



Advertise Date: **Friday, June 15, 2018**

Lee County Board of County Commissioners  
DIVISION OF PROCUREMENT MANAGEMENT

Invitation to Bid (B)  
Construction

Solicitation No.: **B180367DLK**

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Solicitation Name: **Pine Island WWTP Effluent Pump Station Replacement**

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Open Date/Time: **Tuesday, July 17, 2018** Time: **2:30 PM**

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Location: Lee County Procurement Management  
1500 Monroe Street 4th Floor  
Fort Myers, FL 33901

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Procurement Contact: **Diana Khan** Title **Manager**

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Phone: **(239) 533-8881** Email: **dkhan@leegov.com**

Requesting Dept. **Utilities**

**Pre-Bid Conference:**

Type: NON-Mandatory

Date/Time: Monday, July 2, 2018

Location: Pine Island WWTP, 6090 Masters Landing Drive, St. James, FL 33956

All solicitation documents are available for download at  
[www.leegov.com/procurement](http://www.leegov.com/procurement)

**Electronic bidding is coming! Visit [www.leegov.com/bid](http://www.leegov.com/bid) to stay informed**



Advertisement Date: Friday, June 15, 2018

**Notice to Bidder**

**Invitation to Bid #B180367DLK Pine Island WWTP Effluent Pump Station Replacement**

**Invitation to Bid (B) Construction**

Lee County, Florida, is requesting bids from qualified individuals/firms for

**Pine Island WWTP Effluent Pump Station Replacement**

Then and there to be publicly opened and read aloud for the purpose of selecting a vendor to furnish all necessary labor, services, materials, equipment, tools, consumables, transportation, skills and incidentals required for Lee County, Florida, in conformance with solicitation documents, which include technical specifications and/or a scope of work.

Those individuals/firms interested in being considered for this solicitation are instructed to submit, in accordance with specifications, their Bids, pertinent to this project prior to

**2:30 PM Tuesday, July 17, 2018**

to the office of **Procurement Management, 1500 Monroe Street, 4<sup>th</sup> Floor, Fort Myers, Florida 33901**. The Invitation to Bid shall be received in a sealed envelope, prior to the time scheduled to receive Bid(s), and shall be clearly marked with the solicitation name, solicitation number, bidder name, and contact information as identified in these solicitation documents.

The Scope of Work/Specifications for this solicitation is available from [www.leegov.com/procurement](http://www.leegov.com/procurement). Bidders who obtain Scope of Work/Specifications from sources other than [www.leegov.com/procurement](http://www.leegov.com/procurement) are cautioned that the solicitation package may be incomplete. The County's official bidders list, addendum(s) and information must be obtained from [www.leegov.com/procurement](http://www.leegov.com/procurement). It is the bidder's responsibility to check for posted information. The County may not accept incomplete Bids.

**A Non-Mandatory Pre-Bid Conference has been scheduled for the following time and location:**

**Tuesday, July 2, 2018 at 10:00 AM Pine Island WWTP, 6090 Masters Landing Drive, St. James, FL 33956**

for the purpose of discussing the proposed project. Prospective bidders are encouraged to attend. All prospective bidders are encouraged to obtain and review plans, specifications, and scope of work for this bid before the pre-bid conference so that they may be prepared to discuss any question or concerns they have regarding this project. A site visit may follow the pre-bid conference. Questions regarding this solicitation are to be directed, in writing, to the individual listed below using the email address listed below or faxed to (239) 485 8383 during normal working hours.

**Diana Khan** [dkhan@leegov.com](mailto:dkhan@leegov.com)

Sincerely,

A handwritten signature in blue ink, appearing to read "Laurie Victory", is written over a white background.

Laurie Victory, CPPB  
Procurement Manager

\*[www.leegov.com/procurement](http://www.leegov.com/procurement) is the County's official posting site

**Terms and Conditions**  
**INVITATION TO BID (B)**  
**CONSTRUCTION**

**1**        **DEFINITIONS**

- 1.1        **Addendum/Addenda:** A written change, addition, alteration, correction or revision to a bid, proposal or contract Agreement/Contract. Addendum/Addenda may be issued following a pre-bid/pre-proposal conference or as a result of a specification or work scope change to the solicitation.
- 1.2        **Approved Alternate:** Solicitation documents may make reference of specific manufacturer(s) or product(s). These references serve only as a recommendation and a guide to minimum quality and performance. The references are not intended to exclude approved alternatives of other manufacturer(s) or product(s).
- 1.3        **Bid/Proposal Package:** A bid/proposal is a document submitted by a vendor in response to some type of solicitation to be used as a basis for negotiations or for entering into a contract.
- 1.4        **Bidder/Responder/Proposer:** One who submits a response to a solicitation.
- 1.5        **County:** Refers to Lee County Board of County Commissioners.
- 1.6        **Due Date and Time/Opening:** Is defined as the date and time upon which a bid or proposal shall be submitted to the Lee County Procurement Management Division. Only bids or proposals received prior to the established date and time will be considered.
- 1.7        **Liquidated Damages:** Damages paid usually in the form of monetary payment, agreed by the parties to a contract which are due and payable as damages by the party who breaches all or part of the contract. May be applied on a daily basis for as long as the breach is in effect.
- 1.8        **Procurement Management:** shall mean the Director of Lee County’s Procurement Management Department or designee.
- 1.9        **Responsible:** A vendor, business entity or individual who is fully capable to meet all of the requirements of the bid/proposal solicitation documents and subsequent contract. Must possess the full capability including financial and technical, to perform as contractually required. Must be able to fully document the ability to provide good faith performance.
- 1.10       **Responsive:** A vendor, business entity or individual who has submitted a bid or request for proposal that fully conforms in all material respects to the bid/proposal solicitation documents and all of its requirements, including all form and substance.
- 1.11       **Solicitation:** An invitation to bid, a request for proposal, invitation to negotiate or any document used to obtain bids or proposals for the purpose of entering into a contract.

**2**        **ORDER OF PRECEDENCE**

- 2.1        In resolving conflicts, errors, and discrepancies, the order of precedence of the bid document is as follows
  - 2.1.1 Florida State Law as applied to Municipal Purchasing in accordance with Title XIX, “Public Business”, Chapter 287 “Procurement of Personal Property and Services.”
  - 2.1.2 Lee County Procurement Management Manual and Ordinances
  - 2.1.3 Change Order
  - 2.1.4 Agreement
  - 2.1.5 Addenda
  - 2.1.6 Special Conditions
  - 2.1.7 General Conditions, if any
  - 2.1.8 Specifications
  - 2.1.9 Supplemental Information
  - 2.1.10 Drawings/Plans, if any
  - 2.1.11 Figure Dimensions, if any
  - 2.1.12 Scale Dimensions (Large Scale Drawings supersede Small Scale Drawings)
  - 2.1.13 Terms and Conditions

**3**        **RULES, REGULATIONS, LAWS, ORDINANCES AND LICENSES**

- 3.1        It shall be the responsibility of the bidder to assure compliance with all other federal, state, or county codes, rules, regulations or other requirements, as each may apply. Any involvement with the Lee County shall be in accordance with but not limited to:

- 3.1.1 Lee County Procurement Management Manual
  - 3.1.2 Pursuant to FL § Section 119.071, Public Records, General exemptions from inspection or copying of public records. Sealed bids, proposals or replies received by the agency pursuant to a solicitation are exempt from public records request (s. 119.07(1) and s. 24(a), Art. I, of the State Constitution until such time as the agency provides notice of an intended decision or until 30 days after opening the bids, proposals or final replies, whichever is earlier.
  - 3.1.3 FL § 215 regarding scrutinized companies and business operations.
  - 3.1.4 FL § 218 Public Bid Disclosure Act.
  - 3.1.5 Florida State Law as applied to Municipal Purchasing in accordance with Title XIX, “Public Business”, Chapter 287 “Procurement of Personal Property and Services.”
  - 3.1.6 FL § 337.168 Confidentiality of official estimates, identities of potential bidders, and bid analysis and monitoring system.
  - 3.1.7 FL § Section 607.1501(1) states: A foreign corporation may not transact business in the State of Florida until it obtains a certificate of authority from the Department of State.
  - 3.2 **Local Business Tax Account:** As applicable, anyone providing merchandise or services to the public within the jurisdiction of Lee County must obtain a Lee County business tax account to operate unless specifically exempted.
  - 3.3 **License(s):** Bidder should provide, at the time of the opening of the bid, licenses required for this product and/or service.
- 4 BID – PREPARATION OF SUBMITTAL**
- 4.1 **Sealed Bid:** Submission must be in a sealed envelope/box, and the outside of the submission must be marked with the following information (Sealed Bid Label Form is attached for your use):
    - 4.1.1 Marked with the words “Sealed Bid”
    - 4.1.2 Bid Number
    - 4.1.3 Bid Title
    - 4.1.4 Bid Due Date
    - 4.1.5 Name of the firm submitting the bid
    - 4.1.6 Contact e-mail and telephone number
  - 4.2 **Bid submission shall include:**
    - 4.2.1 Provide two (2) hard copies. Mark each: one “Original”, one “Copy”
    - 4.2.2 Provide one (1) electronic CD ROM or flash drive set of the entire submission documents.
    - 4.2.3 Electronic submission document is to be one single Adobe PDF file in the same order as the original hard copy.
    - 4.2.4 Limit the color and number of images to avoid unmanageable file sizes.
    - 4.2.5 Use rewritable CD ROM and do not lock files.
  - 4.3 **Submission Format:**
    - 4.3.1 Required Forms: complete and return **all** required forms. If the form is not applicable please return with “Not Applicable” or “N/A” in large letters across the form.
    - 4.3.2 Failure to submit required or requested information may result in the bidder being found non-responsive.
    - 4.3.3 Execution of Bid: All documents must be properly signed by corporate authorized representative, witnessed, and where applicable corporate and/or notary seals affixed. All Bids shall be typed or printed in ink. The bidder may not use erasable ink. All corrections made to the bids shall be initialed.
    - 4.3.4 If a cost/bid schedule was provided in Microsoft Excel format, the returned completed schedule should be included as a Microsoft Excel File on the CD ROM or Flash drive.
    - 4.3.5 The submission should not contain links to other web pages.
    - 4.3.6 Include any information requested by the County necessary to analyze your bid, i.e., required submittals, literature, technical data, financial statements.
    - 4.3.7 Bid Security/Bond(s), as applicable (Construction projects)
  - 4.4 **Preparation Cost:** The Bidder is solely responsible for any and all costs associated with responding to this solicitation. No reimbursement will be made for any costs associated with the preparation and submittal of any bid, or for any travel and per diem costs that are incurred by any Bidder.

- 5 RESPONSES RECEIVED LATE**
- 5.1 It shall be the Bidder's sole responsibility to deliver the bid submission to the Lee County Procurement Management Division prior to or on the time and date stated. All references to date and time herein reference Lee County, FL local time.
- 5.2 Any bids received after the stated time and date will not be considered. The bid shall not be opened at the public opening. Arrangements may be made for the unopened bid to be returned at the bidder's request and expense.
- 5.3 The Lee County Procurement Management Division shall not be responsible for delays caused by the method of delivery such as, but not limited to; internet, United States Postal Service, overnight express mail service(s), or delays caused by any other occurrence.
- 6 BIDDER REQUIREMENTS (unless otherwise noted)**
- 6.1 **Responsive and Responsible:** Only bids received from responsive and responsible bidders will be considered. The County reserves the right before recommending any award to inspect the facilities and organization; or to take any other necessary action, such as background checks, to determine ability to perform is satisfactory, and reserves the right to reject submission packages where evidence submitted or investigation and evaluation indicates an inability for the bidder to perform.
- 6.1.1 Bids may be declared "non-responsive" due to omissions of "Negligence or Breach of Contract" on the disclosure form. Additionally, bidders may be declared "not responsible" due to past or pending lawsuits that are relevant to the subject procurement such that they call into question the ability of the bidder to assure good faith performance. This determination may be made by the Procurement Management Director, after consulting with the County Attorney.
- 6.1.2 Additional sources may be utilized to determine credit worthiness and ability to perform.
- 6.1.3 Any bidder or sub-contractor that will have access to County facilities or property may be required to be screened to a level that may include, but is not limited to fingerprints, statewide criminal. There may be fees associated with these procedures. These costs are the responsibility of the bidder or sub-contractor.
- 6.2 **BID--Past Performance:** Bidders past performance and prior dealings with Lee County (i.e., failure to meet specifications, poor workmanship, late delivery, etc.) may be reviewed. Poor or unacceptable past performance may result in bidder disqualification.
- 6.3 Submission packages, unless otherwise noted, will be considered only from bidders normally engaged in the provision of the services specified here in. The bidder shall have adequate organization, facilities, equipment, and personnel to ensure prompt and efficient service to Lee County. The County reserves the right before recommending any award to inspect the facilities and organization; or to take any other action necessary to determine ability to perform satisfactorily, and reserves the right to reject submission packages where evidence submitted or investigation and evaluation indicated an inability of the bidder to perform.
- 7 PRE-BID CONFERENCE**
- 7.1 A pre-bid conference will be held in the location, date, and time specified on the cover of this solicitation. The cover will also note if the pre-bid conference is Non-Mandatory or Mandatory. All questions and answers are considered informal. All prospective bidders are encouraged to obtain and review the solicitation documents prior to the pre-bid conference so they may be prepared to discuss any questions or concerns they have concerning this project. All questions must be submitted formally in writing to the procurement staff noted on the first page of the bid document. A formal response will be provided in the form of an addendum (see "County Interpretation/Addendums" for additional information.) A site visit may follow the pre-bid conference, as applicable.
- 7.2 **Non-Mandatory:** Pre-bid conferences are generally non-mandatory, but it is highly recommended that prospective bidders participate.
- 7.3 **Mandatory:** Failure to attend a mandatory pre-bid conference will result in the bid being considered **non-responsive**.
- 8 COUNTY INTERPRETATION/ADDENDUMS**

- 8.1 Each Bidder shall examine the solicitation documents and shall judge all matters relating to the adequacy and accuracy of such documents. Any inquiries, suggestions or requests concerning interpretation, clarification or additional information pertaining to the solicitation shall be **submitted in writing prior to 5:00 PM at least eight (8) calendar days prior to the date when the submission is due.**
- 8.2 Response(s) will be in the form of an Addendum posted on [www.leegov.com/procurement](http://www.leegov.com/procurement). It is solely the bidder's responsibility to check the website for information. No notifications will be sent by Lee County Procurement Management Division.
- 8.3 All Addenda shall become part of the Contract Documents.
- 8.4 The County shall not be responsible for oral interpretations given by any County employee, representative, or others. Interpretation of the meaning of the plans, specifications or any other contract document, or for correction of any apparent ambiguity, inconsistency or error there in, shall be in writing. Issuance of a written addendum by the County's Procurement Management Division is the only official method whereby interpretation, clarification or additional information can be given.
- 9 QUALITY GUARANTEE/WARRANTY (as applicable)**
- 9.1 Bidder will guarantee their work without disclaimers, unless otherwise specifically approved by the County, for a minimum of twelve (12) months from the date of final completion.
- 9.2 Unless otherwise specifically provided in the specifications, all equipment and materials and articles incorporated in the work covered by this contract shall be new, unused and of the most suitable grade for the purpose intended. Refurbished parts or equipment are not acceptable unless otherwise specified in the specifications. All warranties will begin from the date of final completion.
- 9.3 Unless otherwise specifically provided in the specifications, the equipment must be warranted for twelve (12) months, shipping, parts and labor. Should the equipment be taken out of service for more than forty-eight (48) hours to have warranty work performed, a loaner machine of equal capability or better shall be provided for use until the repaired equipment is returned to service at no additional charge to the County.
- 9.4 If any product does not meet performance representation or other quality assurance representations as published by manufacturers, producers or distributors of such products or the specifications listed, the vendor shall pick up the product from the County at no expense to the County. The County reserves the right to reject any or all materials, if in its judgment the item reflects unsatisfactory workmanship or manufacturing or shipping damage. The vendor shall refund, to the County, any money which has been paid for same.
- 10 SUBSTITUTION(S)/APPROVED ALTERNATE(S)**
- 10.1 Unless otherwise specifically provided in the specifications, reference to any equipment, material, article or patented process, by trade name, brand name, make or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. If a bidder wishes to make a substitution in the specifications, the bidder shall furnish to the County, **no later than ten (10) business days prior to the bid opening date**, the name of the manufacturer, the model number, and other identifying data and information necessary to aid the County in evaluating the substitution. Such information is submitted through the Procurement Management Division. Any such substitution shall be subject to County approval through the issuance of a written addendum by the County's Procurement Management Division. Substitutions shall be approved only if determined by the County to be an **Approved Alternate** to the prescribed specifications.
- 10.2 A bid containing a substitution is subject to disqualification if the substitution is not approved by the County. Items bid must be identified by brand name, number, manufacturer and model, and shall include full descriptive information, brochures, and appropriate attachments. Brand names are used for descriptive purposes only. An **Approved Alternate** product or service may be used.
- 11 NEGOTIATED ITEMS**
- 11.1 Any item not outlined in the Scope of Work/Specifications may be subject to negotiations between the County and the successful bidder.
- 11.2 After award of this bid the County reserves the right to add or delete items/services at prices to be negotiated at the time of addition or deletion.

- 11.3 At contract renewal time(s) or in the event of significant industry wide market changes, the County may negotiate justified adjustments such as price, terms, etc., if in its sole judgment, the County considers such adjustments to be in their best interest.
- 12 ERRORS, OMISSIONS, CALCULATION ERRORS (as applicable)**
- 12.1 **Calculation Errors:** In the event of multiplication/addition error(s), the unit price shall prevail. Written prices shall prevail over figures where applicable. All bids will be reviewed mathematically and corrected, if necessary, using these standards, prior to further evaluation.
- 13 CONFIDENTIALITY**
- 13.1 Bidders should be aware that all submissions provided are subject to public disclosure and will **not** be afforded confidentiality, unless provided by Chapter 119 FL §.
- 13.2 If information is submitted with a bid that is deemed “Confidential” the bidder must stamp those pages of the submission that are considered confidential. The bidder must provide documentation as to validate why these documents should be declared confidential in accordance with Chapter 119, “Public Records,” exemptions.
- 13.3 Lee County **will not reveal engineering estimates or budget amounts for a project** unless required by grant funding or unless it is in the best interest of the County. According to FL § 337.168: A document or electronic file revealing the official cost estimate of the department of a project is confidential and exempt from the provisions of s. 119.07(1) until the contract for the project has been executed or until the project is no longer under active consideration.
- 14 BID -- CONFLICT OF INTEREST**
- 14.1 **Business Relationship Disclosure Requirement:** The award hereunder is subject to the provisions of Chapter 112, Public Officers and Employees: General Provisions, Florida Statutes. All bidders must disclose with their submission the name of any officer, director or agent who is also an employee of the Lee County or any of its agencies. Further, all bidders must disclose the name of any County employee who owns directly or indirectly, an interest of five percent (5%) or more in the bidder’s firm or any of its branches.
- 15 ANTI-LOBBYING CLAUSE (Cone of Silence)**
- 15.1 Following FL § Section 287.057(23), Upon the issuance of the solicitation, prospective proposers/bidders or any agent, representative or person acting at the request of such proposer/bidder shall not have any contact, communicate with or discuss any matter relating in any way to the solicitation with any Commissioner, Evaluation Review Committee, agent or employee of the County other than the Procurement Management Director or their designee. This prohibition begins with the issuance of any solicitation, and ends upon execution of the final contract or when the solicitation has been cancelled. **If it is determined that improper communications were conducted, the Bidder/Proposer maybe declared non-responsible.**
- 16 DRUG FREE WORKPLACE**
- 16.1 Lee County Board of County Commissioners encourages Drug Free Workplace programs.
- 17 DISADVANTAGED BUSINESS ENTERPRISE (DBE)**
- 17.1 The County encourages the use of Disadvantaged Business Enterprise Bidder(s) as defined and certified by the State of Florida Department of Transportation (DBE).
- 17.2 As requested in the required forms the Bidder is required to indicate whether they and/or any proposed sub-contractor(s) are Disadvantaged Business Enterprises (DBE). Lee County encourages the utilization and participation of DBEs in procurements, and evaluation proceedings will be conducted within the established guidelines regarding equal employment opportunity and nondiscriminatory action based upon the grounds of race, color, sex or national origin. Interested certified Disadvantaged Business Enterprise (DBE) firms as well as other minority-owned and women-owned firms, as defined and certified by the State of Florida Office of Supplier Diversity (Minority), are encouraged to respond.
- 18 ANTI-DISCRIMINATION/EQUAL EMPLOYMENT OPPORTUNITY**

- 18.1 The bidder agrees to comply, in accordance with FL § 287.134, 504 of the Rehabilitation Act of 1973 as amended, the Americans with Disabilities Act of 1990 (ADA), the ADA Amendments Act of 2008 (ADAAA) that furnishing goods or services to the County hereunder, no person on the grounds of race, religion, color, age, sex, national origin, disability or marital status shall be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination.
- 18.2 The bidder will not discriminate against any employee or applicant for employment because of race, religion, color, age, sex, national origin, disability or marital status. The bidder will make affirmative efforts to ensure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, age, sex, national origin, disability or marital status.
- 18.3 The bidder will include the provisions of this section in every sub-contract under this contract to ensure its provisions will be binding upon each sub-contractor. The bidder will take such actions in respect to any sub-contractor, as the contracting agency may direct, as a means of enforcing such provisions, including sanctions for non-compliance.
- 18.4 An entity or affiliate who has been placed on the State of Florida's Discriminatory Vendor List (This list may be viewed by going to the Department of Management Services website at <http://www.dms.myflorida.com>) may not submit a bid on a contract to provide 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 award or perform work as a vendor, supplier, sub-contractor, or consultant under contract with any public entity, and may not transact business with any public entity.
- 19 SUB-CONTRACTOR**
- 19.1 The use of sub-contractors under this solicitation requires prior written authorization from the County representative.
- 20 BID - PROJECT GUIDELINES (as applicable)**
- 20.1 The County has established the following Guidelines, Criteria, Goals, Objectives, Constraints, Schedule, Budget and or Requirements which shall service as a guide to the bidder(s) in conforming to the provision of goods and/or services to be provided pursuant to this Agreement/Contract:
- 20.1.1 No amount of work is guaranteed upon the execution of an Agreement/Contract.
- 20.1.2 Rates and all other negotiated expenses will remain in effect throughout the duration of the Agreement/Contract period.
- 20.1.3 This contract does not entitle any bidder to exclusive rights to County Agreement/Contracts/contracts. The County reserves the right to perform any and all available required work in-house or by any other means it so desires.
- 20.1.4 In reference to vehicle travel, mileage and man-hours spent in travel time, is considered incidental to the work and not an extra compensable expense.
- 20.1.5 Lee County reserves the right to add or delete, at any time, and or all material, tasks or services associated with this Agreement/Contract.
- 20.1.6 Any Single Large Project: The County, in its sole discretion, reserves the right to separately solicit any project that is outside the scope of this solicitation, whether through size, complexity or the dollar value.
- 21 BID – TIEBREAKER**
- 21.1 Whenever two or more Bids, which are equal with respect to price, quality and service, are received for procurement of commodities or contractual services, from Responsive and Responsible Bidders, the following steps shall be taken to establish the Award to the lowest Bidder. This method shall be used for all ties.
- 21.1.1 Step 1 - Local Bidder: Between a Local Bidder, and a non-Local Bidder, a Contract Award, or the first opportunity to negotiate, as applicable, shall be made to the Local Bidder. **If local preference is prohibited by the funding source then step 2 will replace step 1.**
- 21.1.2 Step 2 - Drug Free Workplace: At the conclusion of step 1, if all is equal, the Bidder with a Drug Free Workplace program shall be given preference over a Bidder with no Drug Free Workplace



program. The Contract Award, or the first opportunity to negotiate, as applicable, shall be made to the Bidder with the Drug Free Workplace program.

21.1.3 **Step 3 - Coin Flip:** At the conclusion of Step 1 and Step 2, if all is equal, the Contract Award, or the first opportunity to negotiate, as applicable, the final outcome shall be determined by the flip of a coin.

21.2 When the tie has been broken pursuant to the above procedures, the Contract Award, or the first opportunity to negotiate, as applicable, shall be furnished to the prevailing Bidder.

21.3 If an Award or negotiation is unsuccessful with the initial Bidder, Award or negotiations may commence with the next highest Bidder, utilizing the tiebreaker steps above to make the determination of next lowest Bidder, if necessary.

## 22 WITHDRAWAL OF BID

22.1 No bid may be withdrawn for a period of **180 calendar days** after the scheduled time for receiving submissions. A bid may be withdrawn prior to the solicitation opening date and time. Withdrawal requests must be made in writing to the Procurement Management Director, who will approve or disapprove the request.

