALL CONDUITS, PULL-BOXES AND EQUIPMENT AS REQUIRED BY THE UTILITIES TO THEIR SPECIFICATIONS.
- ALL CONTRACTOR EQUIPMENT AND MATERIAL SHALL BE NEW, UNUSED AND U.L. LISTED.
- THE CONTRACTOR IS RESPONSIBLE TO TEST ALL SYSTEMS INSTALLED OR MODIFIED UNDER THIS PROJECT AND REPAIR OR REPLACE ALL DEFECTIVE WORK TO THE SATISFACTION OF THE ENGINEER AND OWNER.
- ALL EQUIPMENT FURNISHED AND INSTALLED BY THE CONTRACTOR SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE.
- COORDINATE ALL ELECTRICAL EQUIPMENT LOCATIONS AND VERIFY ALL OBSTRUCTIONS WITH ALL SUBCONTRACTORS AND EQUIPMENT SUPPLIERS PRIOR TO ANY INSTALLATION.
- NOT ALL CONDUITS SHOWN ON RISER AND ONE-LINE DIAGRAMS ARE SHOWN ON BUILDING OR SITE LAYOUTS. CONTRACTOR SHALL SUPPLY ALL CONDUITS AND CABLES AS SHOWN ON RISER AND ONE-LINE DIAGRAMS. THE DRAWINGS ARE NOT INTENDED TO SHOW THE EXACT LOCATION OF CONDUIT RUNS. THESE ARE TO BE COORDINATED WITH THE OTHER TRADES SO THAT CONFLICTS ARE AVOIDED PRIOR TO INSTALLATIONS. ALL LOCATIONS OF EQUIPMENT, PANELS ETC. ARE SHOWN FOR ILLUSTRATION PURPOSES. CONTRACTOR SHALL VERIFY EXACT LOCATION AND SIZE AND INSTALL AS SUCH WITH CORRESPONDING CONDUIT STUB-UPS. SEE OTHER DISCIPLINE DRAWINGS FOR COORDINATION OF ALL DRAWINGS. ANY CONFLICTS SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION AND MOVEMENT OF CONDUITS OR OTHER ELECTRICAL EQUIPMENT SHALL BE ACCOMPLISHED WITHOUT ANY ADDITIONAL COST FOR THE OWNER. DRAWINGS ARE SCHEMATIC AND SHOWN FOR CLARITY.
- ALL REFERENCES TO A PARTICULAR MANUFACTURER ARE GIVEN ON AN "APPROVED EQUAL" BASIS.
- MINIMUM DEPTH FROM TOP OF DUCTBANKS OR CONDUITS TO FINISHED GRADE SHALL BE 24" UNLESS OTHERWISE NOTED.

LINE WEIGHT LEGEND

NEW _____ EXISTING _____

- ALL EXCAVATIONS FOR CONDUITS AND HANDHOLES, NEAR EXISTING PIPING, CONDUIT AND EQUIPMENT SHALL BE HAND EXCAVATED AND COORDINATED WITH PLANT ENGINEER.
- CONDUCTOR PULLING TENSIONS SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION. CONTRACTOR SHALL INSTALL PULL BOXES TO MEET MANUFACTURER'S REQUIREMENTS.
- MINIMUM DISTANCE ALLOWED BETWEEN CROSSING POWER CONDUITS AND INSTRUMENTATION CONDUITS SHALL BE 6 INCHES SEPARATION. MINIMUM DISTANCE ALLOWED BETWEEN PARALLEL POWER CONDUITS AND INSTRUMENTATION CONDUITS SHALL BE:

VOLTAGE	DISTANCE
480V	2 FT
120V	1 FT

- ALL YARD CONDUITS/ EXTERIOR UNDERGROUND CONDUITS SHALL BE INSTALLED DIRECT BURIED METHOD WITH CONCRETE SLAB ON TOP AS SHOWN ON DETAIL. PROVIDE WARNING TAP ABOVE THE CONCRETE SLAB. COUNTERPOISE OF THE DUCTBANK SHALL TIE TO THE NEAREST GROUND GRID OR TIE TO A NEW GROUND ROD, IF NO GROUND GRID IS NEARBY.
- COLOR WARNING TAPE 6" WIDE SHALL BE INSTALLED 8" BELOW FINISHED GRADE DIRECTLY ABOVE ALL UNDERGROUND YARD CONDUITS ACCORDING TO THE FOLLOWING SCHEDULE AND SPECIFICATION 16110: POWER: RED
ALL OTHER CONDUITS: GREEN

- FLEXIBLE CONDUITS SHALL BE USED TO TERMINATE ALL MOTORS AND OTHER VIBRATING EQUIPMENT AND SHALL BE BETWEEN 18" AND 3' IN LENGTH.
- ALL SPARE CONDUITS SHALL BE CAPPED WITH A PVC CAP AND A NYLON PULL STRING INSTALLED WITH IDENTIFICATION ON BOTH ENDS.

- CONTRACTOR SHALL RESTORE SIDEWALKS, ROADWAYS, SOD AND SPRINKLER SYSTEM PIPING TO MATCH EXISTING, AFTER THE COMPLETION OF THE ELECTRICAL INSTALLATION, SUCH AS CONDUITS, PULLBOX, GROUNDING, ETC.

- ALL MATERIAL IN DESIGNATED CORROSIVE AREAS SHALL BE NEMA 4X 316 STAINLESS STEEL.

- ALL REFERENCES TO SS OR STAINLESS STEEL SHALL MEAN 316 STAINLESS STEEL.

- ALL CONTROL PANELS SHALL BE CONSTRUCTED BY A UL 508A APPROVED PANEL VENDOR AND SHALL BEAR A UL 508A LABEL ON THE PANEL.

- INSTRUMENTATION IS LOW VOLTAGE SIGNALS SUCH AS 4-20MA TELEPHONE COMMUNICATION, FIRE ALARM COMMUNICATION. POWER CONDUIT SHALL ONLY CROSS INSTRUMENTATION CONDUIT PERPENDICULARLY AT RIGHT ANGLES WITH 6" SEPARATION.

- CONTRACTOR SHALL PROVIDE RECORD DRAWINGS TO THE OWNER WITHIN 30 DAYS OF SYSTEM ACCEPTANCE.

- CONTRACTOR SHALL PROVIDE OPERATION MANUALS TO THE OWNER.

- THE MAXIMUM VOLTAGE DROP FOR BRANCH CIRCUIT CONDUCTORS IS 3% PER FLORIDA BUILDING CODE AND NEC.

- ALL CONDUITS PENETRATING RATED FIRE WALLS OR RATED FIRE FLOORS SHALL BE INSTALLED WITH U.L. APPROVED DEVICES TO MAINTAIN THE FIRE RATING OF THE WALL OR FLOOR PENETRATED.

HILLERS ELECTRICAL ENGINEERING, INC.
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 BOCA RATON, FLORIDA 33428
 (561) 451-9165
 (561) 451-4666 FAX
 LICENSE NO. EB 5068977

FOR BIDDING PURPOSES ONLY
 NOT FOR CONSTRUCTION
 ELEVATIONS ARE NGVD 1929

THEM WIN, P.E.
 STATE OF FLORIDA PROFESSIONAL ENGINEER
 LICENSE NO. 65722
 DATE: 7/15/17

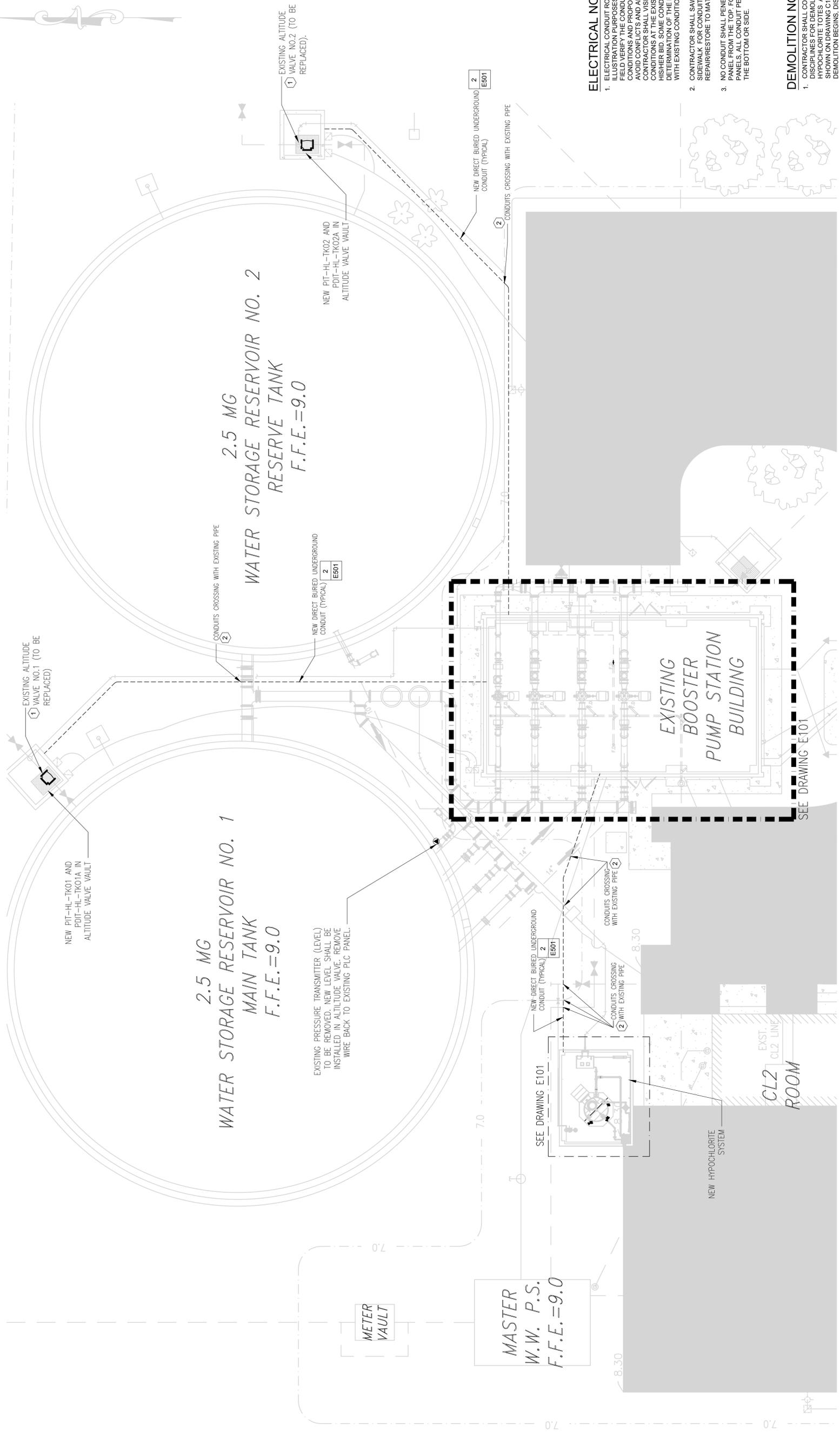
ELECTRICAL LEGEND AND NOTES

BOOSTER STATION DISINFECTION SYSTEM
 IMPROVEMENTS
 HOLLY LAKES & ACADEMIC VILLAGE
 PEMBROKE PINES, FLORIDA

Calvin, Giordano & Associates, Inc.
 EXCELTIONAL SOLUTIONS
 1800 Eller Drive, Suite 600, Fort Lauderdale, Florida 33316
 Phone: 954.921.7781 • Fax: 954.921.8807
 Certificate of Authorization 514

DESIGNED	TW
DATE 1/4/17	1/4/17
CHECKED	PFH
DATE 1/8/17	1/8/17
ISSUED FOR	BIDDING
DATE 7/15/17	7/15/17

NO.	DATE	BY	NO.	DATE	REVISION



HOLLY LAKES BOOSTER PUMP STATION - ELECTRICAL SITE PLAN
 SCALE: 1" = 10'-0"

- ELECTRICAL NOTES**
- ELECTRICAL CONDUIT ROUTING IS SHOWN FOR ILLUSTRATION PURPOSES ONLY. CONTRACTOR SHALL VERIFY THE CONDUIT ROUTING WITH EXISTING AND NEW POSED PIPING, DRAINAGE, ETC. TO AVOID CONFLICTS AND INTERFERENCES. CONTRACTOR SHALL VISIT THE SITE AND DETERMINE CONDITIONS AT THE EXISTING SITE BEFORE SUBMITTING HIS/BID. SOME CONDUIT ROUTINGS REQUIRE FIELD DETERMINATION OF THE ROUTINGS TO AVOID CONFLICTS WITH EXISTING CONDITIONS.
 - CONTRACTOR SHALL SAW CUT OR REMOVE EXISTING SIDEWALK FOR CONDUIT CROSSING AND REPAIR/RESTORE TO MATCH EXISTING CONDITION.
 - NO CONDUIT SHALL PENETRATE AN OUTDOOR ELECTRICAL PANEL FROM THE TOP. FOR OUTDOOR ELECTRICAL PANELS, ALL CONDUIT PENETRATIONS SHALL BE FROM THE BOTTOM OR SIDE.