22.2 A bidder may withdraw a submission any time prior to the opening of the solicitation.

22.3 After submissions are opened, but prior to award of the contract by the County Commission, the Procurement Management Director may allow the withdrawal of a bid because of the mistake of the bidder in the preparation of the submission document. In such circumstance, the decision of the Procurement Management Director to allow the submission withdrawal, although discretionary, shall be based upon a finding that the bidder, by clear and convincing evidence, has met each of the following four tests:

22.3.1 The bidder acted in good faith in submitting the bid,

22.3.2 The mistake in bid preparation that was of such magnitude that to enforce compliance by the bidder would cause a severe hardship on the bidder,

22.3.3 The mistake was not the result of gross negligence or willful inattention by the bidder; and

22.3.4 The mistake was discovered and was communicated to the County prior to the County Commission having formally awarded the Agreement/Contract.

## 23 PROTEST RIGHTS

23.1 Any bidder that has submitted a formal response to Lee County, and who is adversely affected by an intended decision with respect to the award, has the right to protest an intended decision posted by the County as part of the solicitation process.

23.2 "Decisions" are posted on the Lee County Procurement Management Division website. Bidders are solely responsible to check for information regarding the solicitation. ([www.leegov.com/procurement](http://www.leegov.com/procurement))

23.3 Refer to the "Bid/Proposal Protest Procedure" section of the Lee County "Contracts Manual" for the complete protest process and requirements. The Manual is posted on the Lee County website or may be obtained by contacting the Procurement Management Director.

23.4 In order to preserve the right to protest, a written "**Notice Of Intent To File A Protest**" **must be filed with the Lee County Procurement Management Director by 4:00 PM on the 3<sup>rd</sup> working day after the decision** affecting your rights is posted on the Lee County website.

23.4.1 The notice must clearly state the basis and reasons for the protest.

23.4.2 The notice must be physically received by the Procurement Management Director with-in the required time frame. No additional time will be granted for mailing.

23.5 To secure the right to protest a "**Protest Bond**" and written "**Formal Protest**" document must be filed **within 10 calendar days** after the date of "**Notice of Intent to File a Protest**" is received by the Procurement Management Director.

23.6 **Failure to follow the protest procedures requirement within the time frames as prescribed herein and established by the Lee County Board of County Commissioners, Florida, shall constitute a waiver of the right to protest and bar any resulting claims.**

## 24 AUTHORITY TO UTILIZE BY OTHER GOVERNMENT ENTITIES

- 24.1 This opportunity is also made available to any government entity. Pursuant to their own governing laws, and subject to the Agreement/Contract of the vendor, other entities may be permitted to make purchases at the terms and conditions contained herein. Lee County Board of County Commissioners will not be financially responsible for the purchases of other entities from this solicitation.

## 25 CONTRACT ADMINISTRATION

### 25.1 Designated Contact:

- 25.1.1 The awarded bidder shall appoint a person(s) to act as a primary contact for all County departments. This person or back-up shall be readily available during normal working hours by phone or in person, and shall be knowledgeable of the terms and procedures involved.
- 25.1.2 Lee County requires the awarded bidder to provide the name of a contact person(s) and phone number(s) which will afford Lee County access 24 hours per day, 365 days per year, of this service in the event of major breakdowns or natural disasters.

### 25.2 BID – Term: (unless otherwise stated in the Scope of Work or Detailed Specifications)

- 25.2.1 Unless otherwise stated in the scope of work, specifications, or special conditions the default **contract term shall be one (1) year with three (3), one (1) year renewals for a total of four (4) years upon mutual written agreement of both parties.**
- 25.2.2 The County reserves the right to renew this Agreement/Contract (or any portion thereof) and to negotiate pricing as a condition for each.
- 25.2.3 The County's performance and obligation to pay under this contract, and any applicable renewal options, is contingent upon annual appropriation of funds.

### 25.3 BID – Basis of Award:

- 25.3.1 The bid is awarded under a system of sealed, competitive bidding to the lowest responsive and responsible bidder.
- 25.3.2 In the event the lowest responsive and responsive bid for a project exceeds the available funds the County may negotiate an adjustment of the bid price with the lowest responsive and responsive bidder, in order to bring the total cost of the project within the amount of available funds.
- 25.3.3 The County reserves the right to make award(s) by individual item, group of items, all or none, or a combination thereof. The County reserves the right to reject any and all bids or to waive any minor irregularity or technicality in the bids received. Award will be made to the lowest responsive and responsive bidder(s) within the category chosen for basis of award.
- 25.3.4 The County reserves the right to award to one or multiple bidders at the discretion of the requesting authority and approval of the Procurement Management Director.

### 25.4 Agreement/Contracts/Contracts:

- 25.4.1 The awarded bidder will be required to execute an Agreement/Contract as a condition of award. A sample of this document may be viewed on-line at <http://www.leegov.com/procurement/forms>.

### 25.5 Records:

- 25.5.1 Retention: The bidder shall maintain such financial records and other records as may be prescribed by Lee County or by applicable federal and state laws, rules and regulations. Unless otherwise stated in the specifications, the bidder shall retain these records for a period of five years after final payment, or until they are audited by Lee County, whichever event occurs first.
- 25.5.2 Right to Audit/Disclosure: These records shall be made available during the term of the contract as well as the retention period. These records shall be made readily available to County personnel with reasonable notice and other persons in accordance with the Florida General Records Schedule. Awarded Bidder/Proposer(s) are hereby informed of their requirement to comply with FL §119 specifically to:
- 25.5.2.1 Keep and maintain public records required by the County to perform the service.
- 25.5.2.2 Upon request from the County's custodian of public records, provide the County 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 or as otherwise provided by law.

- 25.5.2.3 Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of the contract if the contractor does not transfer the records to the County.
- 25.5.2.4 Upon completion of the contract, transfer, at no cost, to the County all public records in possession of the contractor or keep and maintain public records required by the County to perform the service. If the contractor transfers all public records to the County upon completion of the contract, the contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the contractor keeps and maintains public records upon completion of the contract, the contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the County, upon request from the County's custodian of public records, in a format that is compatible with the information technology systems of the County.
- 25.5.3 Public Record: **IF THE VENDOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE VENDOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THE CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT 239-533-2221, 2115 SECOND STREET, FORT MYERS, FL 33901, <http://www.leegov.com/publicrecords>.**
- 25.5.4 Ownership: It is understood and agreed that all documents, including detailed reports, plans, original tracings, specifications and all data prepared or obtained by the successful bidder in connection with its services hereunder, include any documents bearing the professional seal of the successful bidder, and shall be delivered to and become the property of Lee County, prior to final payment to the successful bidder or the termination of the Agreement/Contract. This includes any electronic versions, such as CAD or other computer aided drafting programs.
- 25.6 **Termination:**
- 25.6.1 Any Agreement/Contract as a result of this solicitation may be terminated by either party giving **thirty (30) calendar days advance written notice**. The County reserves the right to accept or not accept a termination notice submitted by the vendor, and no such termination notice submitted by the vendor shall become effective unless and until the vendor is notified in writing by the County of its acceptance.
- 25.6.2 The Procurement Management Director may immediately terminate any Agreement/Contract as a result of this solicitation for emergency purposes, as defined by the Lee County Purchasing and Payment Procedures Manual (Purchasing Manual), (also known as Appendix "D" "AC-4-1.pdf".)
- 25.6.3 Any bidder who has voluntarily withdrawn from a solicitation without the County's mutual consent during the contract period shall be barred from further County procurement for a **period of 180 days**. The vendor may apply to the Board for a waiver of this debarment. Such application for waiver of debarment must be coordinated with and processed by the Procurement Management Department.
- 25.6.4 The County reserves the right to terminate award or contract following any of the below for goods or services over \$1,000,000:
- 25.6.4.1 Contractor is found to have submitted a false certification as provided under FL § 287.135 (5);
- 25.6.4.2 Contractor has been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List (FL §215.473);
- 25.6.4.3 Contractor has engaged in business operations in Cuba or Syria (FL § 215.471);
- 25.6.4.4 Contractor has been placed on the Scrutinized Companies that Boycott Israel List, or is engaged in a boycott of Israel. (FL § 215.4725)
- 25.6.4.5 The County reserves the right to review, on a case-by-case basis, and waive this stipulation if it is deemed to advantageous to the County.

- 26.1 Once this contract expires, or final payment has been requested and made, the awarded bidder shall have waived any claims against the County concerning this contract. After that period, the County will consider the bidder to have waived any right to claims against the County concerning this Agreement/Contract.
- 27 LEE COUNTY PAYMENT PROCEDURES**
- 27.1 Unless otherwise noted, all vendors are requested to mail an original invoice to:  
**Lee County Finance Department**  
**Post Office Box 2238**  
**Fort Myers, FL 33902-2238**
- 27.2 All invoices will be paid as directed by the Lee County payment procedure unless otherwise stated in the detailed specifications for this project.
- 27.3 Lee County will not be liable for requests for payment deriving from aid, assistance, or help by any individual, vendor, proposer, or bidder for the preparation of these specifications.
- 27.4 Lee County is generally a tax exempt entity subject to the provisions of the 1987 legislation regarding sales tax on services. Lee County will pay those taxes for which it is obligated, or it will provide a Certificate of Exemption furnished by the Department of Revenue. All bidders should include in their bids, all sales or use taxes, which they will pay when making purchases of material or sub-contractor's services.
- 28 SAFETY DATA SHEETS (SDS) (as applicable)**
- 28.1 In accordance with Chapter 443 of the FL §, it is the vendor's responsibility to provide Lee County with Safety Data Sheets on bid materials, as may apply to this procurement.
- 29 DEBRIS DISPOSAL (as applicable)**
- 29.1 Unless otherwise stated, the bidder shall be fully responsible for the lawful removal and disposal of any materials, debris, garbage, vehicles or other such items which would interfere with the undertaking and completion of the project. There shall not be an increase in time or price associated with such removal.
- 30 SHIPPING (as applicable)**
- 30.1 Cost of all shipping to the site, including any inside delivery charges and all unusual storage requirements shall be borne by the bidder unless otherwise agreed upon in writing prior to service. It shall be the bidders responsibility to make appropriate arrangements, and to coordinate with authorized personnel at the site, for proper acceptance, handling, protection and storage (if available) of equipment and material delivered. All pricing to be F.O.B. destination.
- 30.2 The materials and/or services delivered under the bid shall remain the property of the seller until a physical inspection and actual usage of these materials and/or services is accepted by the County and is deemed to be in compliance with the terms herein, fully in accord with the specifications and of the highest quality.
- 31 BOND/SURETY (CONSTRUCTION)**
- 31.1 Bonding/Surety is required for construction projects over \$100,000.00 unless otherwise noted.
- 31.2 **Bid Bond/Security:** The bidder/vendor shall submit **not less than 5% of proposed dollar amount** (including applicable alternates) as bid security. One **ORIGINAL** Bid Bond/Security is to be submitted to the County with Bid Submission. The Bid Security of the bidder/vendor will be retained until the bidder/vendor has executed the contract, whereupon the Bid security may be returned. The bid Security of the bidder/vendor whom the County believes to have a reasonable chance of receiving the award may be retained by the County until the effective date of the Agreement/Contract, whereupon Bid Securities furnished by the bidder/vendor may be returned. The following types of Bid Security are acceptable:
- 31.2.1 **A Certified Check or a Cashier's Check** in the stated dollar amount of not less than 5% of proposed dollar amount. Any Certified Check or Cashier Check submitted in lieu of a Bid Bond Shall be drawn on a solvent bank or trust company, made payable to Lee County Board of County Commissioners and shall have all necessary documentary revenue stamps attached (if required by law); or
- 31.2.2 **A Bid Bond** may be submitted on a Lee County paper Bid Bond Form. Must be signed by all required parties, of not less than 5% of proposed dollar amount (including Alternate(s) as applicable) shall

accompany each submission. The Bid Bond shall be issued by a duly authorized surety authorized to do business and in good standing with the Florida Department of state.

31.3 **Payment and Performance Bond:** In accordance with F.S. 255.05 and Lee County Ordinance 95-2-102, a Public Payment and Performance Bond is to be issued in a sum equal to one-hundred (100%) percent of the total awarded contract amount by a surety company considered satisfactory by Lee County and otherwise authorized to transact business in the State of Florida shall be required from the successful bidder/vendor. This shall insure the faithful performance of the obligations imposed by the resulting contract and protect the County from lawsuits for non-payment of debts incurred during the successful bidder/vendor performance under such Contract.

31.3.1 A public Payment and Performance bond must be properly executed, by the Surety Company and successful bidder/vendor, and recorded with the Lee County Clerk of Court, within **seven calendar days** after notification by Lee County of the approval to award the Contract.

31.3.2 A **Clean Irrevocable Letter of Credit or Cash Bond** may be accepted by the County in lieu of the Public Payment and Performance Bond.

31.4 Only Lee County form(s) may be accepted. Forms are available at <https://www.leegov.com/procurement/forms>.

31.5 **Personal Checks are not acceptable to Lee County as a Bid Security.**

31.6 **Surety:** In order to be acceptable to the County, a Surety Company issuing Evidence of Bondability, Bid Guaranty Bonds or 100% Public Payment and Performance Bonds or Letters of Credit called for herein shall meet and comply with the minimum standards set forth in as part of the Contract Documents.

The surety company shall be authorized to do business and in good standing with the Florida Department of State. All such bonds shall be issued or countersigned by a local producing agent who is a Florida resident with satisfactory evidence of its authority to execute the bond being submitted.

## 32 INSURANCE (AS APPLICABLE)

32.1 Insurance shall be provided by the awarded bidder/vendor. Prior to execution of the Agreement/Contract a certificate of insurance (COI) complying with the bid documents shall be provided by the bidder/vendor.

End of Terms and Conditions Section

## INSURANCE GUIDE

<h2 style="margin: 0;">Major Insurance Requirements</h2>
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**Minimum Insurance Requirements:** *Risk Management in no way represents that the insurance required is sufficient or adequate to protect the Vendor's interest or liabilities. The following are the required minimums the Vendor must maintain throughout the duration of this Contract. The County reserves the right to request additional documentation regarding insurance provided.*

- a. **Commercial General Liability** - Coverage shall apply to premises and/or operations, products and completed operations, independent contractors, and contractual liability exposures with minimum limits of:

\$1,000,000 per occurrence  
 \$2,000,000 general aggregate  
 \$1,000,000 products and completed operations  
 \$1,000,000 personal and advertising injury

- b. **Business Auto Liability** - The following Automobile Liability will be required and coverage shall apply to all owned, hired and non-owned vehicles use with minimum limits of:

\$1,000,000 combined single limit (CSL) or  
 \$500,000 bodily injury per person  
 \$1,000,000 bodily injury per accident  
 \$500,000 property damage per accident

- c. **Workers' Compensation** - Statutory benefits as defined by Chapter 440, Florida Statutes, encompassing all operations contemplated by this Contract or Agreement to apply to all owners, officers, and employees regardless of the number of employees. Workers' Compensation exemptions may be accepted with written proof of the State of Florida's approval of such exemption. Employers' liability will have minimum limits of:

\$500,000 per accident  
 \$500,000 disease limit  
 \$500,000 disease – policy limit

\*The required minimum limit of liability shown in a. and b. may be provided in the form of "Excess Insurance" or "Commercial Umbrella Policies," in which case, a "Following Form Endorsement" will be required on the "Excess Insurance Policy" or "Commercial Umbrella Policy."

**Verification of Coverage:**

1. Coverage shall be in place prior to the commencement of any work and throughout the duration of the Contract. A certificate of insurance will be provided to the Risk Manager for review and approval.

The certificate shall provide for the following:

- a. The certificate holder shall read as follows:

Lee County Board of County Commissioners  
P.O. Box 398  
Fort Myers, Florida 33902

- b. *“Lee County, a political subdivision and Charter County of the State of Florida, its agents, employees, and public officials”* will be named as an "Additional Insured" on the General Liability policy, including Products and Completed Operations coverage.

**Special Requirements:**

1. An appropriate "Indemnification" clause shall be made a provision of the Contract.
2. If applicable, it is the responsibility of the general contractor to ensure that all subcontractors comply with all insurance requirements.

End of Insurance Guide Section

## **SPECIAL CONDITIONS**

These are conditions that are in relation to this solicitation only and have not been included in the County's standard Terms and Conditions or the Scope of Work.

### **1. TERM**

From the Notice to Proceed or the Purchase Order date, whichever applies: 180 calendar days to substantial completion, 225 calendar days to final completion.

### **2. BIDDER/SUB-CONTRACTOR RELATIONSHIP**

The prime bidder/contractor on a project may not also be listed as a sub-contractor to another firm submitting a bid for the same solicitation. Should this occur, all responses from the involved/named firms will be considered non-compliant and rejected for award. Sub-contractors may be listed on multiple submissions for the same solicitation.

### **3. LIQUIDATED DAMAGES (CONSTRUCTION)**

In accordance with the terms set forth in the Agreement, for each consecutive calendar day of delay in achieving Substantial Completion as set forth herein, the Contractor shall be liable to the County for liquidated damages in the amount of \$970.00 per calendar day.

End of Special Conditions Section



## GENERAL CONDITIONS

### 1. Administration

The Consultant is the initial interpreter of the Contract Documents but is not the Judge between the COUNTY and the CONTRACTOR. The COUNTY reserves the right to make final decisions considering the Consultant's recommendations or interpretations of the Contract Documents. The Consultant does not have authority to obligate or commit the COUNTY to fund additional expenditures or approve extensions of time over the approved Contract time or price. However, the CONSULTANT'S interpretation as to the intent of his design shall be final and not subject to interpretation by the COUNTY'S staff.

#### 1.1. Copies of Documents

The COUNTY shall furnish to the CONTRACTOR the number of copies specified in the Supplemental Information of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction which shall be paid by the CONTRACTOR.

#### 1.2. Before Starting Construction

Before undertaking each phase of the Work, the CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. The CONTRACTOR shall promptly report in writing to the OWNER'S REPRESENTATIVE any conflict, error or discrepancy which the CONTRACTOR may discover or other information known to the CONTRACTOR and shall obtain a written interpretation or clarification from the OWNER'S REPRESENTATIVE before proceeding with any Work affected thereby. If the CONTRACTOR performs any construction activity knowing it involves a recognized error, inconsistency or omission in the Contract Documents without such notice to the OWNER'S REPRESENTATIVE, the CONTRACTOR shall assume responsibility for such performance and shall share in costs associated with correction; however, the CONTRACTOR shall not be liable to the COUNTY for failure to report any conflict, error or discrepancy in the Contract Documents, unless the CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

1.2.1. Within ten calendar days after the Effective Date of the Agreement (unless otherwise specified in the Contract Documents), the CONTRACTOR shall submit to the OWNER'S REPRESENTATIVE for review:

- 1.2.1.1. An estimated progress schedule indicating the starting and completion dates of the various stages of the Work:
- 1.2.1.2. Long lead item(s) shall be identified and scheduled accordingly.
- 1.2.1.3. A preliminary schedule of Shop Drawing submission; and
- 1.2.1.4. A preliminary schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction on form No. CMO:013. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work which will be confirmed in writing by the CONTRACTOR at the time of submission; and specify times for Application for Payment.
- 1.2.1.5. A plan of work for maintenance of traffic, when the Contract Documents require maintenance of traffic.

- 1.2.1.6. For informational purposes, a proposed listing of sub-contractors to be used for the project.
- 1.2.2. **Pre-Construction Conference**  
Within fifteen calendar days after the Effective Date of the Agreement, but before the CONTRACTOR starts the Work at the site, a conference attended by the CONTRACTOR, the OWNER'S REPRESENTATIVE, the COUNTY, and Others as appropriate, will be held to discuss the items, to discuss procedures for handling Shop Drawings and other submittals and for processing Applications for Payment, and to establish an understanding among the parties as to the Work.
- 1.2.3 **Finalizing Schedules**  
At least ten calendar days before submission of the first Application for payment, a conference attended by the CONTRACTOR, the OWNER'S REPRESENTATIVE, the COUNTY, and Others as appropriate, will be held to finalize the schedules submitted. The finalized progress schedule will be acceptable to the OWNER'S REPRESENTATIVE and the COUNTY as providing an orderly progression of the Work to completion within the Contract Time, but such acceptance will neither impose on the OWNER'S REPRESENTATIVE or the COUNTY responsibility for the progress or scheduling of the Work nor relieve the CONTRACTOR from full responsibility therefor. The finalized schedule of Shop Drawing submissions will be acceptable to the OWNER'S REPRESENTATIVE as providing a workable arrangement for processing the submissions. The finalized schedule of values will be acceptable to the OWNER'S REPRESENTATIVE and the COUNTY as to form and substance.

## **Definitions**

The following definition of terms associated with this Contract is provided to establish a common understanding between both parties to this Contract as to the intended usage, application and interpretation of such terms pertaining to this Contract.

*ADDENDUM* means any additional Contract provisions in writing signed and sealed by the CONSULTANT, if applicable, issued by the COUNTY prior to the receipt of Bid which clarify, correct, change or interpret the Bidding Documents or the Contract Documents.

*AGREEMENT* means the written agreement between the COUNTY and the CONTRACTOR covering the Work to be performed; the Agreement is a part of the Contract Documents.

*BIDDER* is any individual, firm, partnership, joint venture, or corporation submitting a bid for this project, acting directly or through an authorized representative.

*BID* is a complete and properly signed proposal to do the Work or designated portion thereof for the sums stipulated therein, submitted in accordance with the Bidding Documents.

*BID BOND* is a security in the form and amount required by the COUNTY pledging that the BIDDER will enter into a Contract with the COUNTY on the terms stated in his Bid.

*BID DOCUMENTS* are the Invitation to Bid, the Notice to Bidders, the Invitation to Bid Terms and Conditions, sample forms, the Bid Proposal Form and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

*CHANGE ORDERS* are written order to the CONTRACTOR signed by the COUNTY, issued after execution of the Contract, authorizing a change in the Work or an adjustment in the Contract price or the Contract Time. The Contract Price and the Contract Time may be changed only by a Change Order. A Change Order signed by the CONTRACTOR indicates his agreement therewith, including the adjustment in the Contract Price or the Contract Time.

*COMPLETION (FINAL)* means acceptance of the Project by the COUNTY as evidenced by its signature upon a final payment Certification and approval thereof by the Board of County Commissioners or their designee. The final payment Certification shall be signed only after the COUNTY has assured itself by tests, inspections, or otherwise that all of the provisions of the Contract have been carried out as required.

*COMPLETION (SUBSTANTIAL)* shall mean an acceptance of the Work by the COUNTY when construction is sufficiently complete in accordance with the Contract Documents so the COUNTY can occupy or utilize the Work or designated portion thereof for the use for which it is intended. A certificate of occupancy or compliance, when applicable, issued by the Building Official is required concurrent with or prior to issuance of the Certificate of Substantial Completion.

*CONSTRUCTION* is the erection, fabrication, assembly, remodeling, renovation, addition, modification, repair or demolition of any building or structure or any appurtenances connected or attached to such buildings or structures. The term applies but is not limited to the repair, replacement modification or construction of roads, bridges, sidewalks, traffic devices, parking lots, drainage, underground and overhead utilities.

*CONSULTANT* is the person lawfully licensed to practice Architecture or Engineering and registered in the State of Florida, or an entity lawfully practicing Architecture or Engineering, identified as such in the Construction Contract, and is referred to throughout the Contract Documents as if singular in number and masculine in genre. The term CONSULTANT means the Architect or Engineer or his authorized representative.

*CONTRACT DOCUMENTS* consist of the Invitation to Bid, Agreement, General and Special Conditions of the Contract, Specifications, the Plans, Supplemental Information, Addenda issued prior to execution of the Contract, all written modifications issued after execution of the Contract, all provisions required by law to be inserted in this Contract whether actually inserted or not, and a Contract Number issued by the COUNTY.

A *MODIFICATION* is:

- (1) A written Amendment to the Contract.
- (2) A Change Order.
- (3) A written interpretation necessary for the proper execution or progress of the Work issued by the OWNER'S Representative.
- (4) A Field Change Order.
- (5) A Field Directive Change.

*CONTRACT PRICE* means the total monies payable to the CONTRACTOR under the Contract Documents.

*CONTRACT TIME* means the number of Calendar days stated in the Agreement for the purpose of establishing Substantial Completion and Final Completion dates.

*CONTRACTOR* is the person, firm, joint venture, or corporation with whom the COUNTY has contracted and who has the primary responsibility for performance of the work.