- DEMOLITION NOTE**
- CONTRACTOR SHALL COORDINATE WITH ALL OTHER DISCIPLINES FOR DEMOLITION OF EXISTING SODIUM HYPOCHLORITE TOTES AND ASSOCIATED JUMPER ABOVE DEMOLITION BEGINS. DISCONNECT WIRES AND REMOVE BACK TO SOURCE. REMOVE ALL EXPOSED CONDUITS COMPLETELY. CUT UNDERGROUND CONDUITS FLUSH WITH FLOOR OR GRADE AND CAP, UNLESS APPROVED BY ENGINEER/OWNER TO REUSE THEM.

- KEYED NOTES:**
- PROVIDE AND INSTALL NEW FLEXIBLE CONDUITS FOR ALL SIGNALS RELATING TO ALTITUDE VALVE IN ALTITUDE VALVE VAULT. TYPICAL OF TWO VAULTS. FLEXIBLE CONDUITS SHALL BE FIELD ROUTED NEAR THE PIPING AND SUPPORT THEM AS NEEDED TO AVOID TRIPPING HAZARDS.
 - FIELD DETERMINE CONDUIT DEPTH FOR CROSSING WITH OTHER PIPING. INDICATED OR NOT ON DRAWINGS. IF NEEDED, INSTALL CONDUIT UNDER THE PIPING WITH A MINIMUM OF 12" VERTICAL CLEARANCE FROM THE PIPE.

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Certificate of Authorization 514

DESIGNED	TW
DATE	1/4/17
CHECKED	PFH
DATE	1/6/17
ISSUED FOR	BIDDING
DATE	7/15/17

NO.	DATE	BY	NO.	DATE	REVISION

BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS
 HOLLY LAKES & ACADEMIC VILLAGE
 PEMBROKE PINES, FLORIDA

THEIR WIN, P.E.
 STATE OF FLORIDA PROFESSIONAL ENGINEER
 LICENSE NO. 65722
 DATE: 7/15/17

SCALE: NTS
 PROJECT No. 91-0734-1
 PURPOSE OF THIS SET: BIDDING
E100
 SHEET: 25 OF 39 SHEETS



FOR BIDDING PURPOSES ONLY
NOT FOR CONSTRUCTION
ELEVATIONS ARE NGVD 1929



- 3/4" C, 1#14, 3#14 NOT USED
- 1/2" C, 5#14; TO MCC FOR BOOSTER PUMPS START/STOP
- 1/2" C, 2#14; TO ATS FOR GEN. RUNNING SIGNAL
- BOOSTER PUMP CONTROL PANEL
- 18"X18"X8 J-BOX PANEL (2)
- 3/4" C, 6#14, 10#14 SPARE; TO OLD RTU
- 3/4" C, EMPTY
- 3/4" C, 3#14; TO PANEL "LB"
- 1" C, 11#14
- 3/4" C, 13#14; TO 18X18X8 J-BOX
- 1/2" C, 1-TSP, 1 4C#22; TO 4X4 J-BOX
- EXISTING PLC CONTROL PANEL
- 1" C, 1#14
- 1" C, 23#14; TO PLC PANEL
- 1" C, 4-TSP; TO PLC PANEL

- OLD RTU (24X24X8)
- EXISTING PIT
- 1/2" C, 1-TSP
- 4"X4" J-BOX (TO REMAIN)
- 1/2" C, 1-TSP
- 3/4" C, 1-TSP
- 3/4" C, 3-TSP; TO BOOSTER PUMP CONTROL PANEL
- 3/4" C, 1-TSP, 1 4C#22, 1 2C#22 SPARE
- 1-TSP; TO 18"X18"X8" J-BOX
- EXISTING 6"X6"X4" J-BOX (TO REMAIN)
- 2" C, 1-TSP, 9#14; TO ALT. VALVE NO.1
- 3/4" C, 10#14, 1#12 N; TO PANEL "LB"

EXISTING PANELS AND INSTRUMENT LAYOUT

KEYED NOTES:

1. CONTRACTOR SHALL FIELD IDENTIFY EXISTING CONDUITS AND WIRES CONNECTED TO THE EXISTING PLC CONTROL PANEL AND PUMP STATION CONTROL PANEL. FIELD VERIFY SOURCE AND DESTINATION OF EACH CONDUIT. THE EXISTING PUMP CONTROL PANEL CONDUIT ENTRY PLAN - BOTTOM AND SIDE VIEWS AND EXISTING PLC AND PUMP CONTROL PANEL RISER ARE THE BEST INFORMATION AVAILABLE FROM SITE INVESTIGATION AND FROM THE EXISTING AS-BUILT DRAWINGS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO USE THIS INFORMATION AS APPLICABLE AND ADJUST AS NEEDED.
2. AFTER NEW PLC CONTROL PANEL IS INSTALLED AND OPERATIONAL - REMOVE THE EXISTING PLC CONTROL PANEL AND JUNCTION BOX LOCATED ABOVE THE PLC PANEL AND TURN OVER TO THE OWNER. DISPOSE ANY PARTS THAT IS NOT WANTED BY THE OWNER. REMOVE ALL EXPOSED CONDUITS AND WIRES THAT ARE NO LONGER USED.

SUGGESTED CONSTRUCTION SEQUENCE:

1. BELOW ARE A SUGGESTED/GUIDELINE CONSTRUCTION SEQUENCES AND CONTRACTOR SHALL ADJUST AS NEEDED.
2. CONTRACTOR SHALL COORDINATE WITH INSTRUMENTATION CONTRACTOR TO PROVIDE A TEMPORARY PANEL WITH 8 RELAYS, 8 POWER SUPPLIES TERMINAL BLOCKS, PROVIDE AND INSTALL TEMPORARY CONDUITS AND WIRES FROM EXISTING PLC PANEL TO TEMPORARY PANEL AS WELL AS TEMPORARY TO THE EXISTING PUMP CONTROL PANEL. FOR BIDDING PURPOSE, PROVIDE 5 1/2" C, 40 #14, 1 1/4" C, 1 1/2" C, 6-TSP WIRES TO THE TEMPORARY PANEL FROM BOOSTER PUMP CONTROL PANEL/PLC CONTROL PANEL. PROVIDE AND INSTALL 3/4", 2-12, 1-12G TO PANEL LB.
3. CONTRACTOR SHALL CUT THE LOWER PART OF THE EXISTING PUMP CONTROL PANEL (BETWEEN PANEL AND CONCRETE SLAB) TO HAVE SPACE TO ROUTE TEMPORARY CONDUITS AND WIRES INTO THE EXISTING PUMP CONTROL PANEL.
4. WHEN THE WIRES ARE INSTALLED AND READY, CONTRACTOR SHALL LOCATE AND CONNECT TEMPORARY WIRES TO THE EXISTING ACTIVE WIRES IN THE EXISTING PUMP CONTROL PANEL. CONTRACTOR SHALL REMOVE ALL EXPOSED CONDUITS AND WIRES FROM BOOSTER PUMPS IN HAND DURING THESE MODIFICATIONS. THE MAXIMUM DOWNTIME SHALL BE LIMITED TO 4 HOURS.
5. AFTER TEMPORARY WIRING AND TEMPORARY PANEL IS IN OPERATION, CONTRACTOR SHALL REMOVE THE EXISTING PUMP CONTROL PANEL.
6. CONTRACTOR SHALL SAW CUT THE EXISTING CONCRETE PAD TO HAVE AN OPENING CHANNEL SO THAT TEMPORARY CONDUITS CAN BE PLACED IN THE CHANNEL AND NEW PLC CONTROL PANEL SHALL BE INSTALLED.
7. AFTER NEW PLC CONTROL PANEL IS INSTALLED, CONNECT ALL EXISTING ACTIVE SIGNALS AT THE BOTTOM OF NEW PLC CONTROL PANEL TO NEW TERMINAL BLOCKS THAT ARE ALREADY WIRED TO NEW PLC I/O POINTS.
8. MODIFY TWO EXISTING CONDUITS ABOVE THE JUNCTION BOX (18" - 18" - 8") TO THE NEW PLC CONTROL PANEL FOR GENERATOR RUNNING SIGNAL AND HIGH SERVICE PUMP START/STOP SIGNALS. EXTEND CONDUITS/WIRES AS NEEDED.
9. REPAIR EXISTING CONCRETE PAD AND EXTEND IF NEEDED.

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 (561) 451-9165
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NO.	DATE	BY	NO.	DATE	REVISION

Calvin, Giordano & Associates, Inc.
 EXCEPTIONAL SOLUTIONS
 1800 Eller Drive, Suite 600, Fort Lauderdale, Florida 33316
 Phone: 954-921-1781 • Fax: 954-921-1887
Certificate of Authorization 514

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DATE 10/17	
CHECKED	PHH
DATE 10/17	
ISSUED FOR	BIDDING
DATE 7/15/17	

BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS
 HOLLY LAKES & ACADEMIC VILLAGE
 PEMBROKE PINES, FLORIDA

EXISTING PLC AND PUMP STATION PANEL REPLACEMENT - HOLLY LAKES

THEIR WIN, P.E.
 STATE OF FLORIDA PROFESSIONAL ENGINEER
 LICENSE NO. 65722
 DATE: 7/15/17

**FOR BIDDING PURPOSES ONLY
 NOT FOR CONSTRUCTION
 ELEVATIONS ARE NGVD 1929**



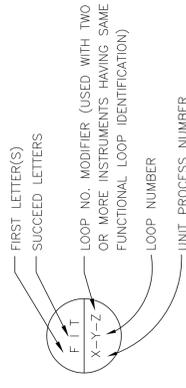
SCALE: NTS
 PROJECT NO: 91-034-1
 PURPOSE OF THIS SET: BIDDING
 SHEET: 27
E102
 OF 39 SHEETS

INSTRUMENT SOCIETY OF AMERICA TABLE

LETTER	FIRST LETTER		SUCCEEDING LETTERS	
	PROCESS OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION
A	ANALYSIS (*)		ALARM	USERS CHOICE (*)
B	BURNER FLAME		USERS CHOICE (*)	USERS CHOICE (*)
C	CONDUCTIVITY			CONTROL
D	DENSITY (S.G.)		DIFFERENTIAL	CLOSE
E	VOLTAGE		PRIMARY ELEMENT	
F	FLOW RATE		RATIO	GATE
G	GAUGE		GLASS	HIGH
H	HAND (MANUAL)			
I	CURRENT		INDICATE	
J	POWER		SCAN	
K	TIME OR SCHEDULE			CONTROL STATION
L	LEVEL OR LIMIT			LOW
M	MOTION			MIDDLE
N	TORQUE			NORMAL
O	LOOP VEH. DETECTOR		USERS CHOICE (*)	OPEN
P	PRESSURE OR VACUUM		POINT (TEST CONNECTION)	
Q	QUANTITY OR EVENT		INTEGRATE	
R	RATIO		RECORD OR PRINT	
S	SPEED OR FREQUENCY		SAFETY	SWITCH
T	TEMPERATURE			TRANSMIT
U	MULTIVARIABLE (*)			
V	VISCOSITY		MULTIFUNCTION (*)	
W	WEIGHT OR FORCE		WELL	VALVE
X	UNCLASSIFIED (*)		UNCLASSIFIED (*)	UNCLASSIFIED (*)
Y	PHOTO CELL		LIGHT SOURCE	RELAY OR COMPUTE (*)
Z	POSITION			DRIVE, ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT

(*) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL

INSTRUMENT IDENTIFICATION



FIELD MOUNTED INSTRUMENT

REAR OF PANEL MOUNTED INSTRUMENT

FRONT OF PANEL MOUNTED INSTRUMENT

MOTOR STATUS/CONTROL WITH INTERLOCKS (OFTEN LOCATED IN MCC)

PLC (PROGRAMMABLE LOGIC CONTROLLER)

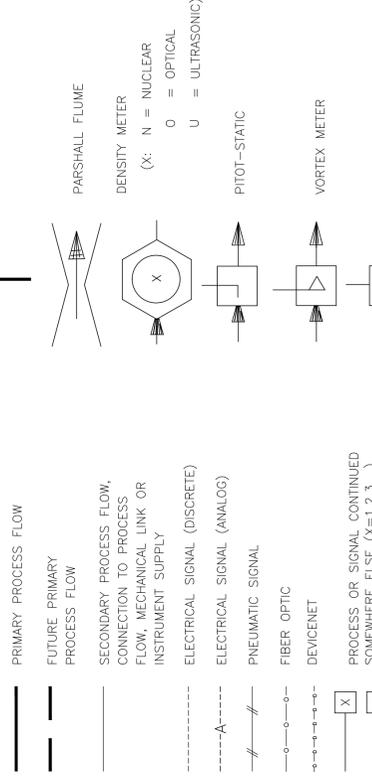
LINE WEIGHT LEGEND

NEW EXISTING

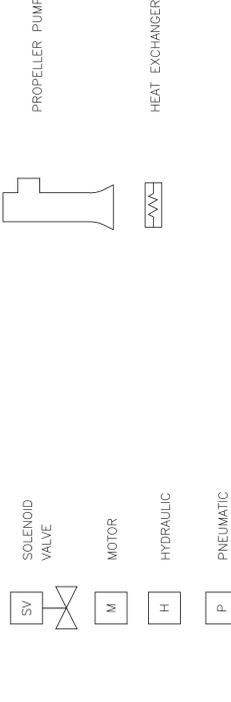
INSTRUMENT ABBREVIATION

ACC	ACCELERATOR
AT	AUTO-TEST
BFP	BELT FILTER PRESS
CL2	CHLORINE
CLW	CLEARWELL
COM	COMMON
COND	CONDUCTIVITY
CP	CONTROL PANEL
DI, AI	DISCRETE INPUT, ANALOG INPUT
DO, AO	DISCRETE OUTPUT, ANALOG OUTPUT
D.O.	DISSOLVED OXYGEN
DR	DISTANCE RELAY
EFFL	EFFLUENT
EP	ELECTRICAL PANEL
ES	EMERGENCY STOP
ETM	ELAPSED TIME METER
FD	CHEMICAL FEEDER
FIL	FILTER
FIS	FLOW INDICATING SWITCH
FRS	FORWARD-REVERSE-STOP
GEN	GENERATOR
HLO	HIGH-LOW-OFF
H/LOR	HIGH-LOW-OFF-REMOTE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HOTC	HAND-OFF-TIMER-COMPUTER
H/L	HIGH/LOW
HSP	HIGH SERVICE PUMP
IND	INDICATION
INFL	INFLUENT
JP	JOCKEY PUMP
LOR	LOCAL-OFF-REMOTE
LOS	LOCK-OUT-STOP
LPU	LINE PROTECTION UNIT
MCC	MOTOR CONTROL CENTER
MCP	MAIN CONTROL PANEL
ME	MISCELLANEOUS EQUIPMENT
M.G.	MILLION GALLON
MOA	MANUAL-OFF-AUTO
MOV	MOTOR OPERATED VALVE
OCA	OPEN-CLOSE-AUTO
OC	OPEN-CLOSE
OO	ON-OFF
ORP	OXIDATION REDUCTION POTENTIAL
OSC	OPEN-STOP-CLOSE
OSCR	OPEN-STOP-CLOSE-REMOTE
PAFM	POWER APPLIED FOR MOVEMENT
PRES	PRESSURE
PH	HYDROGEN ION CONCENTRATION
RES	RESTORE
REF	REFERENCE
RF	RF (ADMITTANCE) LEVEL MONITOR
RIP	REMOTE I/O PANEL
R/L	REMOTE/LOCAL
RSP	REMOTE SETPOINT
SA	SURGE ARRESTER
SEC	SECONDARY
SL	SLAKER
SF	SONIC FLOWMETER
SP	SETPOINT
SS	START/STOP
ST	STEP
STOR	STORAGE
SUS	SUSPENDED SOLIDS
SSRVS	SOLID STATE REDUCED VOLTAGE STARTER
TD	THERMAL DISPERSION
TP	TRANSFER PUMP
TURB	TURBIDITY
VFD	VARIABLE FREQUENCY DRIVE

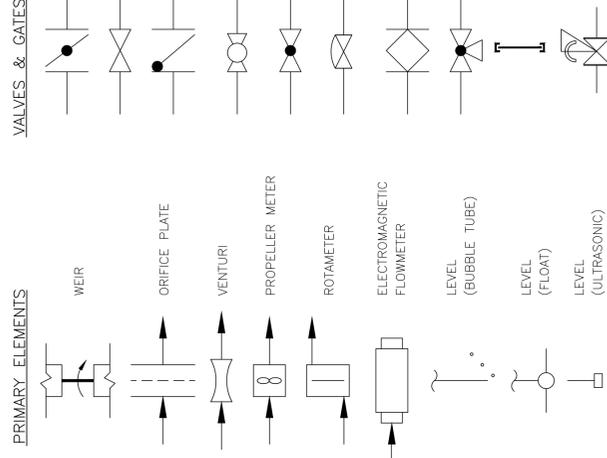
INSTRUMENT LINE SYMBOLS



ACTUATOR OR OPERATORS



INSTRUMENTATION LEGEND



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DESIGNED	TW
DATE 1/4/17	
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DATE 1/8/17	
ISSUED FOR	BIDDING
DATE 7/15/17	

REVISION	BY	NO	DATE
-	-	-	-

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THEM WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722

SCALE NTS
PROJECT No 91-0734.1
PURPOSE OF THIS SET BIDDING

BOOSTER STATION DISINFECTION SYSTEM
IMPROVEMENTS
HOLLY LAKES & ACADEMIC VILLAGE
PEMBROKE PINES, FLORIDA

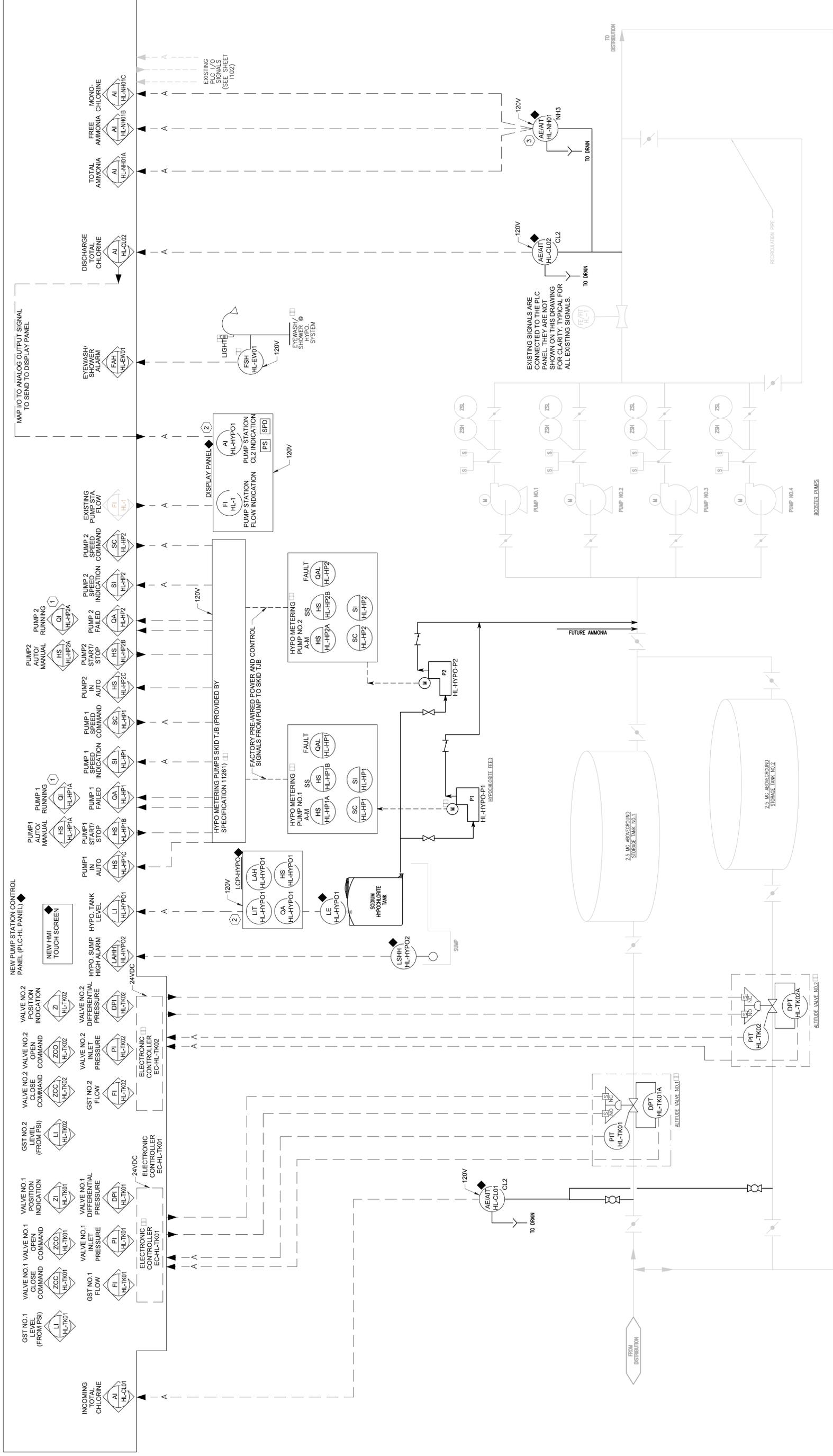
1001
OF 39 SHEETS

DATE 7/15/17

DATE 7/15/17

DATE 7/15/17

DATE 7/15/17



KEYED NOTES:

- 1 IF METERING PUMP CANNOT PROVIDE RUNNING SIGNAL, PLC LOGIC SHALL CREATE A RUNNING STATUS WHEN METERING PUMP IS NOT FAULT AND IT IS CALLED TO START.
- 2 CONTRACTOR SHALL PROVIDE DISPLAY PANEL AND FILL PANEL AS SHOWN ON "DISPLAY PANEL SCHEMATIC" ON SHEET 1101.
- 3 CONTRACTOR SHALL PROVIDE BALL VALVE AND ROTAMETER AT AMMONIA ANALYZER SIMILAR TO THE DETAIL OF CHLORINE ANALYZER.

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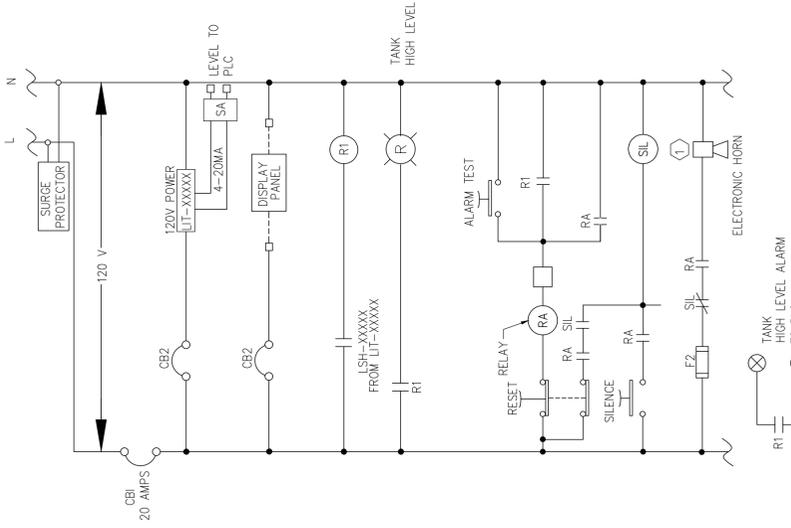
BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS
DIAGRAM - HOLLY LAKES
 HOLLY LAKES & ACADEMIC VILLAGE
 PEMBROKE PINES, FLORIDA

THEIR WIN, P.E.
 STATE OF FLORIDA PROFESSIONAL ENGINEER
 LICENSE NO. 65722
 DATE: 7/15/17

SCALE: NTS
 PROJECT No: 91-034.1
 PURPOSE OF THIS SET: BIDDING
1100
 SHEET: 31 OF 39 SHEETS

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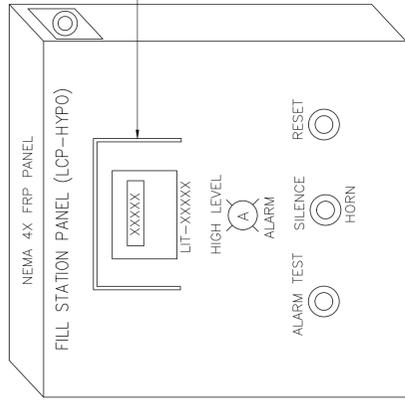