*COUNTY* means the Board of County Commissioners of Lee County, Florida, a political subdivision of the State of Florida, its successors and assigns. Also hereinafter referred to as OWNER.

*DAYS* - The term “day” as used in the Contract Documents shall mean calendar day unless otherwise specifically designated. A calendar day constitutes twenty four hours measured from midnight to the next midnight.

*DEFECTIVE* - An adjective which when modifying the word “Work” refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to the OWNER’S REPRESENTATIVE recommendation of final payment.

*EFFECTIVE DATE OF THE AGREEMENT* means the date on which the agreement is signed and delivered by the latter of the two parties.

*ENGINEER* shall mean the Director of the Lee County Department of Transportation or his designated County Project Manager.

*FIELD CHANGE ORDER* is a written change order requested by the OWNER’S Representative, accepted by the CONTRACTOR, and approved by the PROJECT MANAGER for minor changes in the Work, not involving adjustments in the Contract Sum or an extension of Time, and not inconsistent with the overall intent of the Contract Documents.

*FIELD DIRECTIVE CHANGE* - A written directive to the CONTRACT, issued on or after the effective date of the Agreement ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as defined elsewhere in these documents. A Field Directive Change may not change the Contract Price or the Contract Time, but is evidence that the parties expect that the change directed or documented by a Field Directive Change will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or the Contract Time.

*FINAL ACCEPTANCE* means acceptance of the Work by the COUNTY upon the expiration of the warranty period as stated in the Contract Documents.

*MATERIALS* - Anything used in the process of, but not limited to, constructing, demolishing, renovating or remodeling of any building, structure, road, bridge, recreational facility, transportation element and utility or any addition thereto utilized for this project.

*NOTICE* means written notice. Notice shall be served upon the CONTRACTOR either personally or by leaving the said Notice at his residence or with his agency in charge of the Work, or addressed to the CONTRACTOR at the residence or place of business stated in the Bid Proposal and deposited in a postpaid wrapper in any United States Mailbox.

*NOTICE TO PROCEED* is a written instrument issued by the COUNTY to the CONTRACTOR, authorizing the CONTRACTOR to commence Work on the Project. The NOTICE TO PROCEED shall include the effective date of Commencement.

*NOTICE OF AWARD* means the written Notice given by the COUNTY to the successful Bidder.

*NOTICE OF TERMINATION* is a written instrument issued in accordance with the Contract Documents by the COUNTY to the CONTRACTOR or by the CONTRACTOR to the COUNTY notifying the receiving party that the Contract is being terminated. The NOTICE shall clearly identify the effective date the Contract is to be terminated.

*OWNER'S REPRESENTATIVE* is the CONSULTANT contracted by the COUNTY for Professional Services during the construction phase of this project or a qualified person authorized as his official representative, or in the absence of such a contract, the project Manager will be considered the OWNER'S REPRESENTATIVE for the purpose of this Contract Document. The OWNER'S REPRESENTATIVE is not authorized to issue change orders to the contract sum, contract time or scope of work without express approval of the Board of County Commissioners.

*PLANS AND/OR DRAWINGS* are a graphic representation of the arrangement of the materials or parts of the construction of the project and are a portion of the Contract Documents.

*PROCUREMENT MANAGEMENT* shall mean the Director of Lee County's Procurement Management Department or designee.

*PROJECT* shall mean the entire improvement of which this contract forms a part.

*PROJECT MANAGER* is an employee of the Department or the COUNTY which requested the Contract and is a designee authorized by or for that Department who is the representative of the Board of County Commissioners in matters concerning the contractor of this project. The project manager will act as the OWNER'S REPRESENTATIVE in the absence of a contract with a CONSULTANT. The PROJECT MANAGER is not authorized to issue changes to the Contract Sum, Contract Time, or Scope of Work without express approval by the Department Director, County Manager, or Board of County Commissioners.

The PROJECT MANAGER, within the authority conferred by the Board of County Commissioners, acting as the COUNTY'S designated representative shall initiate written Change Orders, and notification to the CONTRACTOR of any and all changes approved by the COUNTY in the CONTRACTOR'S (1) compensation (2) time and/or schedule of service delivery; (3) any Amendment (s) or other change(s) relative to the WORK and ADDITIONAL SERVICES pursuant to this Contract, or AMENDMENTS, or CHANGE ORDERS pertaining thereto. Following COUNTY approval, the Project Manager shall coordinate assurance of any such documents. The PROJECT MANAGER or his designee shall be responsible for acting on the COUNTY'S behalf to administer, coordinate, interpret and otherwise manage the contractual provisions and requirements set forth in this Contract, or any AMENDMENT(S), or CHANGE ORDER(S) issued there under.

*SPECIFICATIONS* are written documents organized into divisions, sections, and articles which provide detailed instructions to the CONTRACTOR pertaining, but not limited to, materials, style, workmanship, fabrication, dimensions, colors, warranties, finishes, quality, manufacturer, grade and

operational data of all components to be provided by the CONTRACTOR and incorporated into the Project.

*SUB-CONTRACTOR* is a person, firm, partnership, corporation, or entity who has a direct contract with the CONTRACTOR to perform any of the Work at the site. The term Sub-contractor does not include those whose sole purpose is that of a supplier of materials. A supplier of materials shall be classified as a Sub-contractor if it enters into any agreement, whether written or verbal, for the installation of said materials. The term Sub-contractor means a Sub-contractor or its authorized representative.

*SUPPLIER* - A manufacturer, fabricator, distributor, materialmen or vendor.

*SURETY* is the surety company or individual that is bound by Contract bond with and for the CONTRACTOR who is primarily liable, and is responsible for CONTRACTOR'S acceptable performance of the Project and payment of all debts pertaining to the Contract Documents in accordance with Section 255.05, Florida Statutes.

*UNDERGROUND FACILITIES* - All pipeline, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

*WORK* is the construction required by the Contract Documents and includes all labor necessary to produce such construction, and all materials and equipment incorporated or to be incorporated in such construction.

## 2. Starting the Work

Written Notice to Proceed is contingent upon and will be done subsequent to the CONTRACTOR fully satisfying the COUNTY'S stated insurance and Bond submittal requirements. Until the CONTRACTOR receives the COUNTY'S written Notice to Proceed, the CONTRACTOR is advised that the COUNTY will not be liable for any expenses which the CONTRACTOR may incur relative to this Contract before the written Notice to Proceed is issued.

- 2.1. The Contract time shall commence to run from the date specified in the "Notice to Proceed".
- 2.2. The CONTRACTOR is required, before commencing the Work, to deliver to the COUNTY the Public Payment and Performance Bond issued by a surety insurer authorized to do business in the State of Florida as Surety. The Bond must state the name and principal business address of both the principal and the Surety and must contain a description of the project sufficient to identify it and post in conspicuous place at the project site.
- 2.3. The COUNTY will forward to the CONTRACTOR a Notice of Commencement along with a copy of the recorded Public Payment and Performance Bond with instructions to post in a conspicuous spot on the project site.

## 3. Interpretation Intent, Amending and Reuse of Contract Documents

It is the intent of the Specifications and Plans to describe a complete Project to be constructed in accordance with the Contract Documents.

- 3.1 The Contract Documents are complementary; what is called for by one is as binding as if called for by all. If the CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents,

he shall immediately call it to the attention of the OWNER'S REPRESENTATIVE in writing before proceeding with the Work affected thereby.

3.2 Any Work that may be reasonably inferred from the specifications or Drawings as being required to produce the intended result shall be supplied whether or not it is specifically called for.

3.3 Work, materials or equipment described in words which have a well-known technical or trade meaning, shall be deemed to refer to such recognized standards.

3.4 In resolving conflicts, errors, and discrepancies, the order of precedence of the Contract Document is as follows:

- (1) Change Order
- (2) Agreement
- (3) Addenda
- (4) Special Conditions
- (5) General Conditions
- (6) Specifications
- (7) Supplemental Information
- (8) Drawings
- (9) Figure Dimensions
- (10) Scale Dimensions (Large Scale Drawings supersede Small Scale Drawings)
- (11) Terms and Conditions

3.5 Amending and Supplementing Contract Documents

The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

3.5.1 A formal Written Amendment,

3.5.2 A Change Order.

3.5.3 A Field Directive Change.

The Contract Price and the Contract Time may only be changed by a Change Order or Written Amendment.

3.6 In addition, the requirements of the Contract Documents may be supplemented and minor variations and deviations of the Work may be authorized, in one or more of the following ways:

3.6.1 A Field Change Order,

3.6.2 The OWNER'S REPRESENTATIVE approval of a Shop Drawing or sample, or

3.6.3 The OWNER'S REPRESENTATIVE written interpretation or clarification.

3.7 Reuse of Documents

Neither the CONTRACTOR nor any SUB-CONTRACTOR or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with the COUNTY shall have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of the CONSULTANT; and they shall not reuse any of them on extensions of the Project or any other project without written consent of the COUNTY or their CONSULTANT and the specific written

verification or adaptation by the CONSULTANT.

#### **4 Availability of Lands**

The COUNTY will furnish, as indicated in the Contract Documents and not later than the date when needed by the CONTRACTOR, the lands upon which the Work is to be done, rights-of-way for access thereto, and such other lands which are designated for the use of the CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained by the COUNTY unless otherwise specified in the Contract Documents. If the CONTRACTOR believes that any delay in the COUNTY'S furnishing these lands or easements entitles him to an extension of the Contract Time, he may make a claim therefore. The CONTRACTOR will provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment unless designated otherwise. The OWNER'S REPRESENTATIVE will, upon request, furnish to the CONTRACTOR copies of all available boundary and topographic surveys as required and sub-surface tests. The CONTRACTOR shall be responsible for staging and storing equipment or materials. All parcels utilized for staging shall be secured. All parcels utilized for staging will be kept in a neat and orderly fashion and then restored to the landowner's satisfaction upon terminating the use of the staging area or improved as noted in the plans. The CONTRACTOR shall maintain on the job site written proof of authorization for the use of any private land. The COUNTY does not condone trespass on private property and will hold the CONTRACTOR liable for any such trespass. Right-of-way maps, if available, of the lands upon which the improvements will be made shall be provided upon request from the OWNER'S REPRESENTATIVE. The CONTRACTOR may use these lands for work associated with this contract only. The CONTRACTOR shall verify the availability of these lands with the Lee County D.O.T. project manager prior to the issuance of the notice to proceed.

##### **4.1 Physical Conditions**

Explorations and Reports: Reference is made to the Supplemental Information for identification of those reports of explorations and tests of subsurface conditions at the site that have been utilized by the CONSULTANT and/or the COUNTY in preparation of the Contract Documents. These reports are not part of the contract Documents. The CONTRACTOR may rely upon the accuracy of the technical data contained in such reports but not upon the non-technical data, interpretations or opinions contained therein for the completeness or accuracy thereof for the CONTRACTOR'S purposes of preparing or submitting a bid. Except as indicated in the immediately preceding sentence, the CONTRACTOR shall have full responsibility with respect to subsurface conditions at the site. The technical data which will be made available only at the CONTRACTOR'S request may not be sufficient for construction purposes. Additional investigations may be necessary for the purposes of carrying out the construction project.

4.2 Existing Structures: Reference is made to the Supplemental Information for identification of those drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities) which are at or contiguous to the site that have been utilized by the CONSULTANT and/or the COUNTY in preparation of the Contract Documents. The CONTRACTOR may rely upon the accuracy of the technical data contained in such drawings but not for the completeness thereof for the purposes of preparing or submitting a bid. Except as indicated in the immediately preceding sentence, the CONTRACTOR shall have full responsibility with respect to physical conditions in or relating to such structures.

4.3 Unless otherwise stated, the CONTRACTOR shall be fully responsible for the removal of any materials, debris, garbage, vehicles or other such items which would interfere with the undertaking and completion of the project. By submission of a bid, the CONTRACTOR assumes full responsibility for the expenses associated with such removal. There shall not be an increase in time or price associated with such removal.



- 4.4 Report of Differing Conditions: If the CONTRACTOR believes that:
- 4.4.1.1 Any technical data on which the CONTRACTOR is entitled to is inaccurate, or
  - 4.4.1.2 Any physical condition uncovered or revealed at the site differs materially from that indicated, reflected or referred to in the Contract Documents.
  - 4.4.1.3 The CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work in connection therewith (except in an emergency as permitted) notify the OWNER'S REPRESENTATIVE in writing about the inaccuracy or difference.
- 4.5 OWNER'S REPRESENTATIVE Review: The OWNER'S REPRESENTATIVE will promptly review the pertinent conditions, determine the necessity of obtaining additional explorations or tests with respect thereto and advise the COUNTY in writing (with a copy to the CONTRACTOR) of the OWNER'S REPRESENTATIVE'S findings and conclusions.
- 4.6 Possible Document Change: If the OWNER'S REPRESENTATIVE and the COUNTY conclude that there is a material error in the Contract Documents and a change in the Contract Documents is required, a Field Directive Change, a Field Change or a Change Order will be issued as to reflect and document the consequences of the inaccuracy or difference.
- 4.7 Possible Price and Time Adjustments: In each case of a material error in the Contract Documents, an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, or any combination thereof, will be allowable to the extent that they are attributable to any such inaccuracy or difference.
- 4.8 Physical Conditions - Underground Facilities
- Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on information and data furnished to the COUNTY or the CONSULTANT by the owners of such Underground facilities or by others. Unless it is otherwise expressly provided in the Supplemental Information:
- 4.8.1 The CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all Underground Facilities shown or indicated in the Contract Documents, for coordination of the Work with the owners of such Underground Facilities during construction, for the safety and protection thereof and for repairing any damage thereto resulting from the Work, the cost of all of which will be considered as having been included in the Contract Price. The CONSULTANT and COUNTY shall not be responsible for the accuracy or completeness of any such information or data.
- 4.9 Not Shown or Indicated: If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of, the CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work affected thereby (except in an emergency as permitted) identify the owner of such Underground Facility and give written notice thereof to that owner and to the OWNER'S REPRESENTATIVE. The OWNER'S REPRESENTATIVE will promptly review the Underground Facility to determine the extent to which the Contract Documents should be modified to reflect and document the consequences of the existence of the Underground Facility, and with the COUNTY'S approval, the Contract Documents will be amended or supplemented to the extent necessary. During such time, the CONTRACTOR shall be responsible for the safety and protection of such Underground Facility. The CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, to the extent that they are attributable to the existence of any Underground Facility that was not shown or indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of. Locations of existing

underground utilities are not field confirmed. In the case of a conflict between this or any other utility and proposed improvements, it shall be the CONTRACTOR'S duty to coordinate with all utility company relocation activities whether shown or not shown in the plans. Coordination is to include efforts by the CONTRACTOR to minimize time lost due to unexpected utility relocation or modifications.

#### 4.10 Reference Points

The COUNTY shall provide engineering surveys to establish reference points, as specified in the Supplemental Information, for construction which in the judgment of the COUNTY and the CONSULTANT are necessary to enable CONTRACTOR to proceed with the Work. The CONTRACTOR shall be responsible for laying out the Work (unless otherwise specified in the Technical Specifications), shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of the COUNTY. The CONTRACTOR shall report to the OWNER'S REPRESENTATIVE whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.

### 5 Bonds and Insurance

#### 5.1 Public Payment and Performance Bond

The CONTRACTOR will execute the Public Payment and Performance Bonds included herein as security for the faithful performance and payment of all his obligations under the Contract Documents.

5.2 This Bond shall be in amounts at least equal to the Contract Price and in such form and with such securities as are acceptable to the COUNTY. Prior to execution of the Contract Documents, the COUNTY may require the CONTRACTOR to furnish such other bonds, in such form and with such sureties as it may require. If such bonds are required by written instructions given prior to opening of Bids, the Premiums shall be paid by the CONTRACTOR. If the Contract is increased by a Change Order, it shall be the CONTRACTOR'S responsibility to insure that the Public Payment and Performance Bond be amended accordingly and a copy of the amendment forwarded to PROCUREMENT MANAGEMENT.

5.3 If the surety on any bond furnished by the CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in the State of Florida or it ceases to meet the requirements imposed by the Contract Documents, the CONTRACTOR shall within five calendar days thereafter substitute another Bond and Surety, both of which shall be acceptable to the COUNTY.

5.4 If the CONTRACTOR cannot obtain another bond and surety within five calendar days the COUNTY will accept and the CONTRACTOR shall submit an irrevocable letter of credit drawn on a Lee County, Florida bank until the bond and surety can be obtained.

### 6 Qualifications of Surety Companies

In order to be acceptable to the COUNTY, a surety company issuing Bid Guaranty Bonds or 100% Public Payment and Performance Bonds, called for in these specifications, shall meet and comply with the following minimum standards:

#### 6.1 General

All Sureties for Lee County projects must be authorized to do business in the State of Florida and shall comply with the provisions of Florida Statute 255.05.

6.2 Attorneys-in-Fact who sign bid bonds or Public Payment and Performance Bonds for Lee County projects must file with such bond a certified copy of their Power of Attorney to sign such bond.

6.3 Agents of surety companies must list their name, address, and telephone number on all bonds.

- 6.4 The life of all bonds provided to Lee County shall extend twelve months beyond the date of final payment and shall contain a waiver of alteration to the terms of the Contract, extensions of time and/or forbearance on the part of the COUNTY.
- 6.5 To be acceptable to the OWNER on projects not in excess of \$500,000.00, Surety shall comply with these minimum provisions of State Statute 287.0935 as follows:
- 6.5.1 Surety must have twice the minimum surplus and capital required by Florida Insurance Code at the time of bid solicitation.
- 6.5.2 Surety must be in compliance with all provisions of the Florida Insurance Code and hold a currently valid certificate of authority issued by the United States Department of the Treasury under SS.31 U.S.C. 9404-9308.
- 6.5.3 Sureties on projects in excess of \$500,000.00 shall comply with the above minimum provisions as well as being rated thru A.M. Best Company and shall comply with the following provisions:
- 6.5.4 The Surety shall be rated as “A-“ or better as to General Policyholders Rating and Class VII or better as to financial category by the most current Best’s Key Rating Guide, published by A.M. Best Company.
- 6.5.5 Surety must have fulfilled all of its obligations on all other bonds previously given to the COUNTY.
- 6.5.6 Surety must have a minimum underwriting limitation of \$5,000,000 published in the latest edition of the Federal Register for Federal Bonds (U.S. Dept. of Treasury).
- 6.6 Letter of Credit  
At any time during the life of the letter of credit, should the rating of financial institution fall below both of the minimum ratings as indicated in the Contract Documents, or should the financial institution become insolvent, the CONTRACTOR must, within five calendar days after notification by the COUNTY:
- 6.6.1 Replace the existing letter of credit with a replacement letter of credit from a financial institution with either of the minimum ratings as specified in the Contract Documents, or
- 6.6.2 Have the existing letter of credit confirmed by a financial institution with either of the minimum ratings as specified in the Contract Documents.
- 6.6.3 At the COUNTY’S option, the letter of credit may be replaced by a Public Payment and Performance Bond in accordance with the COUNTY’S existing bond policies.
- 6.7 Failure to comply with this provision may result in any or all of the following actions by the COUNTY:
- 6.7.1 Suspension of the CONTRACTOR’S right to pull building permits and schedule inspections;
- 6.7.2 A stop work order; and/or Revocation of the Land Development Permit.
- 6.8 Financial Institutions/Letters of Credit  
In order to be acceptable to the COUNTY, a financial institution issuing 100% Letters of Credit, called for in these specifications, shall meet and comply with the following minimum standards:
- 6.8.1 General  
The face of the letter of credit must be in a format utilizing Lee County Standard Form and indicate the following:
- 6.8.1.1 The letter of credit is “clean” and “irrevocable”;
- 6.8.1.2 An exact expiration date. The life of all letters of credit provided to Lee County shall extend twelve months beyond the date of final payment;
- 6.8.1.3 Statement of the purpose or project for which the letter of credit is issued;
- 6.8.1.4 A specific amount of the letter of credit, in U.S. dollars;

- 6.8.1.5 The method of disbursement of draws against the letter of credit;
- 6.8.1.6 The street address where draws against the letter of credit may be made; and
- 6.8.1.7 Venue in Lee County.
- 6.8.1.8 Verification of the status or certification of any financial institution may be made with:  
Department of Insurance and Treasurer  
Bureau of Collateral Securities  
200 East Gaines Street  
Tallahassee, FL 32377-0345  
Phone (850) 922-3167  
  
Or  
  
Lee County Procurement Management  
1500 Monroe Street, 4<sup>th</sup> Floor  
Fort Myers, FL 33901  
Phone (239) 533-8881  
  
Or  
  
Lee County Risk Management  
2115 Second Street  
Fort Myers, FL 33901  
Phone (239) 533-2221
- 6.8.1.9 At the time of issuance of the letter of credit, the financial institution must have a minimum “peer group” rating of 50 in the latest Sheshunoff Quarterly Listing or a minimum rating of 125 in the latest IDC Bank Financial Quarterly Listing.
- 6.8.1.10 Letters of Credit from financial institutions which do not meet either of the minimum ratings indicated above must be confirmed by a financial institution with either of the minimum ratings indicated above.
- 6.8.1.11 All financial institutions which issue or confirm any Letter of Credit must be authorized by the Secretary of State to do business in the State of Florida, shall show proof of same upon request by COUNTY staff, and agree to venue in Lee County.
- 6.8.1.12 In addition to the institutions meeting the aforementioned requirements, the Federal Home Loan Bank of Atlanta is authorized to issue and confirm letters of credit which are in accordance with the provisions above and all subsequent sub-paragraphs.
- 6.8.1.13 These actions shall be in effect until a satisfactory replacement bond or letter of credit is accepted by the COUNTY. The CONTRACTOR agreement shall so provide for replacement or confirmation in accordance with this policy.

## **7 Contractor’s Liability Insurance**

- 7.1 The CONTRACTOR will purchase and maintain such insurance as will protect him from claims under Worker’s Compensation laws, disability benefit laws or other similar employee benefit laws; from claims for damages because of bodily injury, occupational sickness or disease, or death

of his employees including claims insured by usual personal injury, sickness and disease, or death of any person other than his employees including claims insured by usual personal injury liability coverage; and from claims for injury to or destruction of tangible property including loss of use resulting there from any or all of which may arise out of or result from the CONTRACTOR'S operations under the Contract Documents, whether such operations be by himself or any Sub-contractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be legally liable. This insurance shall be written for no less than the limits of liability specified in the Contract Documents or required by law, whichever is greater, and shall include contractual liability insurance. As a prerequisite to the COUNTY signing the Contract, the CONTRACTOR will file with the COUNTY certificates of such insurance, acceptable to the COUNTY; these certificates shall contain a provision for cancellation.

## 7.2 Insurance Requirements

7.2.1 Before final execution of the Agreement and until acceptance of the Work by the COUNTY, the CONTRACTOR shall procure and maintain insurance of the types and the limits specified by the Insurance Guide included in the Solicitation.

7.2.2 All CONTRACTOR'S Certificates of Insurance must be approved by the Lee County Risk Manager (or designee) before the final execution of the agreement by the COUNTY.

7.2.3 An Insurance Certificate shall be required from the successful BIDDER. Such form must be properly executed and submitted by an authorized representative of the insurance company and successful BIDDER within seven calendar days after notification by Lee County of the Board of County Commissioners' approval to award the contract. Such certificate of insurance state that the coverage is primary, and shall be in the types and amounts stated in the Contract Documents. Certificate should include producers' phone number and reference the name of the project.

## 8 Contractor's Responsibilities

### 8.2 Supervision and Superintendence

8.1.1 The CONTRACTOR will supervise and direct the Work efficiently. He will be solely responsible for the means, methods, techniques, sequences, safety, and procedure of construction, unless otherwise specified. The CONTRACTOR will be responsible to see that the finished Work complies with the Contract Documents.

8.1.2 The CONTRACTOR will keep on the site at all times when work is being performed, a competent, resident superintendent who shall not be replaced without prior written notice to the OWNER'S REPRESENTATIVE. The superintendent will be the CONTRACTOR'S representative at the site and shall have authority to act on behalf of the CONTRACTOR. All communications given to the superintendent shall be binding as if given to the CONTRACTOR.

## 9 Labor Material and Equipment

9.1 The CONTRACTOR will provide competent, suitable, qualified personnel to lay out the Work and perform construction as required by the Contract Documents. He will at all times maintain good discipline and order at the site.

9.2 The CONTRACTOR will furnish all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, heat, light, telephone, water and sanitary facilities and incidentals necessary for the execution, testing, initial operation and completion of the Work unless otherwise specified. All materials and equipment such as concrete pipe, inlets,

manhole covers, etc., furnished by the CONTRACTOR shall be made by the same manufacturer, e.g., all pipe by one company, all inlets by one company, etc.