FILL STATION PANEL (LCP-HYPO) SCHEMATIC

NOT TO SCALE

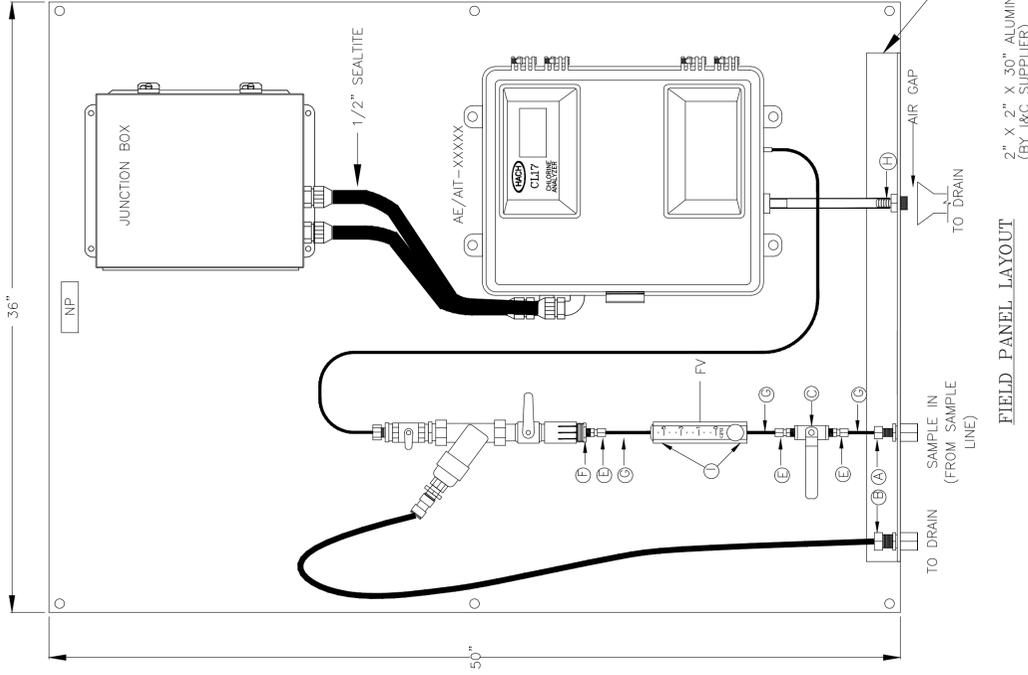
KEYED NOTES

- ① ALARM HORN SHALL BE GENERAL PURPOSE TYPE, 115VAC POWER SUPPLY, SUITABLE FOR WEATHER SERVICE. THE SERVICE SHALL BE ADJUSTABLE. ALARM INDICATORS SHALL BE WEATHERPROOF, ROTATING RED BEACON LIGHT, 115VAC POWER SUPPLY.



FILL STATION PANEL (LCP-HYPO) FRONT VIEW

NOT TO SCALE

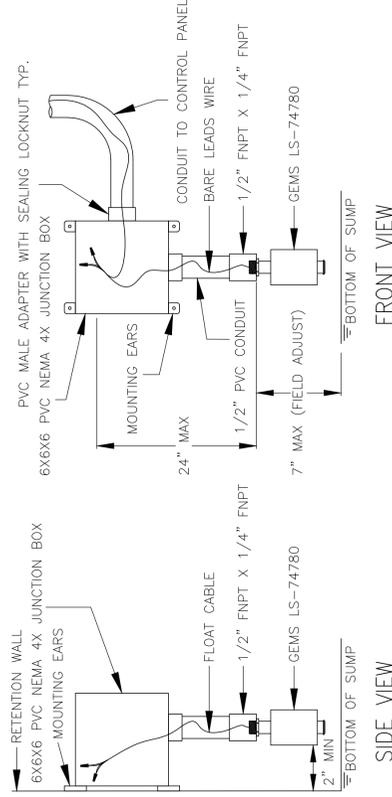


FIELD PANEL LAYOUT

NOTE: 1. ALL PIPING EXTERIOR TO FIELD PANEL BY MECHANICAL CONTRACTOR

CHLORINE RESIDUAL ANALYZER PANEL AND INSTALLATION DETAIL

NOT TO SCALE

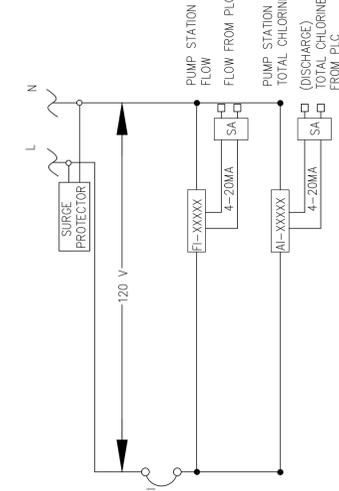


SIDE VIEW

FRONT VIEW

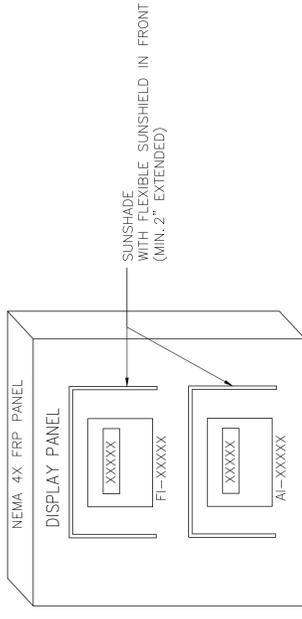
SMALL FLOAT MOUNTING DETAIL

NOT TO SCALE



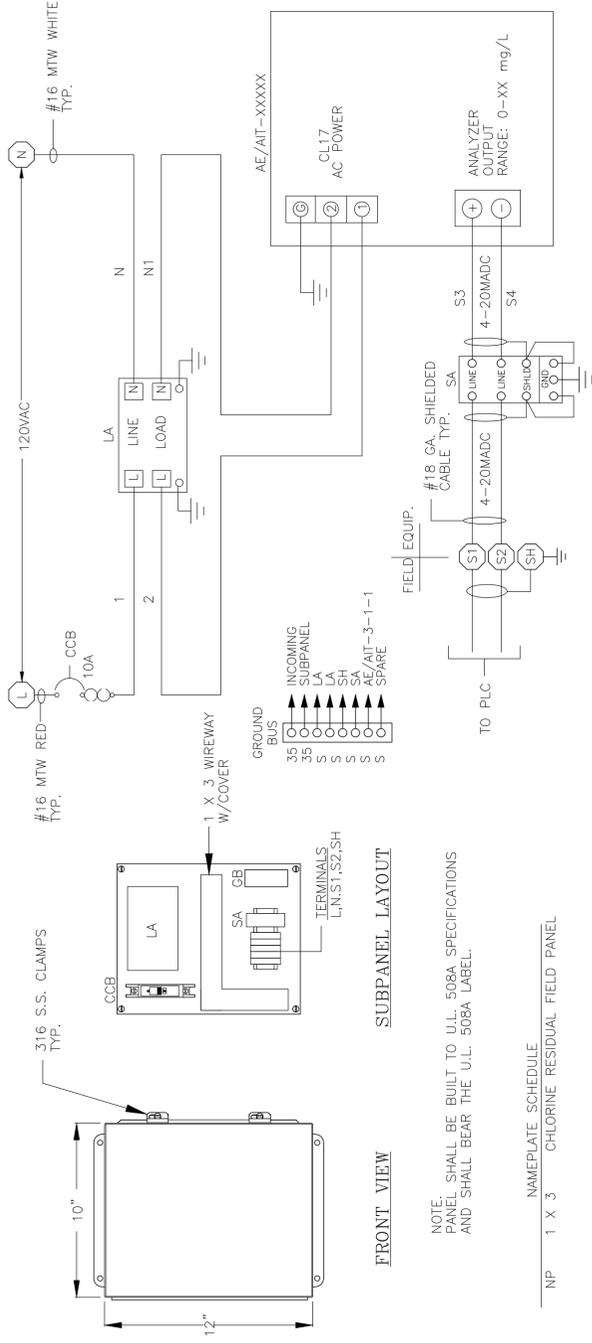
DISPLAY PANEL SCHEMATIC

NOT TO SCALE



DISPLAY PANEL FRONT VIEW

NOT TO SCALE



FRONT VIEW

SUBPANEL LAYOUT

NOTE: PANEL SHALL BE BUILT TO U.L. 508A SPECIFICATIONS AND SHALL BEAR THE U.L. 508A LABEL.

NAMEPLATE SCHEDULE

NP 1 X 3 CHLORINE RESIDUAL FIELD PANEL

NOTE:

- ALL CONTROL WIRING WITHIN CONTROL CABINET TO BE #16 MTW CU. UNLESS OTHERWISE NOTED.
- DESIGNATES TERMINALS FOR CUSTOMER CONNECTION
- WIRE ENDS WITHIN CABINET TO BE IDENTIFIED WITH HEAT SHRINK WIRE MARKERS.
- ALL WIRES EXTERNAL TO CONTROL CABINET TO BE TERMINATED TO A TERMINAL
- TIGHTEN CONTROL TERMINALS TO 20 LB/IN.
- PROVIDE SUNSHIELD FOR OUTDOOR MOUNTING.

LOT

- 2 1/2" SEALTITE ST FITTINGS
- 2 1/2" SEALTITE 90 FITTINGS
- 1 4-4 GH2BZB BRASS 1/2" FPT X 1/4" TUBE BULKHEAD CONNECTOR
- 1 4-4 GH2BZB BRASS 1/2" FPT X 1/2" TUBE BULKHEAD CONNECTOR
- 1 JAMESBURY 1/4"-45T 1/4" BRASS BALL VALVE BALL VALVE
- 1 1/2" I.D. CLEAR PLASTIC HOSE
- 4 PARKER 4-4-FBZB BRASS 1/4" MNPT X 1/4" TUBE MALE CONNECTOR
- 3 1/2" MNPT X 1/4" FNPT BRASS REDUCING BUSHING
- 1 PARKER 8-8-BZHF 1/2" BARB X 1/2" BRASS MNPT CONNECTOR
- 1 PARKER 4-4 CBZB 1/4" FEMALE 90 X 1/4" TUBE BRASS CONNECTOR
- 1 WALLACE & TIERNAN 22A0765XXX2 VAREAMETER FLOWMETER W/ INCLUDED WITH HACH SAMPLE CONDITIONING KIT
- 1 316 S.S. PROCESS CONNECTIONS AND 0-5.77 GPH ADJUSTABLE FLOW RATE.
- 1 CHLORINE RESIDUAL LUGS
- 3 CHLORINE RESIDUAL LUGS
- 1 SOD CLASS 9080 WHA10 END CLAMPS
- 1 SOD CLASS 9080 GP68 END BARRIER
- 5 SOD CLASS 9080 GA6 FLAT SCREW TERMINALS
- 1 SOD OOU110 1P 10A CIRCUIT BREAKER
- 1 EDCO DRS-036 SIGNAL SURGE ARRESTER
- 1 EDCO HSP-121 LINE SURGE ARRESTER
- 1 SEE SPECIFICATION FOR ANALYZER REQUIREMENTS.
- 1 A) RANGE: SEE SPECIFICATION
- 1 B) INSTALLATION KIT
- 1 C) MAINTENANCE KIT
- 1 D) WAREHOUSING KIT
- 1 E) 50"H X 36"W X 1/2" FRP MOUNTING PLATE
- 1 ELECTROMATE E-12106CHNFSS6 NEMA 4X 316 S.S. JUNCTION BOX W/ FOLL:

ITEM

QTY

DESCRIPTION

BILL OF MATERIAL

ITEM

QTY

DESCRIPTION

BILL OF MATERIAL

ITEM

QTY

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HILLERS ELECTRICAL ENGINEERING, INC. 23267 STATE ROAD 7, SUITE 100 BOCA RATON, FLORIDA 33428 (561) 451-9165 (561) 451-4666 FAX LICENSE NO. EB 5068677

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BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS HOLLY LAKES & ACADEMIC VILLAGE PEMBROKE PINES, FLORIDA

INSTRUMENTATION DETAILS - HOLLY LAKES

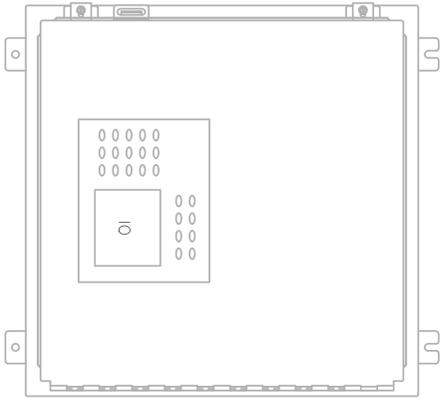
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SCALE NTS PROJECT No. 94-034-1 PURPOSE OF THIS SET BIDDING SHEET: 32 SHEET: 32 1101 OF 39 SHEETS

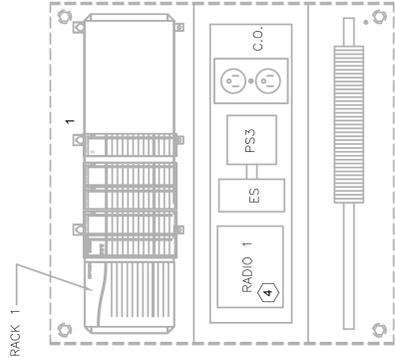
THEIR WIN, P.E. STATE OF FLORIDA PROFESSIONAL ENGINEER LICENSE No. 65722 DATE: 7/15/17

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DATE 1/4/17	
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DATE 1/8/17	
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DATE 7/15/17	

NO.	DATE	BY	NO.	DATE	REVISION



FRONT VIEW



SUBPLATE LAYOUT

EXISTING PLC CONTROL PANEL (1)(2)

NOT TO SCALE

ITEM	QTY	DESCRIPTION
RADIO	1	DATARADIO INTEGRA TUNED & TESTED
ANT	1	OMNI ANTENNA
CF	1	CAVITY FILTER W/RF JUMPER CABLES
SP	1	SURGE PROTECTOR

ITEM	QTY	DESCRIPTION
②	1	RS232 MODEM CABLE DB9M TO DB9F
①	2	BLACK BOX EVNSU21E-0010 CAT5E BLUE ETHERNET CABLE
PS3	1	PULS ML100.102 120VAC/24VDC 90 WATT POWER SUPPLY
C.O.	1	HUBBELL S8 S.S. DUPLEX COVER PLATE
OI	1	HUBBELL CR201 20A DUPLEX RECEPTACLE W/HANDY BOX
	1	ALLEN BRADLEY 2711P-K6M20A PANELVIEW PLUS 600 OPERATOR INTERFACE W/FOLL: A) SUPPLY: 120VAC B) COMMUNICATIONS: ETHERNET, RS232 C) DISPLAY: GRAYSCALE 5.5" BLACK BOX DINRAILMC2 DIN RAIL MTG. BRACKET BLACK BOX LBPH010A-H ETHERNET SWITCH W/FOLL: A) SUPPLY: 4-24VDC B) PORTS: 4-RJ45 C) MEMORY: 16MB ALLEN BRADLEY 1756-L61 CONTROL LOGIX 5561 PROCESSOR W/2MB MEMORY ALLEN BRADLEY 1756-PA72 120VAC POWER SUPPLY ALLEN BRADLEY 1756-A10 10 SLOT RACK ALLEN BRADLEY 1756-ENBT ETHERNET COMMUNICATION MODULE ALLEN BRADLEY 1756-IB16 16 POINT, 24VDC DISCRETE INPUT MODULE ALLEN BRADLEY 1756-OW161 16 POINT ISOLATED CONTACT MODULE ALLEN BRADLEY 1756-IF16 8 CH. 4-20MA ANALOG INPUT MODULE ALLEN BRADLEY 1756-TBCH WIRING ARM (DOAI MODULES) ALLEN BRADLEY 1756-TBNH WIRING ARM (DOAO MODULES) ALLEN BRADLEY 1756-NZ SLOT FILLER CARDS
BRACKET	1	BLACK BOX DINRAILMC2 DIN RAIL MTG. BRACKET
ES	1	BLACK BOX LBPH010A-H ETHERNET SWITCH W/FOLL: A) SUPPLY: 4-24VDC B) PORTS: 4-RJ45 C) MEMORY: 16MB
PLC	1	ALLEN BRADLEY 1756-L61 CONTROL LOGIX 5561 PROCESSOR W/2MB MEMORY
	1	ALLEN BRADLEY 1756-PA72 120VAC POWER SUPPLY
	1	ALLEN BRADLEY 1756-A10 10 SLOT RACK
	1	ALLEN BRADLEY 1756-ENBT ETHERNET COMMUNICATION MODULE
	1	ALLEN BRADLEY 1756-IB16 16 POINT, 24VDC DISCRETE INPUT MODULE
	1	ALLEN BRADLEY 1756-OW161 16 POINT ISOLATED CONTACT MODULE
	1	ALLEN BRADLEY 1756-IF16 8 CH. 4-20MA ANALOG INPUT MODULE
	2	ALLEN BRADLEY 1756-TBCH WIRING ARM (DOAI MODULES)
	2	ALLEN BRADLEY 1756-TBNH WIRING ARM (DOAO MODULES)
	5	ALLEN BRADLEY 1756-NZ SLOT FILLER CARDS

EXISTING PANEL BILL OF MATERIAL

KEYED NOTES:

- EXISTING PLC CONTROL PANEL IS SHOWN ON THIS DRAWING FOR INFORMATION PURPOSE ONLY. CONTRACTOR SHALL PROVIDE AND INSTALL NEW PLC CONTROL PANEL AS PER SPECIFICATION 13302. AFTER NEW PLC CONTROL PANEL IS OPERATIONAL, CONTRACTOR SHALL REMOVE THE EXISTING PLC CONTROL PANEL AND TURN OVER TO THE OWNER FOR SPARE PARTS.
- EXISTING PLC CONTROL PANEL SHALL REMAIN UNTIL NEW PLC CONTROL PANEL IS OPERATIONAL. SUPPLY UNITS WITHIN THE NEW PLC CONTROL PANEL SHALL BE REMOVED FOR TEMPORARY OPERATION DURING INSTALLATION OF NEW PLC CONTROL PANEL AT THE LOCATION OF EXISTING PUMP CONTROL PANEL.
- CONTRACTOR SHALL PROVIDE A DETAILED PLAN FOR TEMPORARY RELAYS AND POWER SUPPLY UNITS WIRING AND GET APPROVAL FROM ENGINEER/OWNER BEFORE REMOVING THE EXISTING PUMP CONTROL PANEL. COORDINATE WITH ELECTRICAL CONTRACTOR FOR CONSTRUCTION SEQUENCE OF NEW PLC CONTROL PANEL AND AS SHOWN ON DRAWING E102.
- EXISTING RADIO, RADIO JUMPER CABLES, RADIO POWER SUPPLY, ETC. SHALL BE RELOCATED TO THE NEW PLC CONTROL PANEL IN THE FIELD AFTER NEW PLC CONTROL PANEL IS IN PLACE. NEW PLC CONTROL PANEL SHALL BE PROVIDED WITH SPACE FOR EXISTING RADIO AND ASSOCIATED DEVICES MOUNTING PLATES/SPACES. EXTEND RADIO ANTENNA WIRE AS NEEDED.
- PLC I/O SIGNALS SHOWN ON THE EXISTING PLC INPUT/OUTPUT LIST (THIS DRAWING) SHALL BE INCLUDED IN THE NEW PLC CONTROL PANEL IN ADDITIONAL TO THE SIGNALS SHOWN ON DRAWING 1100.

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BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS
HOLLY LAKES & ACADEMIC VILLAGE
PEMBROKE PINES, FLORIDA

EXISTING PLC PANEL DETAILS - HOLLY LAKES

THEIR WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE NO. 65722
DATE: 7/15/17

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NOT FOR CONSTRUCTION
ELEVATIONS ARE NGVD 1929



SHEET 33
PROJECT No. 91-034.1
PURPOSE OF THIS SET BIDDING
1102
OF 39 SHEETS

EXISTING PLC INPUT/OUTPUT LIST: (6)

I/O ADDRESS (RACK/SLOT/POINT)	TYPE	DESCRIPTION
R1/S2/NO	DI	HIGH SERVICE PUMP NO.1 REMOTE STATUS
R1/S2/NI1	DI	GENERATOR RUNNING
R1/S2/NI2	DI	HIGH SERVICE PUMP NO.2 REMOTE STATUS
R1/S2/NI3	DI	SPARE INPUT
R1/S2/NI4	DI	HIGH SERVICE PUMP NO.3 REMOTE STATUS
R1/S2/NI5	DI	SPARE INPUT
R1/S2/NI6	DI	HIGH SERVICE PUMP NO.4 REMOTE STATUS
R1/S2/NI7	DI	SPARE INPUT
R1/S2/NI8	DI	HIGH SERVICE PUMP NO.1 RUN STATUS
R1/S2/NI9	DI	HIGH SERVICE PUMP NO.2 RUN STATUS
R1/S2/NI10	DI	HIGH SERVICE PUMP NO.3 RUN STATUS
R1/S2/NI11	DI	HIGH SERVICE PUMP NO.4 RUN STATUS
R1/S2/NI12	DI	SPARE INPUT
R1/S2/NI13	DI	SPARE INPUT
R1/S2/NI14	DI	SPARE INPUT
R1/S2/NI15	DI	SPARE INPUT
R1/S3/OUT1	DO	HIGH SERVICE PUMP NO.1 START/STOP RELAY
R1/S3/OUT2	DO	HIGH SERVICE PUMP NO.3 START/STOP RELAY
R1/S3/OUT3	DO	HIGH SERVICE PUMP NO.4 START/STOP RELAY
R1/S3/OUT4	DO	VALVE NO.1 OPEN RELAY
R1/S3/OUT5	DO	VALVE NO.1 CLOSE RELAY
R1/S3/OUT6	DO	VALVE NO.2 OPEN RELAY
R1/S3/OUT7	DO	VALVE NO.2 CLOSE RELAY
R1/S3/OUT8	DO	SPARE OUTPUT
R1/S3/OUT9	DO	SPARE OUTPUT
R1/S3/OUT10	DO	SPARE OUTPUT
R1/S3/OUT11	DO	SPARE OUTPUT
R1/S3/OUT12	DO	SPARE OUTPUT
R1/S3/OUT13	DO	SPARE OUTPUT
R1/S3/OUT14	DO	SPARE OUTPUT
R1/S3/OUT15	DO	SPARE OUTPUT
R1/S4/AI-CHAN0	AI	GROUND STORAGE TANK LEVEL (RANGE: 0-45 FEET)
R1/S4/AI-CHAN1	AI	HIGH SERVICE DISCHARGE PRESSURE (RANGE: 0-100 PSI)
R1/S4/AI-CHAN2	AI	FILL VALVE 1 POSITION FEEDBACK (RANGE: 0-100%)
R1/S4/AI-CHAN3	AI	FILL VALVE 2 POSITION FEEDBACK (RANGE: 0-100%)
R1/S4/AI-CHAN4	AI	SPARE
R1/S4/AI-CHAN5	AI	SPARE
R1/S4/AI-CHAN6	AI	SPARE
R1/S4/AI-CHAN7	AI	SPARE

NOTE: THIS TABLE ONLY SHOWS EXISTING SIGNALS. SEE P&ID DRAWING FOR ADDITIONAL SIGNALS TO BE INCLUDED.