- 9.3 All materials and equipment will be new except as otherwise provided in the Contract Documents. If required by the OWNER'S REPRESENTATIVE, the CONTRACTOR will furnish satisfactory evidence as to the kind and quality of materials and equipment furnished.
- 9.4 All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturers, fabricator or processors except as otherwise provided in the Contract Documents.
- 9.5 In instances where the act is applicable due to the nature of the bid matter with which this bid package is concerned, all material, equipment, etc., as proposed and offered by CONTRACTOR must meet and conform to all O.S.H.A. requirements; the CONTRACTOR'S signature upon the bid proposal form being by this reference considered a certification of such fact.

## **10 Adjusting the Progress Schedule**

- 10.1 The CONTRACTOR shall submit to the OWNER'S REPRESENTATIVE for acceptance of adjustments in the progress schedule to reflect the impact thereon of new developments; these will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the Contract Documents applicable thereto. The COUNTY reserves the right to reject the progress schedule from the CONTRACTOR which in its judgment does not appear to devote sufficient resources of manpower to enable the timely completion of the project. If the COUNTY requests the progress schedule to be adjusted, the CONTRACTOR shall do so and perform the work according to the adjusted schedule at no additional cost to the COUNTY.

## **11 Substitute Materials or Equipment**

- 11.1 If it is indicated in the specifications that the CONTRACTOR may furnish or use a substitute that is equal to any material or equipment specified, and if the CONTRACTOR wishes to furnish or use a proposed substitute, he will, within thirty calendar days after the award of the Contract, make written application to the OWNER'S REPRESENTATIVE for approval of such a substitute, certifying in writing that the proposed substitute will perform adequately the duties imposed by the general design, be similar and of equal substance to that specified and be suited to the same use and capable of performing the same function as that specified. No substitute shall be ordered or installed without the written approval of the COUNTY who shall be the judge of quality. Whether or not the COUNTY accepts a proposed substitute, the CONTRACTOR shall reimburse the COUNTY for any charges or cost for evaluating any proposed substitute.

## **12 Concerning Sub-contractors**

- 12.1 The CONTRACTOR will be fully responsible for all acts and omissions of his SUB-CONTRACTORS and of persons directly or indirectly employed by them and of persons for whose acts they may be liable to the same extent that they are employed by him. Nothing in the Contract Documents shall create any contractual relationship between any SUB-CONTRACTOR and the COUNTY. The COUNTY may, upon request, furnish to any SUB-CONTRACTOR, to the extent practicable, evidence of amounts paid to the CONTRACTOR on account of specific Work done.
- 12.2 The divisions and sections of the specifications and the identifications of any Drawings shall not control the CONTRACTOR in dividing the Work among SUB-CONTRACTORS or delineating the Work to be performed by any specific trade.
- 12.3 The CONTRACTOR agrees to bind specifically every SUB-CONTRACTOR to the applicable

terms and conditions of these Contract Documents for the benefit of the COUNTY.

- 12.4 All Work performed for the CONTRACTOR by a SUB-CONTRACTOR shall be pursuant to an appropriate agreement between the CONTRACTOR and the SUB-CONTRACTOR which shall contain provisions that waive all rights the contracting parties may have against one another for damages caused by fire or perils covered by insurance, except such rights as they may have to the proceeds of such insurance held by the COUNTY as trustee.

### 13 Patent Fees and Royalties

- 13.1 The costs involved in fees, royalties, or claims for any patented invention, article, process or method that may be used upon, or in a manner connected with the work under this contract, shall be paid by the CONTRACTOR. The CONTRACTOR and his sureties, together with his officers, agents, and employees, shall protect and hold the COUNTY harmless against any and all demands made for such fees or claims brought or made by holder of any invention or patent. Before final payment is made on the account of this Contract, the CONTRACTOR shall, if requested by the COUNTY, furnish acceptable proof of a proper release from all such fees or claims.
- 13.2 Should the CONTRACTOR, his agent, employee, or any of them be enjoined from furnishing or using any invention, article, material or plans supplied or required to be supplied or used under this contract, the CONTRACTOR shall promptly pay such royalties and secure the requisite licenses; or, subject to acceptance by the COUNTY, substitute other articles, materials or appliances in lieu thereof which are of equal efficiency, quality, finish, suitability and market value to those planned or required under the contract. Descriptive information of these substitutions shall be submitted to the OWNER'S REPRESENTATIVE for determination of general conformance to the design concept and the construction contract. Should the COUNTY elect to use the substitution, the CONTRACTOR agrees to pay such royalties and secure such valid licenses as may be requisite for the COUNTY, his officers, agents, and employees, or any of them, to use such invention, article, material, or appliance without being disturbed or in any way interfered with by any proceeding in law or equity on account thereof.

### 14 Permits

- 14.1 Unless otherwise specified herein, the CONTRACTOR will secure and pay for all permits, impact fees, and licenses and will pay all governmental charges and inspections' fees necessary for the prosecution of the Work which are applicable at the time of his bid. The CONTRACTOR will also pay all public utility charges and connection fees except as provided for in the Contract Documents. Permits and licenses of regulatory agencies which are necessary to be maintained after completion of the guarantee period shall be secured and paid for by the COUNTY.
- 14.2 Pursuant to the requirements of F.S. 218.80, the following County permits and fees are required to be obtained and paid for by the CONTRACTOR.
- [DETAILS OF PERMITTING RESPONSIBILITIES]**
- 14.2 This is a disclosure of permits and fees, required by Lee County, for this project and does not relieve the contractor of its responsibility to obtain and pay for permits required by other governmental entities as specified elsewhere in this document.
- 14.3 The CONTRACTOR will give all notices and comply with all laws, ordinances, rules and regulations applicable to the Work. If the CONTRACTOR observes that the Specifications or Drawings are at a variance therewith, he will give the OWNER'S REPRESENTATIVE prompt written notice thereof, and any necessary changes shall be adjusted by an appropriate modification. If the CONTRACTOR performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations and without such notice to the OWNER'S REPRESENTATIVE, he will bear all cost arising therefrom; however, it shall not be his primary responsibility to make

certain that the Drawings and Specifications are in accordance with such laws, ordinances, rules and regulations.

## **15 Licenses**

15.1 The CONTRACTOR must be properly licensed, within the jurisdiction where the project is to be constructed, to perform the work specified in the Scope of Work at the time of bid submittal.

## **16 Use of Premises**

16.1 The CONTRACTOR will confine his equipment, the storage of materials and equipment, and the operations of his workmen to the areas permitted by law, ordinances, permits or the requirements of the Contract Documents and shall not unreasonably encumber the premises with materials or equipment.

## **17 Record Drawings**

17.1 The CONTRACTOR will keep one record copy of all Specifications, Drawings, Addenda, Modifications and Shop Drawings at the site in good order, and annotated to show all changes made during the construction process or addition and exact location of underground or otherwise concealed components such as, but not limited to, plumbing, air conditioning, electric, culverts, drainage structures, water main, force mains, service lines, wiring, traffic loops, pond or ditch bottoms and banks, signal poles, signs, and conduit which were not installed exactly as shown on the contract drawings. These shall be available to the OWNER'S REPRESENTATIVE and shall be verified by the OWNER'S REPRESENTATIVE at 30%, 60%, and 100% completion of the Project. The CONTRACTOR shall submit to the OWNER'S REPRESENTATIVE one complete set of all recorded changes made during Construction entitled "As-Built", and dated. Submittals shall be made in accordance with the above and shall be submitted at the time of substantial completion.

17.2 The sum of \$5,000.00 shall be withheld from the final payment until written acceptance or all of the Record Drawings by the OWNER'S REPRESENTATIVE has occurred.

17.3 Certified "as-built" information, which the CONTRACTOR must show on marked-up copies of the design drawings, prints, and other materials as specified above shall include both authorized and unauthorized changes to horizontal pavement dimensions, finish pavement grades, finish dimensions, elevations and alignment of the items noted in Article 17.1, and any modifications to material types from that specified in the bid plans and specifications. As a prerequisite to any payments, the CONTRACTOR shall make available to the Engineer all "as-built" information pertinent to the design drawings each month prior to his submission of a monthly application for payment. The CONTRACTOR shall also obtain "as-built" cross-sections of the roadway, ditches, channels, and other drainage ways as shown in the Contract Documents at intervals not to exceed 100 ft. The CONTRACTOR shall set benchmarks on or within 100 ft. of each control structure constructed as part of this project. A complete description including elevation and location of each control structure benchmark shall be provided to the Engineer as part of the "as-built" information. The elevation shall be clearly and permanently indicated on each benchmark.

17.4 "As-built" dimensions and elevations shall be obtained by a Professional Land Surveyor registered in the State of Florida pursuant to Chapter 472, Florida Statutes. The "as-built" drawings shall be signed and sealed by the CONTRACTOR'S Professional Land Surveyor in accordance with Section 472.025, Florida Statutes.

17.5 All pertinent surveyors' field survey notes containing the "as-built" data shall be sealed and submitted to the Engineer for review and acceptance prior to authorization of the final payment.

17.6 "As-built" data shall be secured and the accuracy of measurements shall be 0.01 ft.

17.7 All sub-surface improvements considered part of the Work as shown in the Contract Documents shall be "as-built" by the CONTRACTOR prior to backfilling.

17.8 A final bench level circuit shall be secured indicating accuracy of vertical closure and a copy of



these field notes shall be submitted to the Engineer before final acceptance of the project.

- 17.9 The CONTRACTOR shall annotate and show all “as-built” information on 11” x 17” prints of the bid plans during the course of the construction process. Upon completion of all contract work, but prior to authorization of the final payment by the Engineer, the CONTRACTOR shall deliver one (1) set of such annotated, in neat draftsman-like manner, “as-built” 11” x 17” prints to the Engineer for approval. Upon approval of such “as-built” plans, the CONTRACTOR shall forthwith provide two (2) sets of these drawings containing all “as-built” information, a CD of the “as-built” electronic files in AutoCAD or MicroStation format and data which have been sealed by a Professional Land Surveyor by the CONTRACTOR at the CONTRACTOR’S cost and forthwith become the property of the COUNTY.
- 17.10 The cost of preparing, maintaining, and providing “as-built” plans and documents as specified in this Article must be included in the Lump Sum payment for mobilization for each part of the Bid Schedule providing for Mobilization.
- 17.11 Shop drawing submittals processed by the Engineer shall not be construed as Change Orders; the purpose of a shop drawing is to demonstrate to the Engineer that the CONTRACTOR understands the design concept, and that his understanding is demonstrated by indicating the equipment and material to be furnished and installed. Corrections or changes indicated by the Engineer in the shop drawings do not constitute authorization to perform extra work.
- 17.12 The review of shop drawings and schedules shall be considered general and shall not be construed as permitting any departures from the contract requirements. The design drawings and contract specifications shall take precedence over the shop drawings in the event of deviations, discrepancy, or conflict.

## **18 Safety and Protection**

- 18.1 The CONTRACTOR will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. He will take all necessary precautions for the safety of and will provide the necessary protection to prevent damage, injury or loss to:
- 18.1.1 All employees on the Project and other persons who may be affected thereby;
- 18.1.2 All the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site; and
- 18.1.3 Other property at the site or adjacent thereto including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
- 18.1.4 The CONTRACTOR will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. He will erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection and, in addition, he will comply with all applicable recommendations of the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, Inc.; "Roadway and Traffic Design Standards" latest edition published by the Florida Department of Transportation, specifically Index 600-650; and Occupational Safety and Health Administration published by the United States Department of Labor. He will notify owners of adjacent utilities when prosecution of the Work may affect them. All damage, injury or loss to any property caused directly or indirectly, in whole or in part by the CONTRACTOR, any SUB-CONTRACTOR, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable will be remedied by the CONTRACTOR; except any damage or loss attributable to the fault of the Drawings or the Specifications or to the acts or omissions of the COUNTY, and not attributable, directly or indirectly, in whole or in part, to the fault of negligence of the

**CONTRACTOR.**

- 18.1.5 The CONTRACTOR will designate a member of his organization whose responsibility will be to plan for the prevention of accidents at the site. This person shall be the CONTRACTOR'S Superintendent unless otherwise designated in writing by the CONTRACTOR to the OWNER'S REPRESENTATIVE.

**19 Emergencies**

- 19.1 In emergencies affecting the safety of persons, the Work or property at the site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the COUNTY, is obligated to act at his discretion to prevent threatened damage, injury or loss. He will give the OWNER'S REPRESENTATIVE prompt written notice of any significant changes in the Work or deviations from the Contract Documents caused thereby. If the COUNTY and the OWNER'S REPRESENTATIVE determine that a change to the Contract Documents is required because of the action taken in response to an emergency, a Field Directive Change or Change Order shall thereupon be issued covering the changes and deviations involved.

**20 Shop Drawings and Samples**

- 20.1 After checking and verifying all field measurements, the CONTRACTOR will submit to the OWNER'S REPRESENTATIVE for approval, in accordance with the acceptable schedule of Shop Drawing submission, five copies (or at the option of the OWNER'S REPRESENTATIVE, one reproducible copy) of all Shop Drawings, which shall have been checked by and stamped with the approval of the CONTRACTOR and identified as the OWNER'S REPRESENTATIVE may require. The data shown on the Shop Drawings will be complete with respect to dimensions, design criteria, materials of construction and the like to enable the OWNER'S REPRESENTATIVE to review the information as required.
- 20.2 The CONTRACTOR will also submit to the OWNER'S REPRESENTATIVE for approval with such promptness as to cause no delay in the Work, all samples required by the Contract Documents. All samples will have been checked by and stamped with the approval of the CONTRACTOR, identified clearly as to material, manufacturer, any pertinent numbers and the use for which intended.
- 20.3 At the time of each submission, the CONTRACTOR will in writing call the OWNER'S REPRESENTATIVE'S attention to any deviations that the Shop Drawing or sample may have from the requirements of the Contract Documents and, in addition, shall cause a specific notation to be made on each shop drawing submitted for review and approval of each such variation.
- 20.4 The OWNER'S REPRESENTATIVE will review and approve with reasonable promptness Shop Drawings and Samples, but its review and approval shall be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. The approval of a separate item as such will not indicate approval of the assembly in which the item functions. The CONTRACTOR will make any corrections required by the OWNER'S REPRESENTATIVE and will return the required number of corrected copies of Shop Drawings and re-submit new samples until approved. All cost incurred by the COUNTY for the review of a shop drawing in excess of two reviews shall be the CONTRACTORS responsibility. The CONTRACTOR'S stamp of approval on any Shop Drawing or sample shall constitute a representation to the OWNER'S REPRESENTATIVE that the CONTRACTOR has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers and similar data or he assumes full responsibility for doing so, and that he has reviewed or coordinated each Shop Drawing or sample with the requirements of the Work and the Contract Document.
- 20.5 No work requiring a Shop Drawing or sample submissions shall be commenced until the submission has been approved by the OWNER'S REPRESENTATIVE. Any related Work performed prior to review and approval by the COUNTY of the pertinent submission will be the

sole expense and responsibility of the CONTRACTOR. A copy of each approved Shop Drawing and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the OWNER'S REPRESENTATIVE.

- 20.6 The OWNER'S REPRESENTATIVE approval of Shop Drawings or samples shall not relieve the CONTRACTOR from his responsibility for any deviations from the requirements of the Contract Documents, unless the CONTRACTOR has in writing called the OWNER'S REPRESENTATIVE attention to such deviation at the time of submission and the COUNTY and the OWNER'S REPRESENTATIVE have given written approval to the specific deviation; nor shall any approval by the OWNER'S REPRESENTATIVE relieve the CONTRACTOR from responsibility for errors or omissions in the Shop Drawings.

20.6.1 The CONTRACTOR shall, upon completion of the work, furnish to the Engineer two (2) complete sets of prints, neatly bound together, and in good condition, of all the CONTRACTOR'S, Subcontractors' and manufacturers' drawings as finally checked and reviewed by the Engineer with all modifications accepted by the Engineer subsequent thereto, showing the work as actually completed. Such "as-built" information for bridges, culverts, and similar structures shall also be provided by the CONTRACTOR.

## 21 Indemnification

21.1 The CONTRACTOR shall indemnify, save harmless and defend the COUNTY and all of its officers, agents, consultants and employees from and against all losses, claims, demands, payments, suits, actions, recoveries and judgments of every nature and description brought or recoverable against it or them by reason of any act or omission of the CONTRACTOR, his agent, consultants, employees, sub-contractors etc., in the execution of the work or in consequence of any negligence or carelessness in guarding the same and agrees to assume any related cost.

21.2 The CONTRACTOR shall assume all risk and bear any loss or injury to property or persons occasioned by neglect or accident during the progress of work until the same shall have been completed and accepted. The CONTRACTOR agrees to repair, restore or rebuild any damages he causes to any property of the COUNTY. He shall also assume all blame or loss by reason of neglect or violation of any state or federal law or municipal rule, regulation or order. The CONTRACTOR shall give to the proper authorities all required notices relating to the work, obtain all official permits and licenses and pay all proper fees. He shall repair any damage that may have occurred to any adjoining building, structure, utility or private property in the course of this work.

## 22 Cleaning Up

22.1 The CONTRACTOR will keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work; at the completion of the Work he will remove all waste materials, rubbish and debris from and about the premises as well as all tools, construction equipment and machinery, and surplus materials, and will leave the site clean and ready for occupancy by the COUNTY. The CONTRACTOR will restore to their original condition those portions of the site not designated for alteration by the Contract Documents.

22.2 If the CONTRACTOR fails to clean up as provided in the Contract Documents, the COUNTY may do so and the cost thereof shall be deducted from the final retainage due the CONTRACTOR.

## 23 Continuing the Work

23.1 The CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes and disagreements with the COUNTY. No work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted (The COUNTY May Stop Work)

or as the CONTRACTOR and the COUNTY may otherwise agree in writing.

## **24 Anti-Discrimination**

- 24.1 The CONTRACTOR for itself, its successors in interest, and assignees, as part of the consideration thereof covenant and agree that:
- 24.2 In the furnishing of services to the COUNTY hereunder, no person on the grounds of race, religion, color, age, sex, national origin, handicap or marital status shall be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination.
- 24.3 The CONTRACTOR will not discriminate against any employee or applicant for employment because of race, religion, color, age, sex, national origin, handicap or marital status. The CONTRACTOR will make affirmative efforts to insure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, age, sex, national origin, handicap or marital status. Such action shall include, but not be limited to, acts of employment, upgrading, demotion or transfer; recruitment advertising; layoff or termination, rates of pay or other forms of compensation and selection for training, including apprenticeships.
- 24.4 CONTRACTOR agrees to post in a conspicuous place, available to employees and applicants for employment, notices setting forth the provisions of this anti-discrimination clause.
- 24.5 CONTRACTOR will provide all information and reports required by relevant regulations and/or applicable directives. In addition, the CONTRACTOR shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the COUNTY to be pertinent to ascertain compliance. The CONTRACTOR shall maintain and make available relevant data showing the extent to which members of minority groups are beneficiaries under these contracts.
- 24.6 Where any information required of the CONTRACTOR is in the exclusive possession of another who fails or refuses to furnish this information, the CONTRACTOR shall so certify to the COUNTY its efforts made toward obtaining said information. The CONTRACTOR shall remain obligated under this paragraph until the expiration of three years after the termination of this CONTRACT.
- 24.7 In the event of breach of any of the above anti-discrimination covenants, the COUNTY shall have the right to impose sanctions as it may determine to be appropriate, including withholding payment to the CONTRACTOR or canceling, terminating or suspending this CONTRACT, in whole or in part.
- 24.8 Additionally, the CONTRACTOR may be declared ineligible for further COUNTY contracts by rule, regulation or order of the Board of County Commissioners of Lee County, or as otherwise provided by law.
- 24.9 The CONTRACTOR will send to each labor union, or representative of workers with which the CONTRACTOR has a collective bargaining agreement or other contract of understanding, a notice informing the labor union or worker's representative of the CONTRACTOR'S commitments under this assurance, and shall post copies of the notice in conspicuous places available to the employees and the applicants for employment.
- 24.10 The CONTRACTOR will include the provisions in every sub-contract under this contract to insure its provisions will be binding upon each Sub-contractor. The CONTRACTOR will take such action with respect to any Sub-contractor, as the contracting agency may direct, as a means of enforcing such provisions, including sanctions for non-compliance.

## **25 Work by Others**

- 25.1 The COUNTY may perform additional Work related to the Project by itself, or it may let other direct contracts which shall contain General Conditions similar to these.
- 25.2 The CONTRACTOR will afford the other Contractors who are parties to such direct contracts (or

the COUNTY, if it is performing the additional Work itself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of the Work, and shall properly connect and coordinate his work with theirs. Should the Contract entail relocation of facilities not a part of this Contract, the CONTRACTOR will coordinate and cooperate with the applicable entity responsible for this portion of the Work.

- 25.3 Water lines, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cableways, signals, and all other utility appurtenances within the limits of the proposed construction which are to be relocated or adjusted are to be moved by the owners at their expense, unless otherwise provided in the Contract. It is understood and agreed that the CONTRACTOR has considered in his bid all of the permanent and temporary utility appurtenances in their present or relocated positions as shown on the plans and that no additional compensation will be allowed for any delays, inconveniences, or damage sustained to him due to any interference from the said utility appurtenances or the operation of moving them. If any part of the CONTRACTOR'S work depends (for proper execution) upon the Work of any such other Contractor (or the COUNTY), the CONTRACTOR will inspect and promptly report to the OWNER'S REPRESENTATIVE in writing, any defects, deficiencies or delays in such Work that render it unsuitable for such proper execution and results. His failure to report shall constitute an acceptance of the Work, except as to defects, deficiencies and delays which may appear in the other Work after the execution of his Work.
- 25.4 The CONTRACTOR will do all cutting, fitting and patching of his Work, which is consistent with the Contract Documents that may be required to make its several parts come together properly and fit it to receive or be received by such other Work. The CONTRACTOR will not endanger any Work of others by cutting, excavating or otherwise altering such other Work and will only cut or alter such other work with the written consent of the OWNER'S REPRESENTATIVE.
- 25.5 If the performance of additional Work by other Contractors or the COUNTY is not noted in the Contract Documents prior to the execution of the Contract, written notice thereof shall be given to the CONTRACTOR prior to starting any such additional Work.
- 25.6 The CONTRACTOR shall be responsible for coordination with all activities with adjacent projects.

## **26 Owner's Representative Status During Construction**

- 26.1 County's Representatives
- 26.1.1 The COUNTY shall issue all communications to the CONTRACTOR through the OWNER'S REPRESENTATIVE.
- 26.2 Clarifications and Interpretations
- 26.2.1 The OWNER'S REPRESENTATIVE will issue with reasonable promptness, through the COUNTY, such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as the COUNTY may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If the CONTRACTOR believes that a written clarification or interpretation justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree to the amount or extent thereof, the CONTRACTOR may make a claim.
- 26.3 Authorized Variations in Work
- 26.3.1 The OWNER'S REPRESENTATIVE may authorize, with prior approval from the COUNTY minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract

Time and are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Change Order and the CONTRACTOR shall perform the Work involved promptly. If the CONTRACTOR believes that a Field Change Order justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree as to the amount or extent thereof, the CONTRACTOR may make a claim.

## **27 Changes in Work**

- 27.1 Without invalidating the Agreement, the COUNTY may unilaterally and at any time or from time to time order additions, deletions or revisions in the Work; these will be authorized by Change Orders or Field Directive Change. Upon receipt of a Change Order or Field Directive Change, the CONTRACTOR will proceed with the Work involved.
- 27.2 All such Work shall be executed under the applicable conditions of the Contract Documents.
- 27.3 If any Change Order or Field Directive Change causes an increase or decrease in the Contract Price or any extension or shortening of the Contract Time, an equitable adjustment will be made.
- 27.4 Additional Work performed by the CONTRACTOR without written authorization of a change in the form of an approved Change Order will not entitle him to an increase in the Contract Price or any extension of the Contract Time, except in the case of an emergency.
- 27.5 It is the CONTRACTOR'S responsibility to notify the Surety of any changes affecting the general scope of the Work or change of the Contract Price and the amount of the applicable Bonds shall be adjusted accordingly. The Surety's Acceptance must be submitted to the OWNER'S REPRESENTATIVE, by the CONTRACTOR, within ten calendar days of the initiation of the change.

## **28 Change of Contract Price**

- 28.1 The Contract Price constitutes the total compensation payable to the CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by the CONTRACTOR shall be at his expense without change in the Contract Price.
- 28.2 The Contract Price may only be changed by a Change Order. Any claim for an increase or decrease in the Contract Price shall be in writing and delivered to the OWNER'S REPRESENTATIVE within fifteen calendar days of the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within sixty calendar days after such occurrence (unless COUNTY allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR'S written statement that the amount claimed covers all known amounts (direct, indirect, and consequential) to which the CONTRACTOR has reason to believe it is entitled as a result of the occurrence of said event. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance. All claims for adjustment in the Contract Price shall be reviewed by the OWNER'S REPRESENTATIVE. Any change in the Contract Price shall be incorporated in a Change Order and approved by the COUNTY. No claim by the CONTRACTOR for an equitable adjustment hereunder shall be allowed if asserted after final payment under this Contract.
- 28.3 Where the Work involved is covered by unit prices contained in the Contract Documents or subsequently agreed upon, by application of unit prices to the quantities of the items involved.
- 28.4 By mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation.
- 28.5 By cost of the Work and mutually acceptable fixed amount for overhead and profit agreed upon by the parties.
- 28.6 If none of the above methods is agreed upon, the value shall be determined by the COUNTY

on the basis of cost of the Work and a percentage for overhead and profit. Cost shall only include labor (payroll, payroll taxes, fringe benefits, worker's compensation, etc.), materials, equipment, and other incidentals directly related to the Work involved.

- 28.7 In such cases the CONTRACTOR will submit in the form prescribed by the COUNTY an itemized cost breakdown together with supporting data. The amount of credit to be allowed by the CONTRACTOR to the COUNTY for any such change which results in a net decrease in cost will be the amount of the actual net decrease as determined by the COUNTY. When both additions and credits are involved in any one change, the combined overhead and profit shall be figured on the basis of the net decrease, if any.

## 29 Cash Allowance

- 29.1 It is understood that the CONTRACTOR has included in the Contract Price any allowances so named in the Contract Documents and shall cause the Work so covered to be done by such materialmen, suppliers, or SUB-CONTRACTORS and for such sums within the limit of the allowances as the COUNTY may approve. Upon final payment, the Contract Price shall be adjusted as required and an appropriate Change Order issued. The CONTRACTOR agrees that the original Contract Price includes such sums as he deems proper for cost and profit on account of cash allowances. No demand for an additional sum for overhead or profit in connection therewith will be allowed.

### 29.2 Unit Price Work

- 29.2.1 Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit prices for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price.
- 29.2.2 Each unit price will be deemed to include an amount considered by the CONTRACTOR to be adequate to cover the CONTRACTOR'S overhead and profit for each separately identified item.
- 29.2.3 The unit price of an item of Unit Price Work shall be subject to revaluation and adjustment under the following conditions:
- 29.2.3.1 If the total cost of a particular item of Unit Price Work amounts to 5% or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by the CONTRACTOR differs by more than 15% from the estimated quantity of such item indicated in the Agreement; and,
- 29.2.3.2 If there is no corresponding adjustment with respect to any other item of Work; and
- 29.2.3.3 If the CONTRACTOR believes that it has incurred additional expense as a result thereof; or
- 29.2.3.4 If the COUNTY believes that the quantity variation entitles it to an adjustment in the unit price, either the COUNTY or the CONTRACTOR may make a claim for an adjustment in the Contract Price if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.

## 30 Change of Contract Time

- 30.1 The Contract Time may only be changed by a Change Order. Any claim for an extension in

the Contract Time shall be in writing and delivered to the OWNER'S REPRESENTATIVE within fifteen calendar days of the occurrence of the event giving rise to the claim and stating general nature of the claim. Notice of the extent of the claim with supporting data (analysis and documentation) shall be delivered within sixty calendar days after such occurrence (unless the OWNER'S REPRESENTATIVE allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR'S written statement that the adjustment claimed is the entire adjustment to which the CONTRACTOR has reason to believe it is entitled as a result of the occurrence of said event. If adverse weather conditions are the basis for a claim for additional time, such claim shall be documented by data substantiating that weather conditions were abnormal for the period of time and could not have been reasonably anticipated, and that the weather conditions had an adverse effect on the scheduled construction. No claim by the CONTRACTOR under this provision shall be allowed unless the CONTRACTOR has given the notice and the analysis and documentation required in this paragraph. All claims for adjustment in the Contract Time shall be determined by the OWNER'S REPRESENTATIVE. Any change in the Contract Time resulting from any such claim shall be incorporated in a Change Order.

- 30.2 The COUNTY shall not be responsible for any delay in the completion of the project where the delay is beyond the control or without fault or negligence on behalf of the COUNTY. The COUNTY shall not be held accountable for extra compensation or an extension of time due to default by the CONTRACTOR, SUB-CONTRACTORS, or suppliers in the furnishing of labor or materials for the project, or having to replace defective materials.
- 30.3 The CONTRACTOR shall be entitled to a claim for an extension of time when a delay or hindrance is caused by an act of God, or any act or omission on the part of the COUNTY, provided the CONTRACTOR gives notice to the OWNER'S REPRESENTATIVE within fifteen calendar days of the occurrence of the event giving rise to the claim and having stated the general nature of the claim. The CONTRACTOR'S sole remedy shall be an extension of Contract Time.
- 30.4 No extension of Contract Time or increases in Contract Price shall be granted for any delay caused either by (1) inadequate crewing, default or bankruptcy of lower tier contract, slow submittals, etc., or (2) by severe though not unusual weather conditions (other than hurricanes and tornadoes) or (3) any delay impacting a portion of the Work within the available total float or slack time and not necessarily preventing completion of the Work within the Contract Time unless otherwise agreed to by the COUNTY in its sole discretion or (4) for any delay which is caused by the CONTRACTOR having to replace defective material or equipment or (5) delays attributable to the lack of performance by Sub-contractors regardless of the reasons.
- 30.5 All time limits stated in the Contract Documents are of the essence of the Agreement. Shall not exclude recovery for damages (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court cost) for delay by either party.

### **31 Warranty and Guarantee: Acceptance of Defective Work**

#### **31.1 Warranty and Guarantee**

31.1.1 The CONTRACTOR warrants and guarantees to the COUNTY that all materials and equipment will be new unless otherwise specified and that all Work will be of good quality, free from faults or defects and in accordance with the requirements of the Contract Documents and any inspections, test or approvals referred to in this Article. All unsatisfactory Work, all faulty Work, and all Work not conforming to the requirements of the Contract Documents or such inspections, tests or approvals shall be considered defective. Prompt notice of all defects shall be given to the CONTRACTOR. All defective Work, whether or not in place, may be rejected,



corrected or accepted as provided herein. Contractor is to assign any and all warranties or guarantees on equipment, materials, etc. to the COUNTY.

### 31.2 Tests and Inspections

- 31.2.1 If the Contract Documents, laws, ordinances, rules, regulations or order of any public authority having jurisdiction require any Work to specifically be inspected, tested or approved by someone other than the CONTRACTOR, the CONTRACTOR will give the OWNER'S REPRESENTATIVE forty-eight (48) hours' notice of readiness therefore. The CONTRACTOR will furnish the OWNER'S REPRESENTATIVE with the required certificates of inspection, testing or approval. All such tests will be in accordance with the methods prescribed by the American Society for Testing and Materials or such other applicable organizations as may be required by law or the Contract Documents. If any such Work required to be inspected, tested or approved is covered without written approval of the OWNER'S REPRESENTATIVE, it shall, if requested by the OWNER'S REPRESENTATIVE, be uncovered for observation at the CONTRACTOR'S expense. The cost of all such inspections, tests and approvals shall be borne by the CONTRACTOR unless otherwise provided.
- 31.2.2 Project field testing of materials required by the specifications or the OWNER'S REPRESENTATIVE shall be provided by and at the expense of the COUNTY. The CONTRACTOR shall coordinate and schedule the required testing. The Contractor shall pay for all retests when the initial test result reveals that the materials failed to meet the requirements of the specifications. The CONTRACTOR shall notify the OWNER'S REPRESENTATIVE twenty-four (24) hours prior to conducting any test so the OWNER'S REPRESENTATIVE may be present.
- 31.2.3 The OWNER'S REPRESENTATIVE shall have the right to require all materials to be submitted to tests prior to incorporation in the Work. In some instances, it may be expedient to perform these tests at the source of supply, and for this reason, it is required that the CONTRACTOR furnish the OWNER'S REPRESENTATIVE with the information concerning the location of his source before incorporating material into the Work. This does not in any way obligate the OWNER'S REPRESENTATIVE to perform tests for acceptance of material and does not relieve the CONTRACTOR of his responsibility to furnish satisfactory material. The CONTRACTOR shall furnish manufacturer's certificates of compliance with these specifications covering manufactured items incorporated in the Work.
- 31.2.4 Neither observations by the OWNER'S REPRESENTATIVE, nor inspections, tests or approvals by persons other than the CONTRACTOR shall relieve the CONTRACTOR from his obligations to perform the Work in accordance with the requirements of the Contract Documents.
- 31.2.5 Testing/Permits: The CONTRACTOR shall be responsible for performing any testing and the cost for all items that may be required as part of the NPDES, FDEP, USACOE and SFWMD permits.

## 32 Close Out Procedure

### 32.1 General Operating/Maintenance Instructions & Manuals

- 32.1.1 The CONTRACTOR shall organize maintenance operating manual information into four suitable sets of manageable size, and bind into individual binders properly identified and indexed (thumb-tabbed). Emergency instructions, spare parts listing, warranties, wiring diagrams, recommended "turn around" cycles, inspection procedures, shop drawings, product data, and similar acceptable information shall be included. The CONTRACTOR shall bind each manual of each set in a heavy duty,

3-ring vinyl covered binder, and include pocket folders for folded sheet information. Mark identification on both front and spine of each binder.

- 32.1.2 Arrange for each installer of work requiring continuing maintenance (by the OWNER) or operation, to meet with the OWNER'S personnel, at the project site, to provide basic instructions needed for proper operation and maintenance of the entire work. Include instructions by manufacturer's representatives where installers are not expert in the required procedures. Review maintenance manuals, record documentation, tools, spare parts and materials, lubricants, fuels, identification system, control sequences, hazards, cleaning and similar procedures and facilities. For operational equipment, demonstrate start-up, shut-down, emergency operations, noise and vibration adjustments, safety, economy/efficiency adjustments, and similar operations. Review maintenance and operations in relation with applicable guaranties, warranties, agreements to maintain, bonds, and similar continuing commitments.

### **33 Access to the Work**

- 33.1 The COUNTY and the OWNER'S REPRESENTATIVE shall at all times have access to the Work. The CONTRACTOR shall provide proper facilities for such access and observation of the Work and also for any inspection or testing thereof by others.

### **34 Uncovering the Work**

- 34.1 If any work has been covered which the OWNER'S REPRESENTATIVE has not specifically requested to observe prior to its being covered, or if the OWNER'S REPRESENTATIVE considers it necessary or advisable that covered Work be inspected or tested by others, the CONTRACTOR, at the OWNER'S REPRESENTATIVE'S request, will uncover, expose or otherwise make available for observation, inspection or testing as the OWNER'S REPRESENTATIVE may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is defective, the CONTRACTOR will bear all the expense of such uncovering, exposure, observation, inspection and testing, and of satisfactory reconstruction. If, however, such Work is not found to be defective, the CONTRACTOR will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction, if he makes a claim therefore.

### **35 County May Stop Work**

- 35.1 If the Work is defective, if the CONTRACTOR fails to supply sufficient skilled workmen or suitable materials or equipment, or if the CONTRACTOR fails to make prompt payments to SUB-CONTRACTORS for labor, materials or equipment: the COUNTY may order the CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the COUNTY to stop the work shall not give rise to any duty on the part of the COUNTY to exercise this right for the benefit of the CONTRACTOR or any other party.
- 35.2 Notwithstanding Paragraph 35.1, the COUNTY may also issue a Stop Work Order for the following reasons:
- 35.2.1 Insufficient Maintenance of Traffic practices.
  - 35.2.2 Failure to comply with permits regarding pollution control.
  - 35.2.3 Insufficient construction materials or methods.
  - 35.2.4 Failure to provide a safe working environment in accordance with the US Department of Labor Occupational Safety and Health Administration (OSHA).

- 35.3 Upon notice of the Stop Work Order, the CONTRACTOR shall cease all contracted work except for the activities required to correct the problem and as directed by the COUNTY.
- 35.4 If the CONTRACTOR fails to correct the problem causing the Stop Work Order and there is immediate threat to the public's health, safety, or environmental protection, the COUNTY may perform any remedial activities necessary to protect the public and environment. Any costs incurred by the County in the performance of this work shall be deducted from monies due the Contractor or paid by the Contractor to the County.
- 35.5 No increase in the Contract Price or extension of the Contract Time will be granted for any delays or loss of time due to a Stop Work Order.

### **36 Correction or Removal of Defective Work**

- 36.1 If required by the OWNER'S REPRESENTATIVE prior to approval of final payment, the CONTRACTOR will, promptly, without cost to the COUNTY and as specified by the OWNER'S REPRESENTATIVE, either correct any defective Work whether or not fabricated, installed or completed or, if the Work has been rejected by the OWNER'S REPRESENTATIVE, remove it from the site and replace it with non-defective Work. If the CONTRACTOR does not correct such defective Work or remove and replace such rejected Work within ten calendar days, all as specified in a written notice from the OWNER'S REPRESENTATIVE, the OWNER'S REPRESENTATIVE may have the deficiency corrected or the rejected Work removed and replaced. All direct or indirect costs of such correction or removal and replacement shall be paid by the CONTRACTOR. The CONTRACTOR will also bear the expense of making good all Work of others destroyed or damaged by his correction, removal or replacement of his defective Work.

### **37 One Year Correction Period**

- 37.1 If, after the approval of the final payment and prior to the expiration of one year after the date of Final Completion or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any Work is found to be defective, the CONTRACTOR will promptly, without cost to the COUNTY, and in accordance with the OWNER'S REPRESENTATIVE'S written instructions, either correct such defective Work or, if it has been rejected by the OWNER'S REPRESENTATIVE, remove it from the site and replace it with non-defective Work. If, within seven calendar days, the CONTRACTOR does not comply with the terms of such instructions, the Bonding Company shall be notified of default and requested to make repairs or replacement, the COUNTY may have the defective Work corrected or the rejected Work removed and replaced. All direct and indirect costs of such removal and replacement shall be paid by the CONTRACTOR.

### **38 Acceptance of Defective Work**

- 38.1 If, instead of requiring correction or removal and replacement of defective Work, the COUNTY prefers to accept it, the COUNTY may do so. In such case, if acceptance occurs prior to approval of final payment, a Change Order shall be issued incorporating the appropriate revisions to the Contract Documents including an appropriate reduction in the Contract Price. If the acceptance occurs after approval of the final payment, an appropriate amount shall be paid by the CONTRACTOR to the COUNTY.

### **39 Neglected Work By Contractor**

- 39.1 If the CONTRACTOR should neglect to prosecute the Work in accordance with the Contract Documents, including any requirements of the progress schedule, the COUNTY may, after three calendar days written notice to the CONTRACTOR and without prejudice to any other

remedy it may have, make good such deficiency and the cost thereof shall be charged against the CONTRACTOR. A Change Order shall be issued incorporating the appropriate revision to the Contract Documents including an appropriate reduction in the Contract Price. If the payments then or thereafter due the CONTRACTOR are not sufficient to cover such amount, the CONTRACTOR shall pay the difference to the COUNTY.

#### **40 Payment and Completion**

##### **40.1 Schedule of Values**

40.1.1 Within ten (10) calendar days after the effective date of the Agreement, the CONTRACTOR must submit a schedule of values of the Work including quantities and unit prices totaling to the Contract Price. This schedule shall be satisfactory in form and substance to the COUNTY and shall subdivide the Work into sufficient detail to serve as the basis for progress payments during construction. Upon approval of the schedule of values by the OWNER'S REPRESENTATIVE, it shall be incorporated into the Estimate and Requisition for Payment prescribed by the COUNTY. Unit Price Contracts shall have the bid proposal prices incorporated into the Estimate and Requisition for Payment.

##### **40.2 Application for Progress Payment**

40.2.1 Bid proposal units and unit prices shall serve as the basis for progress payments during construction. The bid proposal process shall be incorporated into the Estimate and Requisition for Payment Form No. CSD:505(4) prescribed by the COUNTY.

40.2.2 Not more often than once a month, nor less often than specified in the approved payment schedule, and on a date established at the Project Pre-Construction Conference, the CONTRACTOR will submit to the OWNER'S REPRESENTATIVE for review the Estimate and Requisition for Payment form filled out and signed by the CONTRACTOR covering the Work completed as of the date of the Application and supported by such data as the OWNER'S REPRESENTATIVE may reasonably require. Also, if payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by such supporting data, satisfactory to the OWNER'S REPRESENTATIVE, as will establish the COUNTY'S title to the material and equipment and protect its interest therein, including applicable insurance. All progress payments will be subject to the retainage percentage specified in the Contract Documents. Such retainage shall be paid and will be issued in the final payment after acceptance by the COUNTY of the Work.

#### **41 Contractor's Warranty of Title**

41.1 The CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by an application for progress payment, whether incorporated in the Project or not, will be passed to the COUNTY prior to the next making of application for progress payment, free and clear of all liens, claims, security interest and encumbrances; and that no Work, materials or equipment covered by an Application for Payment will have been acquired by the CONTRACTOR or by any other person performing the Work at the site or furnishing materials and equipment for the Project subject to an agreement under which an interest therein or encumbrance thereon is retained by the seller or otherwise imposed by the CONTRACTOR or such other person.

#### **42 Approval of Payments**

- 42.1 The OWNER'S REPRESENTATIVE will, within ten calendar days after receipt of each Application for Payment, either indicate his approval of payment and deliver the application to the COUNTY or return the Application to the CONTRACTOR indicating in writing the reason for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and re-submit the Application. The COUNTY will, within five calendar days after receipt of each approved application for payment, either indicate their approval of payment, and within fifteen calendar days pay the CONTRACTOR the amount approved, or return the application to the CONTRACTOR thru the OWNER'S REPRESENTATIVE indicating in writing the reason for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the application to the OWNER'S REPRESENTATIVE.
- 42.2 The OWNER'S REPRESENTATIVE'S approval of any payment requested in an Application for Payment shall constitute a representation by him to the COUNTY, based on the OWNER'S REPRESENTATIVE'S on-site observations of the Work in progress and on his review of the Application for Payment and the supporting data that the CONTRACTOR is entitled to payment of the amount approved.
- 42.3 The OWNER'S REPRESENTATIVE'S approval of final payment shall constitute an additional representation by him to the COUNTY that the conditions precedent to the CONTRACTOR'S being entitled to final payment as set forth have been fulfilled.
- 42.4 The OWNER'S REPRESENTATIVE may refuse to approve the whole or any part of any payment if in his opinion; he is unable to make such representations to the COUNTY. He may then refuse to approve any such payment because of subsequently discovered evidence or the results of subsequent inspections or test, nullify any such payment previously approved, to such extent as may be necessary in his opinion to protect the COUNTY from loss because:
- 42.4.1 The Work is defective;
  - 42.4.2 A portion of such payment is the subject of a dispute or claim that has been filed;
  - 42.4.3 The Contract Price has been reduced because of Modifications;
  - 42.4.4 The COUNTY has been required to correct defective Work or complete the Work, or of unsatisfactory prosecution of the Work, including failure to clean up as required.

### **43 Substantial Completion**

- 43.1 Prior to final payment, the CONTRACTOR shall, in writing to the OWNER'S REPRESENTATIVE, certify that the entire Project is substantially complete and request that the OWNER'S REPRESENTATIVE issue a Certificate of Substantial Completion. Within fourteen calendar days thereafter, the OWNER'S REPRESENTATIVE and the CONTRACTOR will make an inspection of the Project to determine the status of completion. If the COUNTY does not consider the Project substantially complete, it will notify the CONTRACTOR in writing giving the reasons therefore. If the COUNTY considers the Project substantially complete, a Certificate of Substantial Completion will be issued. This certificate shall fix the date of Substantial Completion and the responsibilities between the COUNTY and the CONTRACTOR for maintenance, heat and utilities. The Certificate of Substantial Completion will also include a punch list of items to be completed or corrected, said time to be within the Contract Time. The COUNTY shall have the right to exclude the CONTRACTOR from the Project after the date of Substantial Completion but the COUNTY will allow the CONTRACTOR reasonable access to complete items on the punch list.

### **44 Partial Utilization**

- 44.1 Prior to final payment, the OWNER'S REPRESENTATIVE may request the CONTRACTOR to permit the use of a specified part of the Project which the COUNTY believes it may use

without significant interference with construction of the other parts of the Project. If the CONTRACTOR agrees, he will certify to the OWNER'S REPRESENTATIVE that said part of the Project is substantially complete and request the OWNER'S REPRESENTATIVE to issue a Certificate of Substantial Completion for that part of the Project. Within fourteen calendar days thereafter, the OWNER'S REPRESENTATIVE and the CONTRACTOR will make an inspection of that part of the Project to determine its status of completion. If the COUNTY considers that part of the Project to be substantially complete, the OWNER'S REPRESENTATIVE will deliver to the CONTRACTOR a certificate to that effect, fixing the date of Substantial Completion as to that part of the Project, and listing the punch list of items to be completed or corrected before final payment and fixing the responsibility between the COUNTY and the CONTRACTOR for maintenance, heat and utilities as to that part of the Project. The COUNTY shall have the right to exclude the CONTRACTOR from any part of the Project which is so certified to be substantially complete but the COUNTY will allow the CONTRACTOR reasonable access to complete or correct items on the punch list.

#### **45 Final Inspection**

- 45.1 Upon written notice from the CONTRACTOR that the Project is complete, the OWNER'S REPRESENTATIVE will make a final inspection with the CONTRACTOR and will notify the CONTRACTOR in writing of any particulars which this inspection reveals that the Work is defective. The CONTRACTOR shall immediately make such corrections as are necessary to remedy the defects within a reasonable time.

#### **46 Final Inspection for Payment**

- 46.1 After the CONTRACTOR has completed any such corrections to the satisfaction of the OWNER'S REPRESENTATIVE and delivered all maintenance and operating instructions, schedules, guarantees, bonds, Certificates of Inspection and other documents as required by the Contract Documents, he may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by legally effective final releases or waivers of liens from the CONTRACTOR and all SUB-CONTRACTORS which performed services for the CONTRACTOR pursuant to the Contract Documents and the consent of surety, if applicable to final payment.

#### **47 Approval of Final Payment**

- 47.1 If, on the basis of its observations and review of the Work during construction, its final inspection and its review of the final Estimate and Requisition for Payment, all as required by the Contract Documents, the OWNER'S REPRESENTATIVE is satisfied that the Work has been completed and the CONTRACTOR has fulfilled all of his obligations under the Contract Documents, it will, within ten calendar days after receipt of the final Application for Payment, indicate in writing its approval of payment and deliver the application to the COUNTY. Otherwise, it will return the Application to the CONTRACTOR, indicating in writing its reason for refusing to approve final payment, in which case the CONTRACTOR will make the necessary corrections and re-submit the Application. The COUNTY will, within fifteen calendar days after receipt of approved application for final payment, either indicate their approval of the estimate and requisition application for payment and within fifteen calendar days pay the CONTRACTOR the amount approved by the COUNTY and issue a Certificate of Final Completion or return the application thru the OWNER'S REPRESENTATIVE indicating in writing the reason for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the application to the OWNER'S REPRESENTATIVE.

- 47.2 If, after substantial Completion of the Work, final completion is materially delayed through no fault of the CONTRACTOR, and the OWNER'S REPRESENTATIVE so confirms, the COUNTY shall and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required, the written consent of the Surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the CONTRACTOR to the OWNER'S REPRESENTATIVE, prior to certification of such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.
- 47.3 If liquidated damages are to be deducted from the final payment, the COUNTY shall so notify the CONTRACTOR in writing at least seven calendar days prior to the COUNTY'S submittal to Finance.
- 47.4 The Contractor will be required to submit with his final payment documents a DBE Participation Certification, indicating all DBE sub-contractor(s) and amount(s) utilized for the project.
- 47.5 If the CONTRACTOR did not utilize the DBE firm(s) listed on the Bid Proposal, a letter of justification, as to why shall be submitted along with the DBE Participation Certification.
- 47.6 At the final completion of the construction project if the county project manager experienced problems with the CONTRACTOR the project manager will prepare a Contractor Performance Evaluation, and forward to the Contractor for review, comment and signature.
- 47.7 Upon receipt of the Contractor Performance Evaluation the CONTRACTOR will have seven calendar days, from the date received, to review, comment, sign and return back to the project manager. If the evaluation has not been received back from the CONTRACTOR within the seven calendar days, the COUNTY will assume the CONTRACTOR fully agrees with and has no comments to the evaluation. The evaluation will then be placed on file with Lee County Procurement Management.