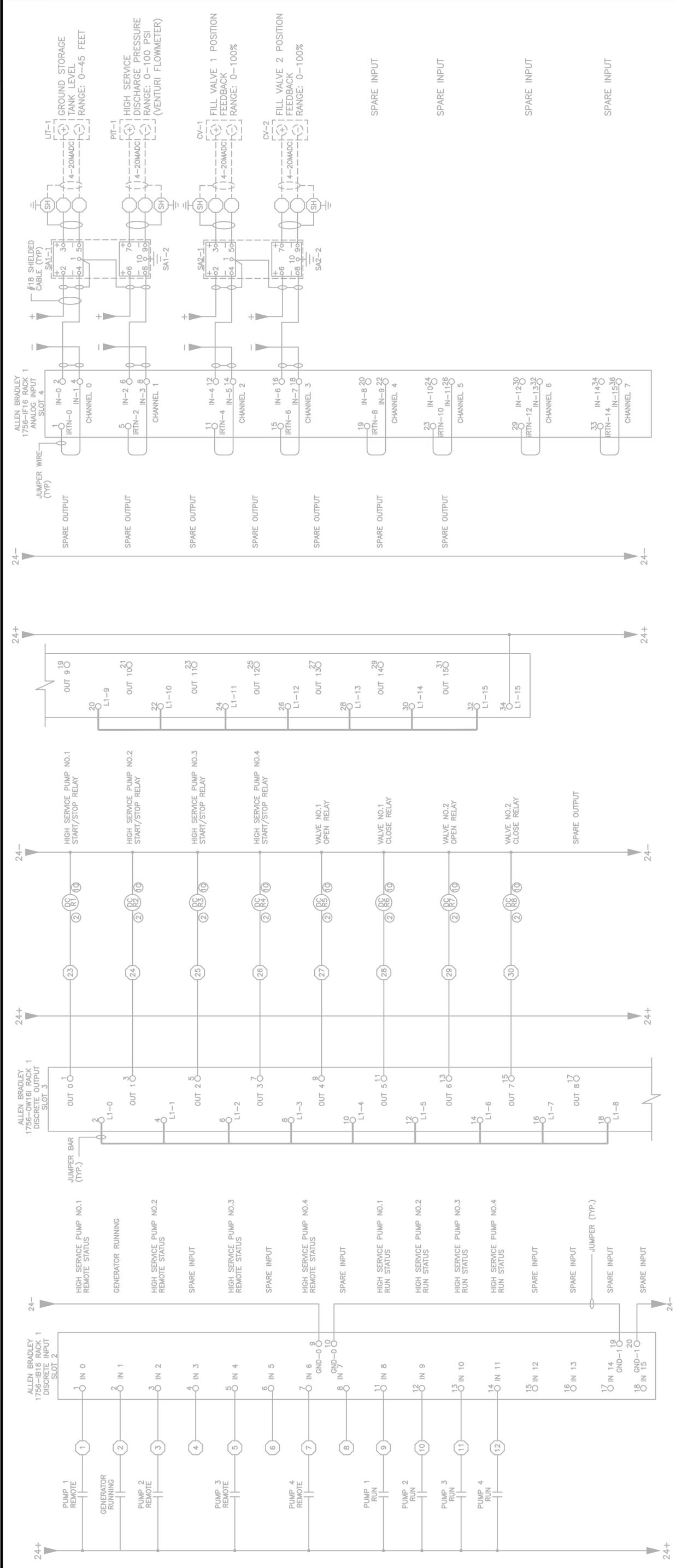
- EXISTING PUMP CONTROL PANEL (TO BE REMOVED), FURNISH AND INSTALL NEW PLC CONTROL PANEL AT THE SAME LOCATION.



- RELOCATE EXISTING RELAYS AND POWER SUPPLY UNITS INSIDE PUMP CONTROL PANEL TO A TEMPORARY PANEL AND WIRE AS NEEDED. COORDINATE WITH ELECTRICAL CONTRACTOR FOR INSTALLING TEMPORARY WIRING SYSTEM FOR RELAYS, POWER SUPPLY UNITS, ETC.

- EXISTING PLC CONTROL PANEL (TO REMAIN IN OPERATION UNTIL NEW PLC CONTROL PANEL IS IN OPERATIONAL)

EXISTING PLC AND PUMP CONTROL PANEL PICTURE
NOT TO SCALE



EXISTING DISCRETE INPUT WIRING
NOT TO SCALE

EXISTING DISCRETE OUTPUT WIRING
NOT TO SCALE

EXISTING ANALOG INPUT WIRING
NOT TO SCALE

EXISTING I/O WIRING NOTES:

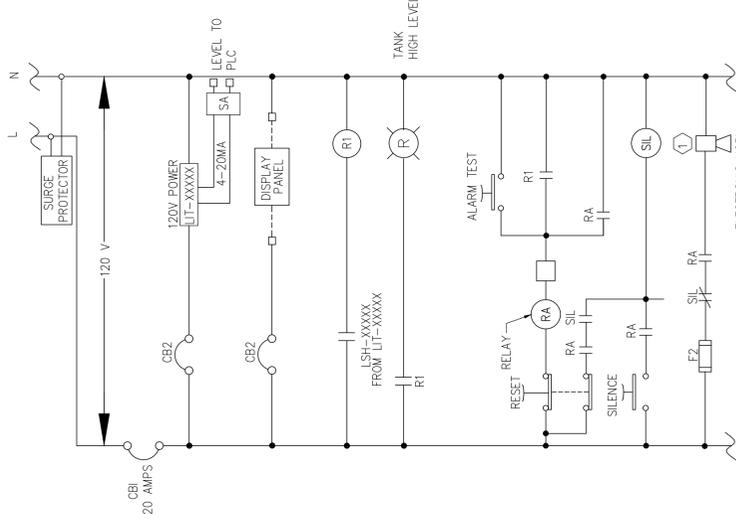
- EXISTING I/O WIRING DIAGRAMS ARE SHOWN TO ASSIST THE CONTRACTOR WITH IDENTIFYING THE EXISTING WIRING AND TERMINATION POINTS AT THE TERMINAL BLOCK, RELAYS, POWER SUPPLIES, PLC, ETC.

HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FLORIDA 33428
(561) 451-9165
(561) 451-4666 FAX
LICENSE NO. EB 5068677

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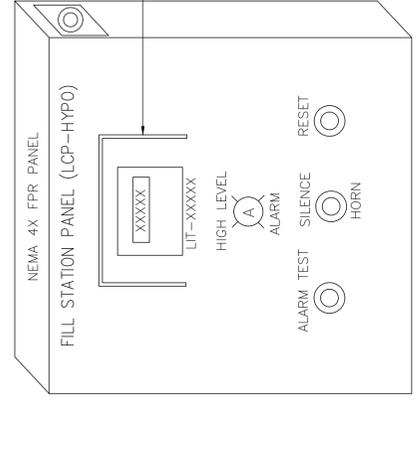
<p>BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS HOLLY LAKES & ACADEMIC VILLAGE PEMBROKE PINES, FLORIDA</p>		<p>EXISTING INPUT-OUTPUT CONNECTION POINTS - HOLLY LAKES</p>		<p>SCALE: NTS PROJECT No: 91-034-1 PURPOSE OF THIS SET: BIDDING</p>	<p>SHEET: 34 1103 OF 39 SHEETS</p>
<p>DESIGNED DATE: 1/4/17</p>	<p>CHECKED DATE: 1/8/17</p>	<p>ISSUED FOR DATE: 7/15/17</p>	<p>BY: NO DATE: REVISION</p>	<p>THEIR WIN, P.E. STATE OF FLORIDA PROFESSIONAL ENGINEER LICENSE No. 65722</p>	<p>DATE: 7/15/17</p>
<p>File Name: E:\PROJECTS\CG\03-04\DWG\910134-1-103-DETL.dwg - (Plotted by: Win, Their on Monday, July 17, 2017 3:54:53 PM)</p>					



FILL STATION PANEL (LCP-HYPO) SCHEMATIC
NOT TO SCALE

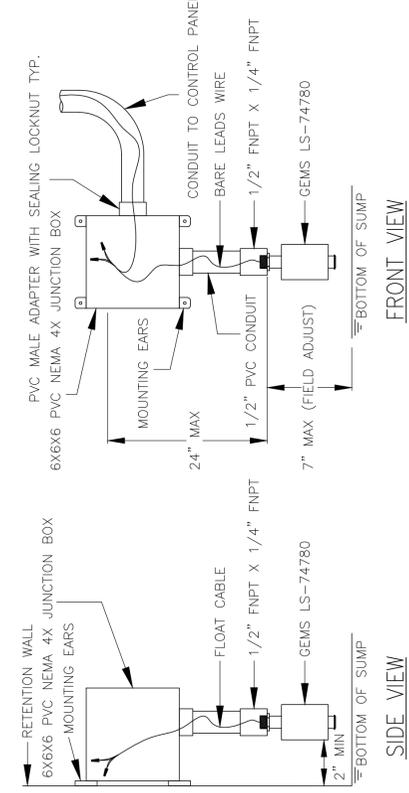
KEYED NOTES

- ① ALARM HORNS SHALL BE GENERAL PURPOSE TYPE, 115VAC POWER SUPPLY, SUITABLE FOR WEATHERPROOF SERVICE. THE SHALL BE ADJUSTABLE ALARM BELLERS SHALL BE WEATHERPROOF, ROTATING RED BEACON LIGHT, 115VAC POWER SUPPLY.



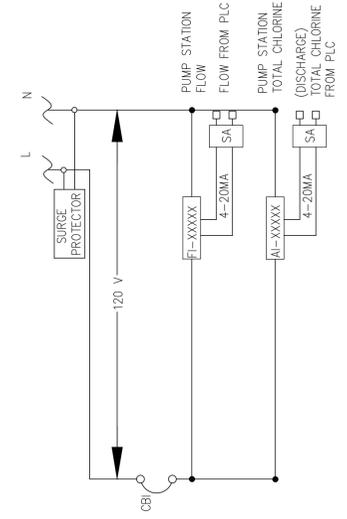
FILL STATION PANEL (LCP-HYPO) FRONT VIEW
NOT TO SCALE

SMALL FLOAT MOUNTING DETAIL
NOT TO SCALE

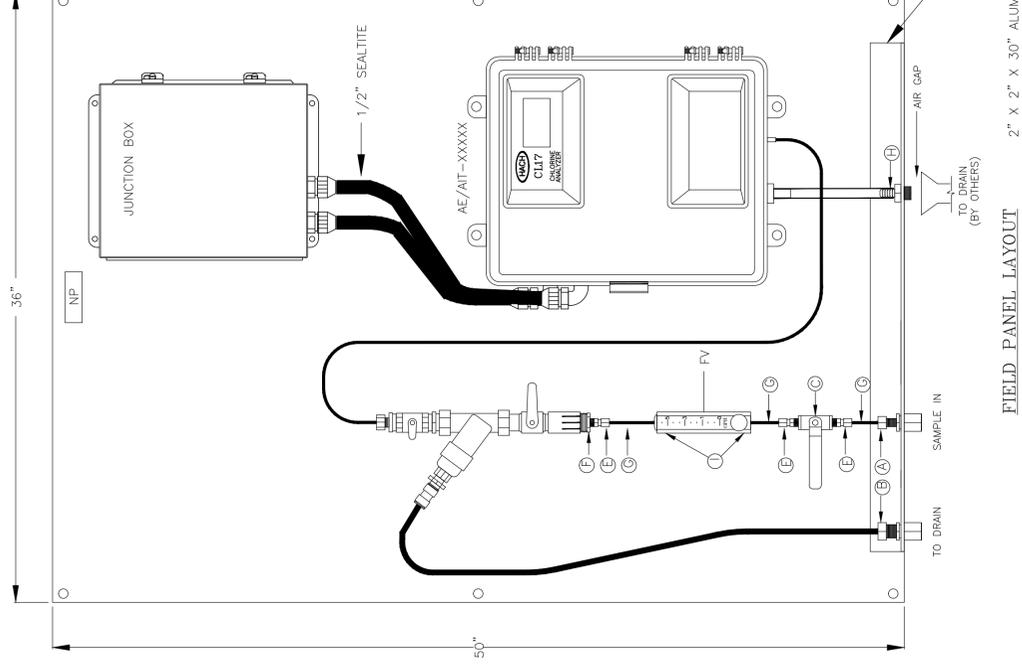


SMALL FLOAT MOUNTING DETAIL
NOT TO SCALE

CHLORINE RESIDUAL ANALYZER PANEL AND INSTALLATION DETAIL
NOT TO SCALE

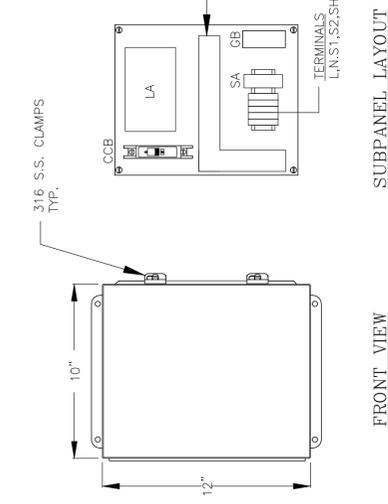


CHLORINE RESIDUAL ANALYZER PANEL AND INSTALLATION DETAIL
NOT TO SCALE



FIELD PANEL LAYOUT
2" X 2" X 30" ALUMINUM ANGLE (BY I&C SUPPLIER)

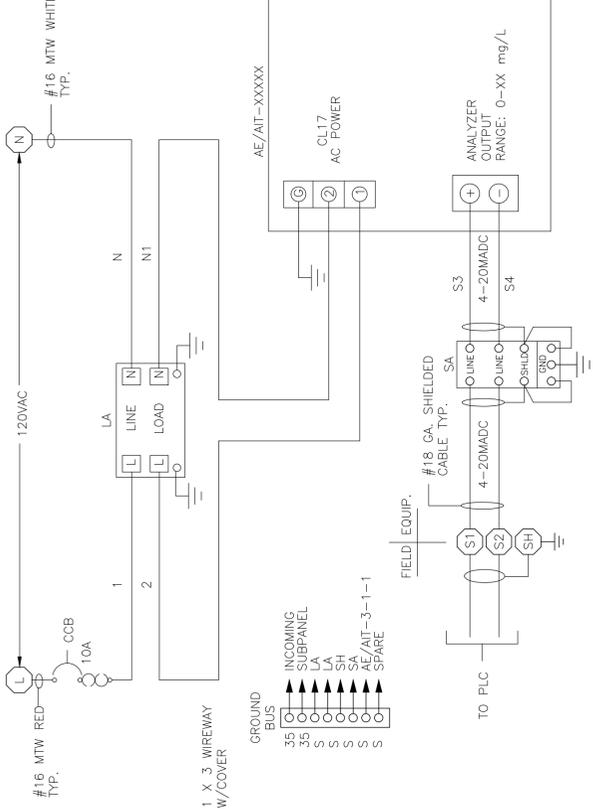
NOTE:
1. ALL PIPING EXTERIOR TO FIELD PANEL BY MECHANICAL CONTRACTOR



FRONT VIEW

NOTE:
PANEL SHALL BE BUILT TO U.L. 508A SPECIFICATIONS AND SHALL BEAR THE U.L. 508A LABEL.