#### **48 Contractor's Continuing Obligation**

- 48.1 The CONTRACTOR'S obligation to perform the Work and complete the Project in accordance with the Contract Documents shall be absolute. Neither approval of any progress or final payment by the COUNTY, the issuance of the Certificates of Completion, any payment by the COUNTY to the CONTRACTOR under the Contract Documents, any use or occupancy of the Project or any part thereof by the COUNTY, any act of acceptance by the COUNTY, any failure to do so, nor any correction of defective Work by the COUNTY shall constitute an acceptance of Work not in accordance with the Contract Documents.

#### **49 Waiver of Claims**

- 49.1 The making and acceptance of final payment shall constitute:
- 49.1.1 A waiver of all claims by the COUNTY against the CONTRACTOR other than those arising from unsettled liens, from defective Work appearing after final payment or from failure to comply with the requirements of the Contract Documents, or from the terms of any special guarantees specified therein, and,
- 49.1.2 A waiver of all claims by the CONTRACTOR against the COUNTY other than those previously made in writing and still unsettled.

#### **50 Suspension of Work and Termination**

- 50.1 County May Suspend Work
- 50.1.1 The COUNTY may at any time and without cause suspend the Work or any portion

thereof for a period of not more than ninety calendar days by notice in writing to the CONTRACTOR. The COUNTY shall fix the date on which Work shall be resumed and the CONTRACTOR will resume the Work on the date so fixed. The CONTRACTOR will be allowed an increase in the Contract Price, an extension of the Contract Time or both, if such increases are justified and directly attributable to any COUNTY suspension and if he makes a claim thereof.

## **51 County May Terminate**

- 51.1 If the CONTRACTOR is adjudged bankrupt or insolvent, if he makes a general assignment for the benefit of his creditors, if a trustee or receiver is appointed for the CONTRACTOR or for any of his property, if he files a petition to take advantage of any debtor's act or reorganizes under the bankruptcy or similar laws, if he repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, if he repeatedly fails to make prompt payments to SUB-CONTRACTORS for labor, materials or equipment, if he disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction, if he disregards the authority of the OWNER'S REPRESENTATIVE, or if he otherwise substantially violates any provisions of the Contract Documents, then the COUNTY may, without prejudice to any other right or remedy and after giving the CONTRACTOR and his surety seven (7) calendar days' written notice, terminate the services of the CONTRACTOR and take possession of the Project and all materials, equipment, tools, construction equipment and machinery thereon owned by the CONTRACTOR and finish the Work by whatever method the COUNTY may deem expedient or arrange with the Surety to complete the project. The CONTRACTOR, if notified by the COUNTY to do so, shall promptly remove any part of his equipment and supplies from the property of the COUNTY; failing, the COUNTY shall have the right to remove such equipment and supplies at the expense of the CONTRACTOR.
- 51.2 In such case the CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct and indirect cost of completing the Project, including compensation for additional professional services, such excess shall be paid to the CONTRACTOR. If such cost exceeds such unpaid balance, the CONTRACTOR will pay the difference to the COUNTY. Such cost incurred by the COUNTY will be determined by the COUNTY and incorporated in a Change Order.
- 51.3 Where the CONTRACTOR'S services have been so terminated by the COUNTY, said termination shall not affect any rights of the COUNTY against the CONTRACTOR then existing or which may thereafter accrue.
- 51.4 If so terminated, any retention or payment of monies by the COUNTY due the CONTRACTOR will not release the CONTRACTOR from liability accruing under this Contract.
- 51.5 If after notice of termination of the CONTRACTOR'S right to proceed under the provisions of this clause, it is determined for any reason that the CONTRACTOR was not in default under the provisions or that the delay was excusable, the rights and obligations of the parties shall be the same as if the notice of termination had not been issued.
- 51.6 Upon thirty (30) calendar days' written notice to the CONTRACTOR, the COUNTY may without cause and without prejudice to any other right or remedy elect to abandon the Project and terminate the Agreement. In such case the CONTRACTOR shall be paid for all Work executed and any expense sustained plus a reasonable profit.

## **52 Contractor May Stop Work or Terminate The Contract**

- 52.1 If through no fault of the CONTRACTOR, or a Sub-contractor, or their agents or employees or any other persons performing portions of the Work under Contract with the CONTRACTOR, the WORK is suspended for a period of more than ninety calendar days by



the COUNTY or under an order of court or other public authority, or the OWNER'S REPRESENTATIVE has not issued a certificate for payment and has not notified the CONTRACTOR of the reason for withholding certification or because the COUNTY has not made payment on a certificate for payment within the time stated in the Contract Documents, then the CONTRACTOR may, upon seven calendar days written notice to the COUNTY and the OWNER'S REPRESENTATIVE, terminate the Agreement and recover from the COUNTY payment for all Work executed and proven loss with respect to materials, equipment, tools and construction equipment and machinery, including reasonable overhead, profit and damages.

- 52.2 In addition and in lieu of terminating the Agreement, if the OWNER'S REPRESENTATIVE has failed to act on an application for payment or the COUNTY has failed to make any payment as aforesaid, the CONTRACTOR may upon seven calendar days written notice to the COUNTY and the OWNER'S REPRESENTATIVE stop the Work until payment of all amounts then due. The provisions of this paragraph shall not relieve the CONTRACTOR of the obligation to carry on the Work in accordance with the progress schedule and without delay during disputes and disagreements with the COUNTY.

### 53 Miscellaneous

#### 53.1 General

53.1.1 All Specifications, Drawings and copies thereof furnished by the COUNTY, to the CONTRACTOR, shall remain the COUNTY'S property. They shall not be used on another Project.

53.1.2 The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder, and, in particular but without limitation, the warrants, guarantees and obligations imposed upon the CONTRACTOR and the rights and remedies available to the COUNTY thereunder shall be in addition to and not a limitation of any otherwise imposed or available by law, by special guarantee or other provisions of the Contract Documents.

53.1.3 Should the COUNTY or the CONTRACTOR suffer injury or damage to its person or property because of any error, omission or act of the other or any of his employees, agents, or others for whose acts he is legally liable, claim should be made in writing to the other party within seven calendar days of the first observance of such injury or damage.

53.1.4 The Contract Documents shall be governed by the laws of the State of Florida, the County of Lee, and the municipality in which the project is being done.

- 53.2 Right-of-Way Station Boards: The CONTRACTOR must establish and maintain throughout construction the right-of-way station boards at every even station within ten (10) days after the Notice to Proceed to assist and expedite construction and utility coordination. No additional compensation or separate pay item will be made for this work.

- 53.3 Abbreviations: Reference in the technical specifications to the specifications or requirements of technical societies, associated organization, or bodies shall mean their most current specifications. These groups are identified in the technical specifications.

- 53.4 Use of Public Streets: The use of public streets and roads shall be such as to minimize any inconvenience to the public and to other traffic. Any earth or other excavation materials spilled from trucks shall be removed by the CONTRACTOR and the streets and roads shall be cleaned by the CONTRACTOR to the satisfaction of the COUNTY.

- 53.5 Damage to Existing Property, Structures and Utilities: The CONTRACTOR shall be held responsible for and shall repair all damage to pavement beyond the limits of the contract or outside the right-of-way. Also, the CONTRACTOR shall repair if damaged buildings, telephone or other cables, poles, signs, mailboxes, irrigation piping, water pipes, sanitary pipes,

or other structures which may be encountered, whether or not they are shown on the Drawings. Information shown on the Drawings as to the location of existing utilities has been prepared from the most reliable data available to the Engineer. However, this information is not guaranteed, and it shall be the CONTRACTOR'S responsibility to determine the location, character, and depth of any existing utilities. The CONTRACTOR shall assist the utility companies, by every means possible, to determine said locations. The CONTRACTOR shall exercise extreme caution to eliminate any possibility of any damage to utilities resulting from his activities.

- 53.5.1 At least two (2) business days prior to excavating any section of the Work, the CONTRACTOR shall call the utility companies noted on the plans and inform them that Work on the specific section is about to commence and request that they field locate their underground utilities.
- 53.5.2 When proceeding with the Work, the CONTRACTOR shall exercise due caution to protect all underground and overhead utilities and existing structures from damage. In keeping with the Trench Safety Act, the CONTRACTOR shall provide all sheeting, shoring, and bracing that may be required to properly protect adjacent property, structures and people. The CONTRACTOR shall repair, to the satisfaction of the OWNER, any surface or subsurface Improvement damaged during the course of the Work (unless such improvement is shown to be abandoned or removed) whether or not such improvement is shown on the Drawing. Should any utilities be encountered that are not shown on the Drawing, the CONTRACTOR shall immediately notify the OWNER'S REPRESENTATIVE and shall take all due caution necessary to protect the utility.
- 53.6 Adjustment of Grades: Adjustments of grades shown on Drawings may be necessary to conform to actual field conditions or to maintain cover under proposed future grades. Such adjustments shall be considered part of the job conditions and no extra compensation will be allowed for such changes, except where specifically otherwise noted in the plans or specifications. Such adjustments must be approved by the OWNER'S REPRESENTATIVE prior to being made.
- 53.7 Existing Drainage: Existing drainage shall be maintained at all times and drainage under construction shall be left open so as not to cause flooding due to blockage. Any damage to construction caused by this requirement shall be the responsibility of the CONTRACTOR.
- 53.8 Reference to Other Specifications
- 53.8.1 Reference to FDOT Specifications shall mean the State of Florida Department of Transportation Standard Specifications for Road and Bridge Construction dated July 2016 and supplements thereto unless specifically stated otherwise in the Contract Documents. Where an FDOT Specification section cites or contains references to other sections, they shall also be included as though cited herein. Where FDOT Specifications refer to the "Engineer", "Engineer of Test" or "Division of Test", it shall be understood to mean the OWNER'S REPRESENTATIVE or his designee. Where FDOT Specifications refer to the "Department", it shall mean the Department of Transportation of Lee County, Florida.
- 53.8.2 In case of conflict between the referenced FDOT Specifications and the Contract Documents, the Contract Documents shall govern.
- 53.8.3 Reference to AASHTO and ASTM are to the latest editions of published text of the American Association of Highway and Transportation Officials and the American Society for Testing and Materials, respectively.
- 53.9 Shoring
- 53.9.1 Unless trench banks are cut back on a stable slope, sheet and brace trenches shall be

used as necessary to prevent caving or sliding, to provide protection for workmen and the pipe, and to protect adjacent structures and facilities. The CONTRACTOR shall not brace sheeting against the pipe, but shall brace it so that no concentrated loads of horizontal thrust are transmitted to the pipe. If portable metal box is used for bracing the slopes, the CONTRACTOR shall take care not to disturb the pipe when the box is removed.

- 53.9.2 The CONTRACTOR must comply with the Trench Safety Act, Florida Statutes Sections 553.60 – 553.64. Cost of compliance is not a separate pay item. Costs shall be included in the cost of pipe placement.
- 53.10 Dewatering: Dewatering of excavations, trenches, structures and utilities may be required. The CONTRACTOR shall be responsible for obtaining water use permits for dewatering operations, as necessary, from the South Florida Water Management District. No separate payment will be made for dewatering operations or procurement of dewatering permits. Costs shall be included in the cost of items as included in the Bid Form.
- 53.11 Excess Excavated Material: Unless otherwise specified, all excavated material in excess of the needs for backfill and area fill shall become the property of the CONTRACTOR, and the CONTRACTOR shall remove same from the project.
- 53.12 Asphalt Paving Conference: A pre-paving conference shall be held prior to any asphalt placement. The conference is intended to closely coordinate the CONTRACTOR'S plant and site personnel with the COUNTY'S plant and field inspectors and establish expected quality assurance procedures. The CONTRACTOR shall not perform any paving prior to this conference.
- 53.13 Rock Excavation: All excavations for the installation of pipes, structures, foundations, or other contract items shall be unclassified and no additional or separate payment for rock excavation shall be provided nor shall additional or separate payment be made for backfill required to compensate for excavated rock material that cannot be reused as backfill.
- 53.14 Permits
- 53.14.1 Copies of permits for this project other than for dewatering or NPDES will be provided by the COUNTY.
- 53.14.2 The CONTRACTOR shall abide by all conditions, statutes, and regulations issued by the jurisdiction authorities, boards and agencies of the COUNTY, State and Federal Governments. The CONTRACTOR shall be fully responsible for the execution and adherence to all directives, instructions, conditions, issuance of notices, special conditions, and limiting conditions contained in permits specifically issued for this project and which pertain to or affect the construction phase of this project. Except as may be provided elsewhere in these documents, the cost of materials, supplies, labor testing, permit fees and other direct or indirect expenses required to abide by or execute conditions of the permits shall be paid for by the CONTRACTOR. There is no direct or specific payment item in the bid for cost due to compliance with said permits. The CONTRACTOR'S reimbursement for said costs shall be distributed within the various items of work and materials associated with the construction of the project.
- 53.15 Field Office: CONTRACTOR is not required to provide a field office within the project limits as long as CONTRACTOR has a field office within Lee, Collier or Charlotte County prior to bidding. If CONTRACTOR does not have an established office within Lee, Collier or Charlotte County, then the CONTRACTOR shall provide and staff a field office within the project limits for the entire project duration, per FDOT requirements. This item shall be compensated under the mobilization item and no separate payment will be made. The CONTRACTOR shall coordinate the location of this field office with the Lee County Project Manager prior to the issuance of the Notice to Proceed.

**54 Computation of Time**

- 54.1 When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

**55 Maintenance of Records**

- 55.1 The CONTRACTOR shall keep adequate records and supporting documents applicable to this contractual matter. Said records and documentation will be retained by the CONTRACTOR for a minimum of five years from the date of termination of this Contract. The COUNTY and its authorized agents shall have the right to audit, inspect and copy records and documentation as often as the COUNTY deems necessary during the period of this Contract and during the period of five years thereafter; provided, however, such activity shall be conducted only during normal business hours. The COUNTY, during the period of time expressed by the preceding sentence, shall also have the right to obtain a copy of, and otherwise inspect, any audit made at the direction of the CONTRACTOR as concerns the aforesaid records and documentation.

- 55.2 Vendor specifically acknowledges its obligations to comply with §119.0701, F.S., with regard to public records, and shall:

55.2.1 keep and maintain public records that ordinarily and necessarily would be required by the County in order to perform the services required under this Agreement;

55.2.2 provide the public with access to public records on the same terms and conditions that the County would provide the records and at a cost that does not exceed the cost provided in Chapter 119, Florida Statutes, or as otherwise provided by law;

55.2.3 ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed, except as authorized by law; and

55.2.4 meet all requirements for retaining public records and transfer, at no cost to the County, all public records in possession of Vendor upon termination of this Agreement and destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. All records stored electronically must be provided to the County in a format that is compatible with the information technology system of the County.

- 55.3 **IF THE VENDOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE VENDOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THE CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT 239-533-2221, 2115 SECOND STREET, FORT MYERS, FL 33901, <http://www.leegov.com/publicrecords>.**

**56 Federal Requirements**

- 56.1 In the event this Contract is paid in whole or in part from any Federal Governmental agency or source, the specific terms, regulations and requirements governing the disbursement of these funds are incorporated by reference and made a part of this Contract as if attached hereto and become a part of this clause.

End of General Conditions Section

## SCOPE OF WORK AND SPECIFICATIONS

### 1. GENERAL SCOPE OF WORK

- 1.1 Lee County Board of County Commissioners and the Utilities Department seek to contract with a qualified Contractor to provide necessary services for the replacement of the effluent pump station. The effluent pump station consists of an 8-foot diameter wet well approximately 15-feet deep, with (3) vertical turbine pumps and above ground piping and controls. The above ground portion consists of a concrete slab that is approximately 17-feet long by 10-feet wide with a steel I-beam and steel plate system, used to support the pumps and piping. Due to the harsh environment and despite continual maintenance, the steel support system has deteriorated. This project will include modifications to the wet well concrete lid configuration, include construction on new discharge piping, (3) new submersible pumps, changes to the chlorine dosing system, including modifying the chlorine disinfection system from a constant feed rate to a variable feed system to be paced with the actual plant flow rate and other ancillary improvements.
- 1.2 The scope of work is further defined and detailed within the attached specifications package titled Technical Specifications affixed to this solicitation package as well as within the plans associated with this project. Bidders are responsible for reviewing all documentation associated with this project.

### 2. AWARD

- 2.1 The basis of award shall be determined by the lowest Project Total Bid of the most responsive, responsible, and qualified Bidder meeting all bid specifications.
- 2.2 The County reserves the right to award to the contractor whose prices, in its sole judgement, are the most realistic in terms of provision of the best services and in the best interest of the County. Additionally, the County reserves the right to reject any and all bids at any time, unconditionally, and without cause.
- 2.3 The County reserves the right to reject any bids or portion of the bid with just cause, which shall include, but not limited to an “unbalanced bid”, to the detriment of the County. An “unbalanced bid” shall include: excessive unit pricing, other unfair pricing for materials or labor, or a disproportionate allocation of cost to the County for the actual construction performed.

End of Scope of Work and Specifications Section

## **SUPPLEMENTAL INFORMATION**

None.

End of Supplemental Information Section

It is the Bidder's/Proposer's responsibility to review the submittal request in its entirety and ensure that all submittal requirements are included within their submission package. Failure to submit required forms may deem your company as non-responsive.

## FORMS DESCRIPTION & INSTRUCTIONS

### *INVITATION TO BID*

This table provides a brief list, description, and instructions regarding the standard requested forms that should be submitted with all bids or proposals. This is not intended to be an all-inclusive list of forms required for your submission, but rather a guide to assist in completion of the County's standard forms. Bidders/Proposers should utilize the Lee County Document Management Form for a complete list of all forms required for project submission.

<b>Form #</b>	<b><u>Title/Description</u></b>
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<b>1</b>	<b><i>Solicitation Response Form</i></b>
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All signatures must be by a corporate authorized representative, witnessed, and corporate and/or notary seal (as applicable.) The corporate or mailing address must match the company information as it is listed with the Florida Department of State Division of Corporations. Attach a copy of the web-page(s) from <http://www.sunbiz.org> as certification of this required information. Sample attached for your reference.

Verify that all Addenda and tax identification number have been provided.

<b>1a</b>	<b><i>Bid/Proposal Form</i></b>
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This form is used to provide itemization of project cost. A more detailed "schedule of values" may be requested by the County.

<b>*</b>	<b><i>Business Relationship Disclosure Requirement</i></b>
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Sections 112.313(3) and 112.313(7), F.S., prohibit certain business relationships on the part of public officers and employees, their spouses, and their children. If this **disclosure is applicable, the Bidder must request the form entitled "INTEREST IN COMPETITIVE BID FOR PUBLIC BUSINESS"** (Required by § 112.313(12)(b), F.S.) to be completed and **returned with the Solicitation Response. It is the Bidder's responsibility to request the form and disclose this relationship; failure to do so may result in being declared non-responsive.**

NOTICE: UNDER THE PROVISIONS OF § 112.317, F.S., A FAILURE TO MAKE ANY REQUIRED DISCLOSURE CONSTITUTES GROUNDS FOR, AND MAY BE PUNISHED BY, ONE OR MORE OF THE FOLLOWING: IMPEACHMENT, REMOVAL OR SUSPENSION FROM OFFICE OR EMPLOYMENT, DEMOTION, REDUCTION IN SALARY, REPRIMAND, OR A CIVIL PENALTY NOT TO EXCEED \$10,000.00.

<b>2</b>	<b><i>Affidavit Certification Immigration Laws</i></b>
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Submission of this form constitutes acknowledgement that the Bidder is in compliance in regard to all applicable immigration laws.

3

**Reference Survey**

Provide this form to reference respondents. For Bids, this form will be requested from the apparent low Bidder prior to the award. (not required to submit with bid)

1. **Section 1:** Bidder/Proposer to complete with reference respondent's information prior to providing to them for their response. (This is **not** the Bidder/Proposer's information.)
2. **Section 2:** Enter the name of the Bidder/Proposer; provide the project information in which the reference respondent is to provide a response.
3. The reference respondent should complete "**Section 3.**"
4. **Section 4:** The reference respondent to print and sign name
5. **Three (3) Reference responses** are to be provided upon request.
6. Failure to obtain reference surveys may make your company non-responsive.

4

**Negligence or Breach of Contract Disclosure Form**

The form may be used to disclose negligence or breach of contract litigation that your company may have been a part of over the past ten (10) years. You may need to duplicate this form to list all history. If the Bidder has more than ten (10) lawsuits, you may narrow them to litigation of the company or subsidiary submitting the Solicitation Response. Include, at a minimum, litigation for similar projects completed in the State of Florida. Final outcome should include in whose favor the litigation was settled and whether a monetary amount was awarded. The settlement amount may remain anonymous.

If you have **no litigation**, enter "**None**" in the first "**type of incident**" block of the form. Please do not write N/A on this form.

5

**Affidavit - Principal Place of Business**

Certifies Bidder's location information.

6

**Sub-Contractor List**

To be completed and returned when sub-contractors are to be utilized and are known at the time of the submission.

7

**Public Entity Crime Form**

Any person or affiliate, as defined by statute, 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 the County; may not submit a Bid on a contract with the County for the construction or repair of a public building or a public work; may not submit Bids or leases of real property to the County; may not be Awarded or perform Work as a contractor, supplier, subcontractor, or consultant under a contract with the County, and may not transact business with the County in excess of \$25,000.00 for a period of thirty-six (36) months from the date of being placed on the convicted vendor list.

8

**Trench Safety**

Typically required in construction projects where trench excavations are in excess of 5 feet deep per Florida Trench Safety Act (90-96, Laws of Florida)

9

**Bid Bond**

Guarantee to County that Bidder/Proposer will take on job if selected.

10

**Signatory Authorization Affidavit**

Providing Authorization to individuals to execute legal documents on behalf of the Bidder/Proposer.



**11**

***Minimum Qualifications Requirements***

States the minimum qualifications the Bidder/Proposer is required to meet in order to be considered for award or evaluation.

\*

***Bid/Proposal Label***

Self-explanatory. Please affix to the outside of the sealed submission documents.

\*

***Include any licenses or certifications requested***

Local Business Tax Account (as applicable) issued by City and/or County entity. This is necessary for all Florida vendors.

It is the Bidder's responsibility to ensure the Solicitation Response is mailed or delivered in time to be received no later than the specified opening date and time. (If Solicitation is not received prior to the deadline, it cannot be considered or accepted)



LEE COUNTY PROCUREMENT MANAGEMENT
SOLICITATION RESPONSE FORM

Date Submitted: \_\_\_\_\_ Deadline Date: 7/17/2018

SOLICITATION IDENTIFICATION: B180367DLK

SOLICITATION NAME: Pine Island WWTP Effluent Pump Station Replacement

COMPANY NAME: \_\_\_\_\_

NAME & TITLE: (TYPED OR PRINTED) \_\_\_\_\_

BUSINESS ADDRESS: (PHYSICAL) \_\_\_\_\_

CORPORATE OR MAILING ADDRESS: \_\_\_\_\_

[ ] SAME AS PHYSICAL

ADDRESS MUST MATCH SUNBIZ.ORG

E-MAIL ADDRESS: \_\_\_\_\_

PHONE NUMBER: \_\_\_\_\_ FAX \_\_\_\_\_

NOTE REQUIREMENT: IT IS THE SOLE RESPONSIBILITY OF THE BIDDER/PROPOSER TO CHECK LEE COUNTY PROCUREMENT MANAGEMENT WEB SITE FOR ANY ADDENDA ISSUED FOR THIS PROJECT. THE COUNTY WILL POST ADDENDA TO THIS WEB PAGE, BUT WILL NOT NOTIFY.

By responding to this sealed solicitation, the Bidder/Proposer makes all representations required by the instructions and further warrants and represents that: Bidder/Proposer has examined copies of all the solicitation documents and of the following addenda:

No. \_\_\_\_\_ Dated: \_\_\_\_\_ No. \_\_\_\_\_ Dated: \_\_\_\_\_ No. \_\_\_\_\_ Dated: \_\_\_\_\_
No. \_\_\_\_\_ Dated: \_\_\_\_\_ No. \_\_\_\_\_ Dated: \_\_\_\_\_ No. \_\_\_\_\_ Dated: \_\_\_\_\_

Tax Payer Identification Number: \_\_\_\_\_

(1) Employer Identification Number -OR- (2) Social Security Number:

\*\* Lee County collects your social security number for tax reporting purposes only

Please submit a copy of your registration from the website www.sunbiz.org establishing your firm as authorized (including authorized representatives) to conduct business in the State of Florida, as provided by the Florida Department of State, Division of Corporations. (a sample is attached for your reference)

1 Collusion Statement: Lee County, Florida The undersigned, as Bidder/Proposer, hereby declares that no person or other persons, other than the undersigned, are interested in this solicitation as Principal, and that this solicitation is submitted without collusion with others; and that we have carefully read and examined the specifications or scope of work, and with full knowledge of all conditions under which the services herein is contemplated must be furnished, hereby bid/propose and agree to furnish this service according to the requirements set out in the solicitation documents, specifications or scope of work for said service for the prices as listed on the county provided price sheet or (CCNA) agree to negotiate prices in good faith if a contract is awarded.

2 Scrutinized Companies Certification: Section 287.135, FL §, "Prohibition against contracting with scrutinized companies." Prohibits agencies from contracting with companies, for goods or services over \$1,000,000, that are on the Scrutinized Companies with Activities in Sudan List, the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, Scrutinized Companies that Boycott Israel List, have been engaged in a boycott of Israel, or been engaged in business operations in Cuba or Syria. The County reserves the right to review, on a case-by-case basis, and waive this stipulation if it is deemed to advantageous to the County.

As the person authorized to sign on behalf of Respondent, I hereby certify that the company identified above is in compliance with Section 287.135, FL §. I understand that submission of a false certification may subject company to contract termination, civil penalties, attorney's fees, and/or costs.

**Form#1 – Solicitation Form, Page 2**

**3 Business Relationship Disclosure Requirement:** Sections 112.313(3) and 112.313(7), FL §, prohibit certain business relationships on the part of public officers and employees, their spouses, and their children. See Part III, Chapter 112, FL §, and/or the brochure entitled "A Guide to the Sunshine Amendment and Code of Ethics for Public Officers, Candidates and Employees" for more details on these prohibitions. However, Section 112.313(12), FL § (1983), provides certain limited exemptions to the above-referenced prohibitions, including one where the business is awarded under a system of sealed, competitive bidding; the public official has exerted no influence on bid negotiations or specifications; and where disclosure is made, prior to or at the time of the submission of the bid, of the official's or his spouse's or child's interest and the nature of the intended business. The Commission on Ethics has promulgated this form for such disclosure, if and when applicable to a public officer or employee.

**If this disclosure is applicable request form "INTEREST IN COMPETITIVE BID FOR PUBLIC BUSINESS" (Required by 112.313(12)(b), FL § (1983)) to be completed and returned with solicitation response. It is the bidder/proposer's responsibility to disclose this relationship, failure to do so could result in being declared non-responsive.**

**Business Relationship Applicable (request form)**       **Business Relationship NOT Applicable**

**4** Disadvantaged Business Enterprise (DBE) bidder/proposer? If yes, please attach a current certificate. Yes      No

**ALL SUBMISSIONS MUST BE EXECUTED BY AN AUTHORIZED AUTHORITY OF THE BIDDER/PROPOSER. WITNESSED AND SEALED (AS APPLICABLE)**

\_\_\_\_\_  
Company Name (Name printed or typed)



\_\_\_\_\_  
Authorized Representative Name (printed or typed)

(Affix Corporate Seal, as applicable)

\_\_\_\_\_  
Authorized Representative's Title (printed or typed)

\_\_\_\_\_  
Witnessed/Attested by: (Witness/Secretary name and title printed or typed)

\_\_\_\_\_  
Authorized Representative's Signature

\_\_\_\_\_  
Witness/Secretary Signature

Any blank spaces on the form(s), qualifying notes or exceptions, counter offers, lack of required submittals, or signatures, on County's Form may result in the submission being declared non-responsive by the County.

## Detail by Entity Name

### Florida Profit Corporation

Bill's Widget Corporation

### Filing Information

Document Number 655555  
 FE/EIN Number 5111111111  
 Date Filed 09/22/1980  
 State FL  
 Status ACTIVE  
 Last Event AMENDED AND RESTATED ARTICLES  
 Event Date Filed 07/25/2006  
 Event Effective Date NONE

### Principal Address

555 N Main Street  
Your Town, USA 99999

Changed 02/11/2012

Verify either Principal or Mailing address is on Form 1

### Mailing Address

555 N Main Street  
MYour Town, USA 99999

Changed 02/11/2012

### Registered Agent Name & Address

My Registered Agent  
111 Registration Road  
Registration, USA99999

Name Changed:12/14/2006

Address Changed: 12/14/2006

### Officer/Director Detail

#### Name & Address

Title P

President, First  
555 AVENUE  
Anytown, USA99999

Title V

President, Second  
555 AVENUE  
Anytown, USA99999

#### IMPORTANT:

For corporations, ALL documents must be signed by the president of the company or an authorized individual. For any individual other than the president, we will need one of the following to confirm their authority to sign:

1. a corporate resolution by the Board of Directors, or
2. an extract of minutes, or
3. an extract of Vote by the Board of Directors

If the company's articles of incorporation identify additional positions that have the power to bind the corporation, we will accept the articles of incorporation with verification from the president that a certain individual serves in that role (e.g., the president confirms that John Doe is the CEO, and the articles of incorporation provide that the CEO has the power to bind the company).

With respect to an LLC, the authority to bind a limited liability company is controlled by Florida statutes. Managers or managing members have inherent authority to bind an LLC.

If the president of a corporation or a manager/managing member of an LLC delegates their authority, such delegation must be sent to us on company letterhead with the President's or manager's/managing member's original, wet signature.

v01/03/2018

STATE OF FLORIDA

SECRET

REGISTRATION DIVISION



Lee County Procurement Management  
**BID/PROPOSAL FORM**

Company Name: \_\_\_\_\_

Pine Island WWTP Effluent Pump Station

Solicitation # **B180367DLK** Solicitation Name **Replacement**

Having carefully examined the “Terms and Conditions”, and the “Detailed Scope of Work”, all of which are contained herein, propose to furnish the following which meet these specifications.

Please include this page with your submission package.

<i>Item #</i>	<i>Description</i>	<i>Unit of Measure</i>	<i>Quantity</i>	<i>Unit Price</i>	<i>Total Cost</i>
1a	Mobilization/Demobilization	LS	1		
1b	Survey stakeout/As-builts	LS	1		
1c	Preconstruction video	LS	1		
1d	Bond/Insurance	LS	1		
1e	Testing	LS	1		
2	Bypass Pumping Requirements (include variable pumps, automatic valves, check valves, flow meters, 6” piping, etc.)	LS	1		
3	Miscellaneous Demolition and Removal of Metal Support Plate	LS	1		
4	Furnish and Install Submersible Pumps including Misc. Piping and Appurtenances	EA	3		
5	Furnish and Install Corrosion Resistant Air Blower	EA	1		
6	Furnish and Install Air Release Valve Assembly	EA	3		
7	Furnish and Install 8-inch Emergency Pump-Out and air vent	EA	1		
8	Furnish and Install 8-inch Ductile Iron Pipe and Fittings	LF	85		
9	Furnish and Install 8-inch Magnetic Flowmeters	EA	2		
10	Furnish and Install 4-inch Swing Check Valve (FLG)	EA	3		
11a	Furnish and Install 4-inch Plug Valve (FLG)	EA	3		
11b	Furnish and Install 8-inch Plug Valve (FLG)	EA	1		
12	Furnish and Install 8-inch Butterfly Valve, Motorized (FLG)	EA	2		
13a	Furnish and Install 8-inch Gate Valve (MJ)	EA	1		
13b	Furnish and Install 10-inch Gate Valve (MJ)	EA	1		
14	Furnish and Install Wet Well Coating System	LS	1		
15	Furnish and Install Wet Well Top Slab, Access Hatch and Vents	LS	1		
16	Furnish and Install Concrete Pad (10” thick)	SY	20		
17	Furnish and Install Bedding Rock (4-inch thick) with Filter Fabric	SY	30		

18	Electrical Improvements	LS	1		
19	Ground and Resistance Testing	LS	1		
20	Instrumentation Improvements	LS	1		
<b>Grand Total</b>					

Amount Written \_\_\_\_\_



LEE COUNTY  
S O U T H W E S T F L O R I D A

**AFFIDAVIT CERTIFICATION IMMIGRATION LAWS**

SOLICITATION NO.: B180367DLK SOLICITATION NAME: Pine Island WWTP Effluent Pump Station Replacement

LEE COUNTY WILL NOT INTENTIONALLY AWARD COUNTY CONTRACTS TO ANY CONTRACTOR WHO KNOWINGLY EMPLOYS UNAUTHORIZED ALIEN WORKERS, CONSTITUTING A VIOLATION OF THE EMPLOYMENT PROVISIONS CONTAINED IN 8 U.S.C. SECTION 1324 a(e) {SECTION 274A(e) OF THE IMMIGRATION AND NATIONALITY ACT (“INA”).

LEE COUNTY MAY CONSIDER THE EMPLOYMENT BY ANY CONTRACTOR OF UNAUTHORIZED ALIENS A VIOLATION OF SECTION 274A(e) OF THE INA. **SUCH VIOLATION BY THE RECIPIENT OF THE EMPLOYMENT PROVISIONS CONTAINED IN SECTION 274A(e) OF THE INA SHALL BE GROUNDS FOR UNILATERAL CANCELLATION OF THE CONTRACT BY LEE COUNTY.**

BIDDER/PROPOSER ATTESTS THAT THEY ARE FULLY COMPLIANT WITH ALL APPLICABLE IMMIGRATION LAWS (SPECIFICALLY TO THE 1986 IMMIGRATION ACT AND SUBSEQUENT AMENDMENTS).

Company Name: \_\_\_\_\_

\_\_\_\_\_  
Signature Title Date

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_

The foregoing instrument was signed and acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_  
20\_\_\_\_, by \_\_\_\_\_ who has produced

(Print or Type Name)  
\_\_\_\_\_ as identification.

(Type of Identification and Number)

\_\_\_\_\_  
Notary Public Signature

\_\_\_\_\_  
Printed Name of Notary Public

\_\_\_\_\_  
Notary Commission Number/Expiration

The signee of this Affidavit guarantee, as evidenced by the sworn affidavit required herein, the truth and accuracy of this affidavit to interrogatories hereinafter made. **LEE COUNTY RESERVES THE RIGHT TO REQUEST SUPPORTING DOCUMENTATION, AS EVIDENCE OF SERVICES PROVIDED, AT ANY TIME.**



Lee County Procurement Management

**REFERENCE SURVEY**

**Solicitation # B180367DLK**

Pine Island WWTP Effluent Pump Station Replacement

<b>Section 1</b>	Reference Respondent Information	<b>Please return completed form to:</b>	
<b>FROM:</b>	_____	<b>Bidder/Proposer:</b>	
<b>COMPANY:</b>	_____	<b>Due Date:</b>	
<b>PHONE #:</b>	_____	<b>Total # Pages: 1</b>	
<b>FAX #:</b>	_____	<b>Phone #:</b>	<b>Fax #:</b>
<b>EMAIL:</b>	_____	<b>Bidder/Proposer E-Mail:</b>	

<b>Section 2</b>	Enter Bidder/Proposer Information, as applicable Similar Performed Project (Bidder/Proposer to enter details of a project performed for above reference respondent)		
Bidder/Proposer Name:	_____		
Reference Project Name:	Project Address:	Project Cost:	
Summarize Scope:			

**You as an individual or your company has been given as a reference on the project identified above. Please provide your responses in section 3 below.**

<b>Section 3</b>		Indicate: "Yes" or "No"
1. Did this company have the proper resources and personnel by which to get the job done?		
2. Were any problems encountered with the company's work performance?		
3. Were any change orders or contract amendments issued, other than owner initiated?		
4. Was the job completed on time?		
5. Was the job completed within budget?		
6. On a scale of one to ten, ten being best, how would you rate the overall work performance, considering professionalism; final product; personnel; resources. <span style="float: right;">Rate from 1 to 10. (10 being highest)</span>		
7. If the opportunity were to present itself, would you rehire this company?		
8. Please provide any additional comments pertinent to this company and the work performed for you:		

<b>Section 4</b>	
Reference Name (Print)	<b>Please submit non-Lee County employees as references</b>
Reference Signature	





## ALLEGED NEGLIGENCE OR BREACH OF CONTRACT DISCLOSURE FORM

Please fill in the form below. Provide each incident in regard to alleged negligence or breach of contract that has occurred over the past 10 years.  
Please complete in chronological order with the most recent incident on starting on page 1.

**Company Name:** \_\_\_\_\_

Type of Incident <i>Alleged Negligence or Breach of Contract</i>	Incident Date And Date Filed	Plaintiff <i>(Who took action against your company)</i>	Case Number	Court <i>County/State</i>	Project	Claim Reason <i>(initial circumstances)</i>	Final Outcome <i>(who prevailed)</i>

Make as many copies of this sheet as necessary in order to **provide a 10 year history** of the requested information. If there is no action pending or action taken in the last 10 years, complete the **company name** and write **“NONE”** in the first **“Type of Incident”** box of this page and return with your submission package. This form should also include the primary partners listed in your submission. Do not include litigation with your company as the plaintiff. Final outcome should include who prevailed and what method of settlement was made. If a monetary settlement was made the amount may remain anonymous. **Please do not modify this form (expansion of spacing allowed) or submit your own variation.**

Page Number: \_\_\_\_\_ Of \_\_\_\_\_ Total pages

Update the page number to reflect the current page and the total number of pages. Example: Page 3, of 5 total submitted pages of this form.



# LEE COUNTY

S O U T H W E S T F L O R I D A

## AFFIDAVIT PRINCIPAL PLACE OF BUSINESS

Instructions: Please complete all information that is applicable to your firm

Company Name: \_\_\_\_\_

Printed name of authorized signer \_\_\_\_\_

Title \_\_\_\_\_

⇒  
Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

The signee of this Affidavit guarantee, as evidenced by the sworn affidavit required herein, the truth and accuracy of this affidavit to interrogatories hereinafter made. **LEE COUNTY RESERVES THE RIGHT TO REQUEST SUPPORTING DOCUMENTATION, AS EVIDENCE OF SERVICES PROVIDED, AT ANY TIME.**

Notary:

State of \_\_\_\_\_

County of \_\_\_\_\_

The foregoing instrument was signed and acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_

**20** \_\_\_\_\_, \_\_\_\_\_ who has produced

\_\_\_\_\_ as identification (or personally known)

Type of ID and number

⇒  
Notary Public Signature \_\_\_\_\_

Notary Commission Number and expiration \_\_\_\_\_

1. Principal place of business is located within the boundaries of: \_\_\_\_\_ Lee County  
\_\_\_\_\_ Collier County  
\_\_\_\_\_ Non-Local

Local Business Tax License # \_\_\_\_\_

2. Address of Principal Place of Business: \_\_\_\_\_

3. Number of years at this location \_\_\_\_\_ years

4. Have you provided goods or services to Lee County on a regular basis within the past 3 consecutive years \_\_\_\_\_ Yes\* \_\_\_\_\_ No \*If yes, attach contractual history for past 3 consecutive years

5. Number of available employees for this contract \_\_\_\_\_

6. Does your company have a Drug Free Workplace Policy \_\_\_\_\_ Yes \_\_\_\_\_ No

Form 6-Sub-contractor List



SUB-CONTRACTOR LIST

Sub-contractor Name	Area Of Work	Point Of Contact Or Project Supervisor	Phone Number and Email	Qualified DBE Yes/No	Amount or Percentage of Total

Please include sub-contractors name, area of work (i.e. mechanical, electrical, etc.) and a **valid** phone number and email. Also include the dollar value or percentage that the sub-contractor will be performing. If sub-contractors qualify as Disadvantaged Business Enterprise (**DBE**) contractors, please attach a current certificate.

This form must be signed and sworn to in the presence of a notary public or other officer authorized to administer oaths.

1. This sworn statement is submitted to \_\_\_\_\_  
(Print name of the public entity)

by \_\_\_\_\_  
(Print individual's name and title)

for \_\_\_\_\_  
(Print name of entity submitting sworn statement)

whose business address is \_\_\_\_\_

(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: On the attached sheet.) Required as per IRS Form W-9.

2. 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, and bid or contract for goods or services to be provided to any public entity or agency or political subdivision or any other state or of the United States, and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.

3. I understand that "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.

4. I understand that "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 offices, directors, executives, partners, shareholders, employees, members and agents who are active in the management of the affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not fair market value under an arm's length Agreement/Contract, shall be a 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.

5. I understand that a "person" as defined in Paragraph 287.133(1) (c), Florida Statutes, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by 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 the entity.

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

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

**Public Entity Crime Form**

\_\_\_\_\_ The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, member, or agents who are active in management of the entity, or an affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989.

\_\_\_\_\_ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, member, 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. However, there has been subsequent proceeding before a Hearing Officer of the State of Florida, Division of Administrative Hearing and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted vendor list. (Attach a copy of the final order)

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1 (ONE) ABOVE IS FOR THAT PUBLIC ENTITY ONLY AND, THAT THIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IS FILED. I ALSO UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY PRIOR TO ENTERING INTO A CONTRACT IN EXCESS OF THE THRESHOLD AMOUNT PROVIDED IN SECTION 287.017, FLORIDA STATUTES, FOR CATEGORY TWO OR ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_

PERSONALLY APPEARED BEFORE ME, the undersigned authority, \_\_\_\_\_

(Name of individual signing)

who, after first being sworn by me, affixed his/her signature in the space provided above on this \_\_\_\_\_ day of \_\_\_\_\_, 2\_\_\_\_\_.

\_\_\_\_\_  
(NOTARY PUBLIC)

My Commission Expires: \_\_\_\_\_

**Form#8: Trench Safety (Required for Construction Projects Only)**

**TRENCH SAFETY**

Contractor/Vendor acknowledges that included in the appropriate solicitation items of the solicitation and in the Total solicitation price are costs for complying with the Florida Trench Safety Act (90-96, Laws of Florida) effective October 1, 1990. The contractor/vendor further identifies the costs of such compliance to be summarized below:

Trench Safety Measure (Description)	Units of Measure (LF, SF)	Unit (Quantity)	Unit Cost	Extended Cost
.....				
A. _____	_____	_____	_____	_____
B. _____	_____	_____	_____	_____
C. _____	_____	_____	_____	_____
D. _____	_____	_____	_____	_____
TOTAL \$ _____				

If applicable, the contractor/vendor certifies that all trench excavation done within his control in excess of five (5') feet in depth shall be in accordance with the Florida Department of Transportation's Special Provisions Article 125-1 and Sub-article 125-4.1 (TRENCH EXCAVATION SAFETY SYSTEM AND SHORING, SPECIAL-TRENCH EXCAVATION).

Failure to complete the above may result in the solicitation being declared non-responsive.

\_\_\_\_\_  
*(Signature)*

\_\_\_\_\_  
*(Company Name)*

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_

The foregoing instrument was acknowledged before me this \_\_\_\_ day of \_\_\_\_\_ by \_\_\_\_\_ *(name and title of corporate officer)* of \_\_\_\_\_ *(name of corporation)*, a \_\_\_\_\_ *(state or place of incorporation)* corporation, on behalf of the corporation. He/she is personally known to me or has produced \_\_\_\_\_ *(type of identification)* as identification.

\_\_\_\_\_  
*(signature line for notary public)*

\_\_\_\_\_  
*(name of notary typed, printed or stamped)*

\_\_\_\_\_  
*(title or rank)*

\_\_\_\_\_  
*(serial number, if any)*

My commission expires:  
\_\_\_\_\_

BID BOND

Complete EITHER Lee County Paper Bid Bond OR provide cashier's check

KNOW ALL MEN BY THESE PRESENTS, that we

\_\_\_\_\_ as Principal, and  
(BIDDER'S Name)  
\_\_\_\_\_ a Corporation licensed to do  
(Surety's Name)

business under the laws of the State of Florida as a Surety, are held and firmly bound unto LEE COUNTY BOARD OF COUNTY COMMISSIONERS, LEE COUNTY, FLORIDA, a Political Subdivision of the State of Florida,  
in the SUM OF \_\_\_\_\_  
for the payment whereof, well and truly to be made, we bind ourselves, our heirs, successors, personal representatives and assigns, jointly and severally, firmly, by these presents.

SIGNED AND SEALED this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_

WHEREAS, said Principal is herewith submitting a Bid/Proposal for the construction of:

NOW, THEREFORE, the condition of the above obligation is such that if said Principal shall be awarded the Contract upon said Bid/Proposal within the specified time and shall enter into a written Contract, satisfactory in form, provide an acceptable Public Payment & Performance Bond from a Surety acceptable to the COUNTY and provide other Insurance as may be required to the COUNTY within seven (7) calendar days after the written Notice of Award date, or within such extended period as the COUNTY may grant, then this obligation shall be null and void; otherwise said Principal and Surety shall pay to said COUNTY in money the difference between the amount of the Bid of said Principal and the amount for which said COUNTY may legally contract with another party to perform said work, if the latter amount be in excess of the former, together with any expenses and reasonable attorney's fees incurred by said COUNTY if suit be brought here on, but in no event shall said Surety's liability exceed the penal sum hereof plus such expenses and attorney's fees. For purposes of unsuccessful bid protests filed by the Principal herein, this obligation shall bind the Surety to pay costs and damages associated with the bid protest or delays to the project upon a finding from the Board of County Commissioners for Lee County that the bid protest was frivolous and/or lacked merit. The liability of the Surety shall not exceed the penal sum of the bid bond.

Witness as to Principal: \_\_\_\_\_ (SEAL)  
(Principal)

\_\_\_\_\_  
(By) Printed Name

Witness as to Surety: \_\_\_\_\_ (SEAL)  
(Surety's Name)

\_\_\_\_\_  
(By-As Attorney-in-Fact, Surety)

Affix Corporate Seals and attach proper Power of Attorney for Surety.

Form 10: *Signatory Authorization Affidavit*



Lee County Procurement Management  
Signatory Authorization Affidavit

**Date:** July 17, 2018.    **Solicitation No.:** B180367DLK

**Solicitation Name:** Pine Island WWTP Effluent Pump Station Replacement

AUTHORIZATION: The following individuals are hereby authorized, as representatives of the Bidder/Proposer, identified below, to execute legally binding documents on behalf of the Bidder/Proposer. The signee of this Affidavit guarantees, as evidenced by the sworn affidavit required herein, the truth and accuracy of this affidavit to interrogatories hereinafter made. Lee County reserves the right to request supporting documentation, as evidence of services provided, at any time.

INSTRUCTIONS: This Authorization Affidavit shall only be executed by the following:

- Corporation:            President
- LLC:                      Managing Member
- Sole Proprietor:       Owner

Attach corporate designation documentation, if applicable.

**Bidder/Proposer Name:** \_\_\_\_\_

Authorized Signatory Name	Title

By execution of this document, I hereby authorize the individuals shown above to execute legally binding documents on behalf of the Bidder/Proposer. I further acknowledge that it shall be my responsibility to provide an updated Signatory Authorization Affidavit upon any change in authorization to the Lee County Procurement Management Department, Attention: Procurement Management Director, 1500 Monroe Street, 4<sup>th</sup> Floor, Fort Myers, FL 33901.

\_\_\_\_\_  
*(Signature)*                                  *(Title: President, Managing Member, Owner)*                                  *(Date)*

\_\_\_\_\_  
*(printed name)*

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_

The foregoing instrument was signed and acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_  
20\_\_\_\_ who produced the following as identification \_\_\_\_\_  
*(type Identification and number or personally known)*

\_\_\_\_\_  
*Notary Public Signature*                                  *Printed Name of Notary Public*                                  *Commission Number/Expiration*



Form 11: Minimum Qualifications Requirements



LEE COUNTY  
S O U T H W E S T F L O R I D A

**MINIMUM QUALIFICATION REQUIREMENTS**

**FOR**

***B180367DLK, Pine Island WWTP Effluent Pump Station Replacement***

Bidder(s)/Proposer(s) must meet the minimum qualification requirements as specified in the following form to qualify for consideration of award. This form must be completed and returned with the proposal submittal along with any supporting documentation where requested and/or indicated herein.

The County reserves the right, in their sole judgment, to determine to its satisfaction whether the Bidder(s)/Proposer(s) has met the minimum qualification requirements as specified herein. The determination shall be based upon the examination of the Minimum Qualification Requirements form and associated supportive documentation (if any requested).

An affirmative determination shall be a prerequisite for award of the contract to the Bidder(s)/Proposer(s). A negative determination shall result in disqualification of the proposal, in which event the County shall exclude the proposal from the evaluation or consideration process and therefore deeming the Bidder(s)/Proposer(s) ineligible for award.

**1. CRITERIA 1 – Experience with Water and/or Wastewater pump station rehab:** Contractor should be qualified and experienced in the construction and/or rehabilitation of water and/or wastewater pump stations.