NAMEPLATE SCHEDULE
NP 1 X 3 CHLORINE RESIDUAL FIELD PANEL



SUBPANEL LAYOUT

- LOT
- 1 1/2" SEALTITE ST FITTINGS
 - 2 1/2" SEALTITE 90 FITTINGS
 - 3 PARKER 4-4 GH2BZB BRASS 1/4" FPT X 1/4" TUBE BULK-HEAD CONNECTOR
 - 4 PARKER 8-8 GH2BZB BRASS 1/2" FPT X 1/2" TUBE BULK-HEAD CONNECTOR
 - 5 JAMESBURY 1/4-45TIT 1/4" BRASS BALL VALVE BALL VALVE
 - 6 1/2" CLEAR PLASTIC HOSE
 - 7 1/2" CLEAR PLASTIC HOSE
 - 8 1/2" SCH. X COPPER PIPE
 - 9 1/4" MNPT X 1/4" FNPT BRASS REDUCING BUSHING
 - 10 1/4" SCH. X COPPER PIPE
 - 11 PARKER 8-8 BZHF 1/2" BARB X 1/2" BRASS MNPT CONNECTOR
 - 12 PARKER 4-4 BZHF 1/2" FEMALE 90 X 1/4" TUBE BRASS CONNECTOR
 - 13 INCLUDED WITH HACH SAMPLE CONDITIONING KIT
 - 14 WALLACE & TIERNAN 22A076SXX2 VAREAMETER FLOWMETER W/ 316 S.S. PROCESS CONNECTIONS AND 0-5.77 GPH ADJUSTABLE FLOW RATE.
 - 15 PANDUIT GB35 COPPER LUGS
 - 16 SCD CLASS 9080 WHA10 END CLAMPS
 - 17 SCD CLASS 9080 GRB END CLAMPS
 - 18 SCD CLASS 9080 GRB END CLAMPS
 - 19 SCD QCU110 1P 10A CIRCUIT BREAKER
 - 20 EDCC DRS-036 SIGNAL SURGE ARRESTER
 - 21 EDCC HSP-121 LINE SURGE ARRESTER
 - 22 SEE SPECIFICATION FOR ANALYZER REQUIREMENTS.
- TERMINALS
- 1 CCB
 - 2 LA
 - 3 SA
 - 4 AE/AIT-XXXXX

- MOUNTING PLATE 1
- JUNCTION BOX 1
- ITEM QTY DESCRIPTION REMOTE BILL OF MATERIAL

HILLERS ELECTRICAL ENGINEERING, INC.
23297 STATE ROAD 7, SUITE 100
BOCA RATON, FLORIDA 33428
(561) 451-9165
(561) 451-4666 FAX
LICENSE NO. EB 5068877

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS
1800 Eller Drive, Suite 600, Fort Lauderdale, Florida 33316
Phone: 954-921-7701 • Fax: 954-921-3807
Certificate of Authorization 514

DESIGNED	TW
DATE	10/17
CHECKED	PFH
DATE	10/17
ISSUED FOR	BIDDING
DATE	7/15/17

NO.	DATE	BY	NO.	DATE	REVISION

INSTRUMENTATION DETAILS -
ACADEMIC VILLAGE

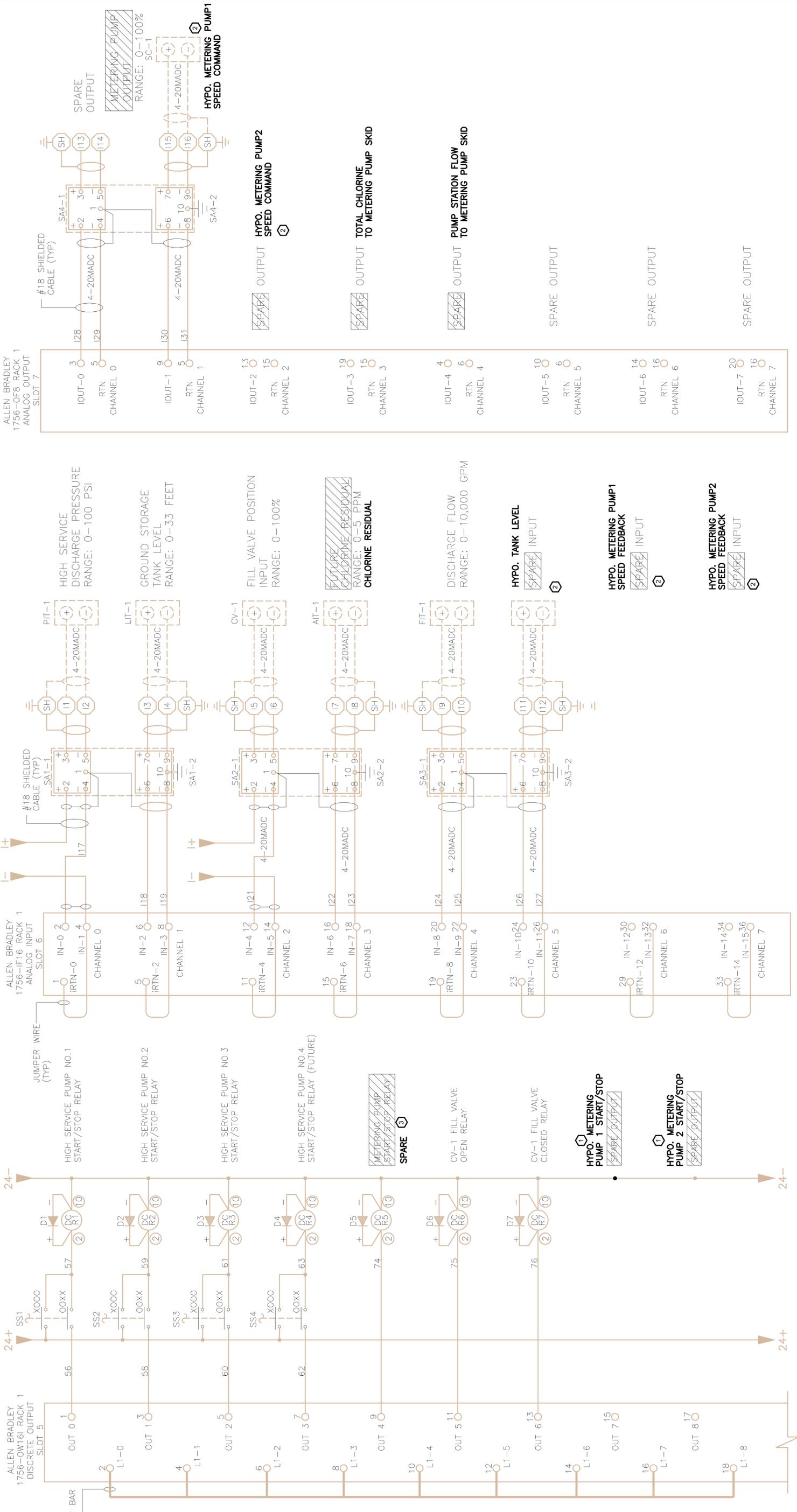
BOOSTER STATION DISINFECTION SYSTEM
IMPROVEMENTS
HOLLY LAKES & ACADEMIC VILLAGE
PEMBROKE PINES, FLORIDA

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SCALE	SHEET: 37
PROJECT No.	91-034-1
PURPOSE OF THIS SET	BIDDING

THEIR WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722





DISCRETE OUTPUT CONNECTION POINTS

ANALOG INPUT CONNECTION POINTS

ANALOG OUTPUT CONNECTION POINTS

KEYED NOTES:

- CONTRACTOR SHALL PROVIDE AND INSTALL NEW RELAYS AND WIRING FOR HYPO. METERING PUMP 1 AND 2 START/STOP SIGNALS SIMILAR TO THE EXISTING DISCRETE OUTPUT RELAYS.
- CONTRACTOR SHALL FIELD VERIFY THE SPARE LOCATION AT THE EXISTING PLC SYSTEM AND SIGNALS MATCH SURGE ARRESTOR TYPE AND MODEL WITH EXISTING. MAKE ALL NECESSARY CONNECTIONS, TERMINATIONS, ETC. FOR A COMPLETE AND WORKING PLC I/O SYSTEM IN PLACE.
- DISCONNECT WIRES FROM RELAY DC-RS FOR EXISTING METERING PUMP AND LABEL AS "SPARE RELAY".
- ADD NEW SURGE ARRESTOR FOR NEW SIGNALS AS NEEDED. MATCH MODEL WITH EXISTING.

HILLERS ELECTRICAL ENGINEERING, INC.
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 LICENSE NO. EB 5068877

Calvin, Giordano & Associates, Inc.
 EXECUTIVE SOLUTIONS
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 Phone: 954.921.7781 • Fax: 954.921.3887
Certificate of Authorization 514



BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS
 HOLLY LAKES & ACADEMIC VILLAGE
 PEMBROKE PINES, FLORIDA

PLC INPUT-OUTPUT CONNECTION POINTS - ACADEMIC VILLAGE

SCALE: NTS
 PROJECT No: 91-034-1
 PURPOSE OF THIS SET: BIDDING
 SHEET 39
1203
 OF 39 SHEETS

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[Vendor view of bid](#)

[Chat](#) | [Bid Comments](#) | [Documents](#) | [Attachments](#) | [Items](#)

Bid #PSUT-17-09 - Booster Stations Disinfection System Improvements    

Time Left Bid has ended.
Bid Started Nov 7, 2017 6:25:28 PM EST
Bid Ended **This bid closed on Dec 12, 2017 2:00:00 PM EST**
Agency Information City of Pembroke Pines, FL ([view agency's bids](#))

Notifications [Report Bidder Activity](#)
of suppliers that viewed 90  ([View](#))
Q & A [Questions & Answers](#)
 Questions: 11
 Q&A Deadline: Nov 20, 2017 8:30:00 PM EST

Bid Classifications [Classification Codes](#)
Bid Regions [Regions](#)
Bid Contact [see contact information](#)

Pre-Bid Conference(s) Nov 16, 2017 3:00:00 PM EST
Attendance is mandatory
 Location: There will be a mandatory scheduled pre-bid meeting and site visit on November 16, 2017 at 3:00 p.m. Meeting location will be at 8300 S. Palm Drive, Pembroke Pines, FL 33025.

All vendors will be required to complete Attachment L "Mandatory Pre-Bid Meeting Form" at the meeting and submit it as part of their proposal to show proof of attendance to the mandatory meeting.

[Transcript](#) [Attendance](#)

Copy Bid Click here to [copy](#) the bid and relist it as a new bid
View Rules Click here to [change](#) the rules for this bid.
Bid Packet  [Packet for Bid PSUT-17-09](#) ([download](#))
Best and Final Offer: [Create](#)

Approval

View Approval Flow [View Approval Flow](#)
Approval Status Approved

Bid Comments

Contract Duration One Time Purchase
Contract Renewal 1 annual renewal
Prices Good for 30 days
Budgeted Amount \$1,250,000.00 ([change](#))
Standard Disclaimer Bids/proposals must be submitted electronically

Please note vendors should be registered on BidSync under the name of the organization that they are operating as and it should match the organization name on the documents that they are submitting and utilizing when responding to the solicitation. The vendor must provide the necessary information on the BidSync website and upload all of the requested documents listed in the PROPOSAL REQUIREMENTS section of this solicitation. Unless otherwise specified, the City requests for vendors to upload their documents as one (1) PDF document in the order that is outline in the bid package.

The City recommends for proposers to submit their proposals as soon as they are ready to do so. Please allow ample time to submit your proposals on the BidSync website. Proposals may be modified or withdrawn prior to the deadline for submitting Proposals. BidSync Support is happy to help you with submitting your proposal and to ensure that you are submitting your proposals correctly, but we ask that you contact our support line at 1-800-990-9339 with ample time before the bid closing date and time.

PLEASE DO NOT SUBMIT ANY PROPOSALS VIA MAIL, E-MAIL OR FAX.

However, please note that any required Bid Bond or Cashier's Check should be in a sealed envelope, plainly marked "BID SECURITY" (with the Solicitation Number and Title) and sent to the City of Pembroke Pines, City Clerk's Office, 4th Floor, 601 City Center Way, Pembroke Pines, FL 33025.

Bid Comments

The City of Pembroke Pines is seeking proposals from qualified firms to provide improvements to Booster Stations' Disinfection System at Academic Village, 17189 Sheridan Street, Pembroke Pines, FL 33331 and also Holly Lakes, 21800 NW 8th Place, Pembroke Pines, FL 33029.

Documents

Select All | Select None | Download Selected

- 1.  [PSUT 17-09 Booster Stations Disinfection System Improvements.pdf](#) [\[download\]](#)
- 2.  [Attachment A- Contact Information.docx](#) [\[download\]](#)
- 3.  [Attachment B - Vendor Information Form and a W-9.pdf](#) [\[download\]](#)
- 4.  [Attachment C - Non-Collusive Affidavit](#) [\[download\]](#)
- 5.  [Attachment D - Sworn Statement on Public Entity Crimes](#) [\[download\]](#)
- 6.  [Attachment E - Local Vendor Preference Certification](#) [\[download\]](#)
- 7.  [Attachment F - Veteran Owned Small Business \(VOSB\) Preference Certification](#) [\[download\]](#)
- 8.  [Attachment G - Equal Benefits Certification Form](#) [\[download\]](#)
- 9.  [Attachment H - Proposers Qualifications Statement](#) [\[download\]](#)
- 10.  [Attachment I - Sample Insurance Certificate.pdf](#) [\[download\]](#)
- 11.  [Attachment I - Specimen Contract Construction Agreement Rev. 2017-07-22.pdf](#) [\[download\]](#)
- 12.  [Attachment K - References Form](#) [\[download\]](#)
- 13.  [Attachment L - Mandatory Pre-Bid - Site Visit Confirmation Form 2017-03-06.pdf](#) [\[download\]](#)
- 14.  [Attachment M - Standard Release of Lien.pdf](#) [\[download\]](#)
- 15.  [Attachment N - Vendor Drug-Free Workplace Certification Form.pdf](#) [\[download\]](#)
- 16.  [Attachment O - Vendor Certification Regarding Scrutinized Companies List.pdf](#) [\[download\]](#)
- 17.  [Attachment P - Technical Specifications.pdf](#) [\[download\]](#)
-  Attachment Q: Drawings (3 documents)
- 18.  [PSUT-17-09 - Mandatory Pre-Bid Meeting Attendance Sheet.pdf](#) [\[download\]](#)

 = Included in Bid Packet  = Excluded from Bid Packet

Items

- HOLLY LAKE AND ACADEMIC VILLAGE BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS [\[Description\]](#)
- HOLLY LAKE BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS [\[Description\]](#)
- ACADEMIC VILLAGE BOOSTER STATION DISINFECTION SYSTEM IMPROVEMENTS [\[Description\]](#)
- PERMIT ALLOWANCE [\[Description\]](#)

Change Made On Nov 9, 2017 8:54:46 AM EST

- New Documents** 2017-11-07 Booster Station Disinfection System Improvements Plan Set LYE.pdf
2017-11-07 Booster Station Disinfection System Improvements Plan Set CGA.pdf
2017-11-07 Booster Station Disinfection System Improvements Plan Set HEE.pdf
- Removed Documents** M-501 MECHANICAL DETAILS - 2017-11-07 Booster Station Disinfection System Improvements Plan Set CGA.pdf
E501 - 2017-11-07 Booster Station Disinfection System Improvements Plan Set HEE.pdf
2017-11-07 Booster Station Disinfection System Improvements Plan Set LYE.pdf

Change Made On Nov 22, 2017 7:52:29 AM EST

- New Documents** PSUT-17-09 - Mandatory Pre-Bid Meeting Attendance Sheet.pdf

Change Made On Dec 5, 2017 1:49:16 PM EST

Previous End Date Dec 5, 2017 2:00:00 PM EST

New End Date Dec 12, 2017 2:00:00 PM EST

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Question and Answers for Bid #PSUT-17-09 - Booster Stations Disinfection System Improvements

Create New Question

Question Deadline: Nov 20, 2017 8:30:00 PM EST

Overall Bid Questions

Question 1

The plans provided appear to be in portrait orientation. Is it possible to get a set of electronic plans in landscape orientation that can be printed on 11x17 paper? (Submitted: Nov 8, 2017 7:40:00 AM EST)

[edit](#) 

Answer

- The plans have been set to landscape orientation and resubmitted to Bidsync. (Answered: Nov 22, 2017 7:32:32 AM EST)

Add to Answer:

Question 2

Is there a cost estimate or budget for the project? (Submitted: Nov 8, 2017 8:46:21 AM EST)

[edit](#) 

Answer

- Staff estimates this project to cost approximately \$1,250,000. (Answered: Nov 22, 2017 7:27:12 AM EST)

Add to Answer:

Question 3

The specs are not full size and are difficult to read, can new specs be uploaded? (Submitted: Nov 9, 2017 12:14:50 PM EST)

[edit](#) 

Answer

- The plans have been set to landscape orientation and resubmitted to Bidsync. (Answered: Nov 22, 2017 7:32:32 AM EST)

Add to Answer:

Question 4

Currently a single I&C supplier is named in specifications 13302. This is to request that Champion Controls is added as an approved I&C supplier on this project. Champion meets all the requirements of this specification including those of section 13300 for the System Integrator. Champion is also conveniently located in Broward County and is a certified County Business Enterprise (CBE). (Submitted: Nov 13, 2017 8:22:20 AM EST)

[edit](#) 

Answer

- Provided that all of the requirements of the specifications for this project are met, Champion Controls will be allowed to pursue this project as the I&C supplier. (Answered: Nov 22, 2017 11:46:55 AM EST)

Add to Answer:

Question 5

Is builder's risk insurance required? (Submitted: Nov 14, 2017 10:03:14 AM EST)

Answer

[edit](#) 

- Yes builder's risk insurance is required. (Answered: Nov 22, 2017 2:53:30 PM EST)

Add to Answer:

Question 6

Can the contract timeframe be reviewed? Due to submittal review and lead times, we feel that 270 days may not be enough time to complete the contract. 330 days would allow for submittal review and procurement. (Submitted: Nov 14, 2017 10:39:03 AM EST)

Answer

[edit](#) 

- The project timeline for this project will be increased to 330 days. (Answered: Nov 22, 2017 11:46:55 AM EST)

Add to Answer:

Question 7

Is there a soils report available that shows water table for Holly Lakes? (Submitted: Nov 14, 2017 10:57:04 AM EST)

Answer

[edit](#) 

- A soils report is not available. (Answered: Nov 22, 2017 11:46:55 AM EST)

Add to Answer:

Question 8

What are the cost for liquidated damages in calendar days for Substantial Completion and Final Completion? (Submitted: Nov 14, 2017 2:58:12 PM EST)

Answer

[edit](#) 

- The liquidated damages in calendar days will be \$1,000 per day. (Answered: Nov 22, 2017 11:46:55 AM EST)

Add to Answer:

Question 9

What are the Site Locations Addresses? (Holly Lakes & Academic Village) (Submitted: Nov 15, 2017 9:42:03 AM EST)

Answer

[edit](#) 

- Academic Village - 17189 Sheridan Street, Pembroke Pines, FL 33331
Holly Lakes - 21800 NW 8th Place, Pembroke Pines, FL 33029 (Answered: Nov 22, 2017 7:32:32 AM EST)

Add to Answer:

Question 10

Please detail the shutdown sequence for the storage tanks at Holly Lakes. Since we are replacing the outlet piping and altitude valves, I assume that each tank will need to be drained then re-filled and bacteriologically cleared. Can both tanks be out of service at the same time? For how long? Who will pay for the water to fill the tanks? (Submitted: Nov 20, 2017 7:48:37 AM EST)

Answer

- : Refer to Section 01011 for information on the Special Project Procedures. The Contractor is required to submit a request, in writing, to disrupt the existing operations in advance to performing the work. The request shall detail the activities that are required to perform the work in accordance with the contract documents. Both of the storage tanks at Holly Lakes can be taken out of service at the same time. The Contractor's request to disrupt the existing operations must detail how long the tanks will be out of service and must demonstrate the intent to minimize the amount of time the tanks are not in service. The Contractor will not be required to pay for the water to fill the storage tanks. The water to fill the tanks will be provided by the City of Pembroke Pines. (Answered: Nov 22, 2017 11:46:55 AM EST)

[edit](#) 

Add to Answer:

Question 11

The specifications call for one I&C contractor with others requiring approval. Would like to request approval for NSite Engineering as an approved I&C contractor. NSite currently meets the criteria in the specifications and would appreciate the opportunity to provide a competitive quote to the City of Pembroke Pines. (Submitted: Nov 20, 2017 3:07:23 PM EST)

Answer

- Provided that all of the requirements of the specifications for this project are met, NSite Engineering will be allowed to pursue this project as the I&C supplier. Please note, in addition to other requirements of the specification, the I&C supplier shall have a maintenance office within a 150 mile radius of the project, per Section 13302, paragraph 1.02.A. Based upon an initial investigation, it appears that NSite Engineering does not meet this requirement. (Answered: Nov 22, 2017 11:46:55 AM EST)

[edit](#) 

Add to Answer:

Submit

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PRE-BID ATTENDANCE SHEET

Date: November 16, 2017 at 3:00 pm

Proposal/Bid #: # PSUT-17-09 Booster Stations Disinfection System Improvements

Av HZ

Company Name	Address	Representative Name	E-Mail	Phone Number	Signature
Calvin, Giordano & Associates, Inc.	1800 Eller Dr., #600 Fort Lauderdale, FL 33316	David Stambaugh	dstambaugh@cgasolutions.com	954 921 7781	
NSite Engineering	3306 Medulla Rd Plant City, FL 33566	Ryan Gillispie	rgg@nsiteeng.com	863-581-9278	
NSITE ENGINEERING	3306 Medulla Rd Plant City, FL 33566	AARON JENKINS	AJ@NSITEENG.COM	863.224.3254	
KEYWARD FL PAUC	415 COUNTRY CLUB DR. WINTER PARK, FL 32789	RON STUPLER	HEYWARD@RSSAOL.COM	561-718-1210	
DANIEL O'CONNELL'S BROS, INC	2999 NE 191 ST. AUBURN, FL	ROBERT MURPHY	RMURPHY@OCONNELLS.COM	305 435 1438	
RF ENVIRONMENTAL SERVICES, INC	4324 NEDIST AVE FORT UNDERHILL	THOMAS BUCKLEY	thad3939@gmail.com	754-605-6711	
Intercounty	1925 NW US 90 ST Pompano Beach, FL 33061	MIKE SORREY	m.sorrey@intercounty.com	954-972-9500	
Florida Design Drilling	7733 Hooper Rd West Palm Beach, FL 33411	Jay Bright	jay@drilling.com	561 818 9802	
TLC Diversified, Inc.	2711 17th Street East Palm Ht, FL 34221	NITISH KRISHNAN	bids@tlediv.com	941-722-0071	
CALVIN, GIORDANO & ASSOCIATES, INC.	1800 ELLER DR., STE. 600 FORT LAUDERDALE, FL 33316	NICHOLAS KANELIDIS	NKANELIDIS@CGASOLUTIONS.COM	954-921-7781	
Brown's Brown Electric Inc	1150 SW 30th Ave Pompano Beach 33069	Hermine Brown Natalia Brown	herminebrownandbrown@brownlectic.com	954-938-8986	
Cardinal Contractors	5365 Stirling Rd	ROSCAR DICER	O Dicer @ Prim. COM	954 931 1564	