Has your firm successfully completed a water and/or wastewater pump station project, within the past 5 years?

\_\_\_\_\_ **YES** \_\_\_\_\_ **NO**

If YES, provide details as requested below:

- Provide name of project and Owner’s contact name, phone number and email address.

Project Name: \_\_\_\_\_

Owner Name, phone number and email: \_\_\_\_\_

**2. CRITERIA 2 – Experience with Water and/or Wastewater plants:** Contractor should be qualified and experienced in the successful completion of water and/or wastewater plant projects.

Has your firm successfully completed a water and/or wastewater plant project, within the past 5 years?

\_\_\_\_\_ **YES** \_\_\_\_\_ **NO**

If YES, provide details as requested below:

- Provide name of project and Owner’s contact name, phone number and email address.

Project Name: \_\_\_\_\_

Owner Name, phone number and email: \_\_\_\_\_

Authorized Bidder/Proposer Signature

Date:

Authorized Bidder/Proposer Name (Print or Type)

*Sealed Bid Label*

**Cut along the outer border and affix this label to your sealed solicitation envelope to identify it as a “Sealed Bid”.**

<b>SEALED BID DOCUMENTS • DO NOT OPEN</b>	
BID No.:	B180367DLK
BID TITLE:	Pine Island WWTP Effluent Pump Station Replacement
DATE DUE:	<b>Tuesday, July 17, 2018</b>
TIME DUE:	<b>Prior to: 2:30 PM</b>
SUBMITTED BY:	_____ (Name of Company)
e-mail address	Telephone
<b>DELIVER TO:</b>	Lee County Procurement Management 1500 Monroe 4 <sup>th</sup> Floor Fort Myers FL 33901
<i>Note: submissions received after the time and date above will not be accepted.</i>	



Lee County Procurement Management  
1500 Monroe Street, 4<sup>th</sup> Floor  
Fort Myers, FL 33901  
(239) 533-8881  
[www.leegov.com/procurement](http://www.leegov.com/procurement)

**PLEASE PRINT CLEARLY**

**PROJECT MANUAL**

**LEE COUNTY UTILITIES**

**CIP NUMBER: 7318**

**CIP PROJECT NAME: Pine Island WWTP Effluent Pump Station Replacement**

**Bid Set  
Technical Specifications**

*Prepared for:*

**Lee County Utilities  
1500 Monroe Street  
Third Floor  
Fort Myers, Florida 33901**

*Prepared by:*

**Lee County Utilities  
1500 Monroe Street  
Third Floor  
Fort Myers, Florida 33901**

**February 2018**

**LEE COUNTY UTILITIES  
PINE ISLAND WASTEWATER TREATMENT PLANT EFFLUENT PUMP STATION  
REPLACEMENT**

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*The Contractor shall complete all work in conformance with the Lee County Utilities Design Manual, latest revision, and as provided herein these technical specifications. The latest version of the Design Manual is available at the Lee County Website:*

*<https://www.lee.gov/utilities/new-development/design-manual>*

Supplementary General Conditions

Part G

*In particular, the following technical specifications of the Design Manual shall apply to this project:*

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**LEE COUNTY UTILITIES  
PINE ISLAND WASTEWATER TREATMENT PLANT EFFLUENT PUMP STATION  
REPLACEMENT**

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**LEE COUNTY UTILITIES  
PINE ISLAND WASTEWATER TREATMENT PLANT EFFLUENT PUMP STATION  
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## SUPPLEMENTARY GENERAL CONDITIONS

These Supplementary General Conditions amend or supplement the LEE COUNTY CONSTRUCTION CONTRACT GENERAL CONDITIONS (PART F) as indicated herein. All provisions which are not so amended or supplemented remain in full force and effect.

### 1.1 DESCRIPTION

#### A. Contractor's Responsibilities

1. The Contractor shall provide temporary power for the Contractor's construction operations, as necessary.
2. All work conducted at night or under conditions of deficient daylight shall be suitably lighted to insure proper work and to afford adequate facilities for inspection and safe working conditions. Temporary lighting shall be provided by the Contractor.
3. All wiring for temporary electric light and power shall be properly installed and maintained and shall be securely fastened in place. All electrical facilities shall conform to the requirements of Subpart K of the OSHA Safety and Health Standards for Construction.
4. The Contractor shall provide water for the Contractor's construction operations.
5. The Contractor may install a temporary water service connection to an existing potable waterline within the area. The Contractor shall be responsible for installing a registered meter and monitoring flow. Consumption will be charged at the current rate by the water service provider.
6. 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.
7. Such facilities shall be made available when the first employees arrive on the work site, shall be properly secluded from public observation, and shall be constructed and maintained in suitable numbers and at such points and in such manner as may be required.
8. The Contractor shall maintain the sanitary facilities in a satisfactory and sanitary condition at all times and shall enforce their use. The Contractor shall rigorously prohibit the committing of nuisances on the site of the work, on County land, or an adjacent property.

9. The County and the Owner's Representative shall have the right to inspect any building or other facility erected, maintained, or used by the Contractor, to determine whether or not the sanitary regulations have been complied with.
10. 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 Owner's Representative and in accordance with all laws and regulations pertaining thereto.
11. Original warranties, called for in the Contract Documents, shall be submitted to the County through the Owner's Representative. When warranties are required, they shall be submitted prior to request for payment.
12. The Contractor shall guarantee that all materials, equipment, structures and work performed are free from defects in workmanship, design or materials for a period of one year after installation and acceptance. If any part of the work shall fail within this period, it shall be replaced and the unit restored to operation at no cost to the Owner.
13. When advance copies of warranties are requested, they shall be submitted with, and considered as shop drawings.
14. References to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations Code of Federal Regulations (OSHA), including all changes and amendments thereto.
15. References 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.
16. The Contractor shall employ a Florida Registered Professional Land Surveyor, for the completion of Record Drawings.
17. As-Built or Record Drawing data, with respect to the relocation and depth of the constructed utility lines or facilities, shall be taken and recorded on a set of plans, while the construction work is in progress.
18. During the entire construction operation, the Contractor shall maintain as-built records showing the work performed and any deviations from the Drawings and Specifications and shall prepare them from a complete set of Record Drawings showing correctly and accurately all surface and subsurface structures, lines, valves, fittings, services, concrete pads, edge of pavement, and other pertinent items. Actual elevations and distances of surface and subsurface structures from centerline or other appropriate



reference shall be included to reflect the work as it was actually constructed. These drawings shall conform to recognized standards of drafting and shall be neat and legible.

19. Complete as-built record drawings shall be submitted to the Engineer for review no later than 30 working days after installation of the utility or appurtenances. Final contract payment will not be made to the Contractor until Record Drawings, signed and sealed by a Florida Registered P.L.S., have been submitted to the Department of Lee County Utilities representative and accepted. The basis of payment shall be included in the cost of all Pay Items.
20. All paved areas 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 temporary and permanent pavement shall conform to the requirements of the County. All pavements which are subject to partial removal shall be neatly saw cut in straight lines.
21. Wherever required by the County, the Contractor shall place temporary surfacing promptly after backfilling and shall maintain such surfacing for the period of time fixed by the County before proceeding with the final restoration of improvements.
22. 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.
23. During adverse weather, and against the possibility thereof, the Contractor shall take all necessary precautions so that the work may be properly done and satisfactorily in all respects. When required, protection shall be provided by use of tarpaulins, shelters, or other acceptable means.
24. The Owner's Representative may suspend construction operations at any time when, in the judgement of the Owner's Representative, the conditions are unsuitable or the proper precautions are not being taken, whatever the weather conditions may be, in any season.
25. The Contractor shall take all precautions necessary to protect the work during hurricane and storm watches and warnings.
26. The Contractor shall be responsible for the prompt submittal of all shop drawings so that there shall be no delay to work due to the absence of such

drawings. The Owner's Representative will review submitted shop drawings and return to the Contractor (regular mail, posted) no later than 21 days after receipt.

27. The Contractor's responsibility for errors and omissions in submittals is not relieved by the Owner's Representative review of submittals. Also, the Owner's Representative review of submittals shall not be construed as a complete check and shall not relieve the Contractor from responsibility for complete compliance with the Contract requirements. No corrections, changes, or deviations indicated on submittals reviewed by the Owner shall be considered as a change order.
28. Time delays or time extensions caused by rejection of submittals are not cause for extra charges to the County.
29. All shop drawings shall be submitted to the Owner's Representative through the Contractor, including those from any subcontractors. All drawings shall be clearly marked with the name of the project, owner, Contractor, project number, and to which the drawing applies. Drawings shall be suitably numbered and stamped by the Contractor. Each shipment of drawings shall be accompanied by a Letter of Transmittal giving a list of the drawing numbers and the names mentioned above.
30. Where manufacturer's publications in the form of catalogs, brochures, illustrations, or other data sheets are submitted in lieu of prepared shop drawings, such submission shall specifically indicate the particular item offered. Identification of such items and relative pertinent information shall be made with indelible ink. Submissions showing only general information will not be accepted.
31. The Contractor shall notify the Owner's Representative, in writing at the time of submission, of deviations in submittals from the requirements of the Contract Documents. The Contractor's responsibility for deviations in submittals from the requirements of the Contract Documents is not relieved by the Owner's Representative review of submittals, unless the Owner gives written acceptance of specific deviations.
32. Original warranties, called for in the Contract Documents, shall be submitted to the County through the Owner's Representative. When warranties are required, they shall be submitted prior to request for payment.
33. When advance copies of warranties are requested, they shall be submitted with, and considered as shop drawings.
34. Performing work, supplying sufficient workmen or suitable materials or workmen shall be applicable to, but not limited to, the Maintenance of Traffic

or any portion thereof. The County may stop work because of insufficient Maintenance of Traffic practices by the Contractor.

35. In addition to defective work, the County may stop the work as specified above for the following reasons:
  - a. Failure to comply with permits regarding pollution control.
  - b. Insufficient construction, methods or materials.
  - c. Failure to provide a safe working environment in accordance with OSHA or the Department of Labor, Safety and Health Regulations.
36. Upon notice of the Stop Work Order, the Contractor shall cease all contracted work except for the activities required to correct the problem and as directed by the County.
37. If the Contractor fails to correct the problem causing the Stop Work Order and there is immediate threat to the public's health, safety, or environmental pollution, the County may perform any remedial activities necessary to protect the public and environment.
38. No increase in the Contract Price or extension of the Contract Time will be provided for any delays or loss of time due to a Stop Work Order.
39. Any costs that the County incurs in performing the work related to a Stop Work Order shall be paid by the Contractor.
40. The bid items in the Bid Schedule are defined in the technical specifications and construction drawings. Payment will be made based on the specified items included in the description for each bid item. The Contractor shall receive and accept the compensation provided in the Proposal and the Contract as full payment for furnishing and mobilization/demobilization of all materials, labor, tools, and equipment for performing all operations necessary to complete the work under the Contract; and also in full payment for all loss or damages arising from the nature of the work, or from any discrepancy between the actual quantities of work and quantities herein estimated by the Engineer, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work until the final acceptance by the Owner.
41. The prices stated in the Proposal shall include all costs and expenses for taxes, labor, equipment, materials, commissions, transportation charges and expenses, patent fees and royalties, labor for handling materials during inspection, together with any and all other costs and expenses for performing and completing the work as shown on the plans and specified herein. Should the Contractor feel that the cost for any item of work has not been established by the Bid Schedule or Basis of Payment, he shall include the cost for that work in some other applicable bid item, so that his proposal

for the project does reflect his total price for completing the work in its entirety.

42. The Owner reserves the right to alter the project, modify incidental work as may be necessary, and increase or decrease quantities of work to be performed to accord with such changes, including addition, deduction or cancellation of any one or more of the Pay Items. Changes in the work shall not be considered as a waiver of any conditions of the Contract nor invalidate the provisions thereof. When changes result in changes in quantities of work to be performed, the Contractor will accept payment according to Contract Unit Prices.
43. Payment shall fully reimburse the Contractor for cooperating with and meeting all the requirements of the State of Florida Trench Safety Act (90-96, Laws of Florida).

END OF SECTION

**DIVISION 1**  
**GENERAL REQUIREMENTS**

## SECTION 01000

### PROJECT REQUIREMENTS

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

###### A. Scope of Work:

1. The Work to be done consists of the furnishing of all labor, materials, and equipment, and the performance of all Work included in this Contract. The summary of the Work is presented in Section 01010: Summary of Project.
2. Work Included:
  - a. The Contractor shall furnish all labor, superintendence, materials, plant power, light, heat, fuel, water, tools, appliances, equipment, supplies, and means of construction necessary for proper performance and completion of the Work. The Contractor shall obtain and pay for any necessary local building permits. The Contractor shall perform and complete the Work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the ENGINEER, and in strict accordance with the Contract Documents. The Contractor shall clean up the Work and maintain it during and after construction, until accepted, and shall do all Work and pay all costs incidental thereto. He shall repair or restore all structures and property that may be damaged or disturbed during performance of the Work.
  - b. The Contractor shall provide and maintain such modern tools, and equipment as may be necessary, in the opinion of the ENGINEER, to perform in a satisfactory and acceptable manner all the Work required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The Contractor shall be solely responsible for the adequacy of his workmanship, materials, and equipment, prior approval of the ENGINEER notwithstanding.
3. Public Utility Installations and Structures:
  - a. Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, vaults, manholes, and all other appurtenances and facilities pertaining thereto whether owned or controlled by the Owner, other governmental bodies, or privately owned by individuals, firms,

or corporations, used to serve the public with transportation, traffic control, gas, electricity, telephone, sewerage, drainage, water, or other public or private property which may be affected by the Work shall be deemed included hereunder.

- b. The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. These data are not guaranteed as to their completeness or accuracy and it is the responsibility of the Contractor to make his own investigations to inform himself fully of the character, condition, and extent of all such installations and structures as may be encountered and as may affect the construction operations.
- c. The Contractor shall protect all public utility installations and structures from damage during the Work. Access across any buried public utility installation or structure shall be made to avoid any damage to these facilities. All required protective devices and construction shall be provided by the Contractor at his expense. All existing public utilities damaged by the Contractor shall be repaired by the Contractor, at his expense. No separate payment shall be made for such protection or repairs to public utility installations or structures.
- d. Public utility installations or structures owned or controlled by the Owner or other governmental body which are shown on the Drawings to be removed, relocated, replaced, or rebuilt by the Contractor shall be considered as a part of the general cost of doing the Work and shall be included in the prices bid for the various Contract Items. No separate payment shall be made therefor.
- e. Where public utility installations of structures owned or controlled by the Owner or other governmental body are encountered during the course of the Work, and are not indicated on the Drawings or in the Specifications, and when, in the opinion of the ENGINEER, removal, relocation, replacement, or rebuilding is necessary to complete the Work under this Contract, such Work shall be accomplished by the utility having jurisdiction, or such Work may be ordered, in writing by the ENGINEER, for the Contractor to accomplish. If such work is accomplished by the utility having jurisdiction it will be carried out expeditiously, and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement, or rebuilding as required. If such work is accomplished by the Contractor, it will be paid for as extra work as provided in the Agreement.

- f. The Contractor shall, at all times in performance of the Work, employ acceptable methods and exercise reasonable care and skill so as to avoid unnecessary delay, injury, damage, or destruction of public utility installations and structures; and shall, at all times in the performance of the Work, avoid unnecessary interference with, or interruption of, public utility services, and shall cooperate fully with the owners thereof to that end.
- g. The Contractor shall give written notice to Owner and other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least 10 days in advance of breaking ground in any area or on any unit of the Work.
- h. The maintenance, repair, removal, relocation, or rebuilding of public utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the owners of such utilities.

## 1.2 DRAWINGS AND PROJECT MANUAL

- A. Drawings: When obtaining data and information from the Drawings, figures shall be used in preference to scaled dimensions, and large-scale drawings in preference to small-scale drawings.
- B. Supplementary Drawings:
  - 1. When, in the opinion of the ENGINEER, it becomes necessary to explain more fully the Work to be done or to illustrate the Work further or to show any changes which may be required, drawings known as Supplementary Drawings, with specifications pertaining thereto, will be prepared by the ENGINEER, and the Contractor will be furnished one (1) complete set of reproducible construction drawings (22 inches by 34 inches) and one (1) reproducible hard copy of the Project Manual.
  - 2. The Supplementary Drawings shall be binding upon the Contractor with the same force as the Contract Drawings. Where such Supplementary Drawings require either less or more than the estimated quantities of Work, credit to the Owner or compensation therefor to the Contractor shall be subject to the terms of the Agreement.
- C. Contractor to Check Drawings and Data:
  - 1. The Contractor shall verify all dimensions, quantities, and details shown on the Drawings, Supplementary Drawings, schedules, Specifications, or other data received from the ENGINEER, and shall



notify him of all errors, omissions, conflicts, and discrepancies found therein. Failure to discover or correct errors, conflicts, or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory work, faulty construction, or improper operation resulting therefrom, nor from rectifying such conditions at his own expense. He will not be allowed to take advantage of any errors or omissions, as full instructions will be furnished by the ENGINEER, should such errors or omissions be discovered.

2. All schedules are given for the convenience of the ENGINEER and the Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract.

D. Specifications: The Technical Specifications consist of three (3) parts: General, Products, and Execution. The General part of a Specification contains General Requirements which govern the Work. The Products and Execution parts modify and supplement the General Requirements by detailed requirements for the Work and shall always govern whenever there appears to be a conflict.

E. Intent:

1. All Work called for in the Specifications applicable to this Contract, but not shown on the Drawings in their present form, or vice versa, shall be a reflection of both. Work not specified in either the Drawings or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the Work, is required and shall be performed by the Contractor as though it were specifically delineated or described.
2. The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, the interpretation of these Specifications shall be made upon that basis.

### 1.3 MATERIALS AND EQUIPMENT

#### A. Manufacturer:

1. All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request and at the ENGINEER's option, that the manufacturer or subcontractor deal directly with the ENGINEER. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.
3. Any two (2) or more pieces of material or equipment of the same kind, type, or classification, and being used for identical types of service, shall be made by the same manufacturer.

#### B. Delivery:

1. The Contractor shall deliver materials in ample quantities to ensure the most speedy and uninterrupted progress of the Work so as to complete the Work within the allotted time.
2. The Contractor shall also coordinate deliveries in order to avoid delay in, or impediment of, the progress of the work of any related Contractor.

#### C. Tools and Accessories:

1. The Contractor shall, unless otherwise stated in the Contract Documents, furnish with each type, kind, or size of equipment, one (1) complete set of suitably marked high grade special tools and appliances which may be needed to adjust, operate, maintain, or repair the equipment. Such tools and appliances shall be furnished in approved painted steel cases, properly labeled and equipped with good grade cylinder locks and duplicate keys.
2. Spare parts shall be furnished as specified herein and as recommended by the manufacturer necessary for the operation of the equipment, not including materials required for routine maintenance.
3. Each piece of equipment shall be provided with a substantial nameplate, securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacture, serial number, weight, and principal rate data.

#### D. Service of Manufacturer's ENGINEER:

1. The Contract Prices for equipment shall include the cost of furnishing a competent and experienced engineer or superintendent who shall

represent the manufacturer and shall assist the Contractor, when required, to install, adjust, test, and place in operation, the equipment in conformity with the Contract Documents.

2. After the equipment is placed in permanent operation by the Owner, such engineer or superintendent shall make all adjustments and tests required by the ENGINEER to prove that such equipment is in proper and satisfactory operating condition, and shall instruct such personnel as may be designated by the Owner in the proper operation and maintenance of such equipment.

#### 1.4 INSPECTION AND TESTING

##### A. General:

1. For tests specified to be made by the Contractor, the testing personnel shall make the necessary inspections and tests, and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Five (5) copies of the reports shall be submitted, and authoritative certification thereof must be furnished to the ENGINEER as a prerequisite for the acceptance of any material or equipment.
2. If, in the making of any test of any material or equipment, it is ascertained by the ENGINEER that the material or equipment does not comply with the Contract Documents, the Contractor will be notified thereof, and he will be directed to refrain from delivering said material or equipment, or to remove it promptly from the site or from the Work and replace it with acceptable material, without cost to the Owner.
3. The Contractor shall be fully responsible for the proper operation of equipment during testing and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the Owner formally takes over the operation thereof.

##### B. Costs:

1. All inspection and testing of materials furnished under this Contract will be provided by the Contractor, unless otherwise expressly specified.
2. The cost of shop and field tests of equipment and of certain other tests specifically called for in the Contract Documents shall be borne by the Contractor, and such costs shall be deemed to be included in the Contract Price.
3. Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested

by the Owner for compliance. The Contractor shall reimburse the Owner for the expenditures incurred in making such tests of materials and equipment which are rejected for non-compliance.

C. Certificate of Manufacture:

1. Contractor shall furnish to ENGINEER authoritative evidence in the form of a certificate of manufacture that the materials to be used in the Work have been manufactured and tested in conformity with the Contract Documents.
2. These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

D. Shop Tests:

1. Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function, or special requirements are specified shall be tested in the shop of the maker in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents.
2. Five (5) copies of the manufacturer's actual test data and interpreted results thereof, accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company and/or independent laboratory, shall be submitted to the ENGINEER for approval.
3. The cost of shop tests and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the Contractor.

E. Demonstration Tests:

1. Prior to Contractor's request for a Substantial Completion inspection, all equipment and piping installed under this Contract shall be subjected to demonstration tests as specified or required to prove compliance with the Contract Documents.
2. The Contractor shall furnish labor, fuel, energy, water, and all other materials, equipment, and instruments necessary for all demonstration tests, at no additional cost to the Owner. Contractor shall assist in the demonstration tests as applicable.

## 1.5 LINES AND GRADES

### A. Grade:

1. All work under this Contract shall be constructed in accordance with the lines and grades shown on the Drawings, or as given by the ENGINEER. The full responsibility for keeping alignment and grade shall rest upon the Contractor.
2. Adjustments of grades shown on Drawings may be necessary to conform to actual field conditions or to maintain cover under proposed future grades. Such adjustments shall be considered part of the job conditions and no extra compensation will be allowed for such changes, except where specifically otherwise noted in the Drawings or Specifications. Such adjustments must be approved by the ENGINEER prior to being made.
3. The ENGINEER will establish bench marks and baseline controlling points. Reference marks for lines and grades as the Work progresses will be located by the Contractor to cause as little inconvenience to the prosecution of the Work as possible. The Contractor shall so place excavation and other materials as to cause no inconvenience in the use of the reference marks provided. He shall remove any obstructions placed by him contrary to this provision.

### B. Surveys:

1. The Contractor shall furnish and maintain, at his own expense, stakes and other such materials.
2. The Contractor shall check such reference marks by such means as he may deem necessary and, before using them, shall call the ENGINEER's attention to any inaccuracies.
3. The Contractor shall, at his own expense, establish all working or construction lines and grades as required from the reference marks set by the ENGINEER, and shall be solely responsible for the accuracy thereof. He shall, however, be subject to the check and review by the ENGINEER.

### C. Safeguarding Marks:

1. The Contractor shall safeguard all points, stakes, grade marks, monuments, and bench marks made or established on the Work, bear the cost of re-establishing them if disturbed, and bear the entire expense of rectifying work improperly installed due to not maintaining

or protecting or to removing without authorization such established points, stakes, and marks.

2. The Contractor shall safeguard all existing and known property corners, monuments, and marks adjacent to but not related to the Work and shall bear the cost of re-establishing them if disturbed or destroyed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01010

### SUMMARY OF WORK

#### PART 1 - GENERAL

##### 1.1 SECTION INCLUDES:

- A. Description of Work
- B. Constraints
- C. Work by Others
- D. CONTRACTOR's Use of Site
- E. Work Sequence
- F. Owner Occupancy

##### 1.2 DESCRIPTION OF WORK

- A. General: The Work to be done under this Contract consists of the rehabilitation of a wastewater effluent pump station facility as shown and specified in Contract Documents entitled Pine Island WWTP Effluent Pump Station Replacement.
- B. The Work includes:
  - 1. Furnishing of all labor, material, superintendence, power, light, heat, fuel, water, tools, appliances, equipment, supplies, services and other means of construction necessary or proper for performing and completing the Work.
  - 2. The Work consists of, but not limited to, the following:
    - a. Remove all existing internal wet well components, wet well top slab, electrical components and any other existing pump station components as shown in the Contract Documents.
    - b. Remove existing force main including roadway restoration as shown in the Contract Documents.
    - c. Install submersible pumps, discharge piping, valves and appurtenances, flowmeters, air release valves, wet well top slab and access hatches, blower, wet well coating and all other appurtenances to complete the installation as described in the Contract Documents.

- d. Installation of control panel, telemetry antenna and RTU.
  - e. Miscellaneous site improvements including installation of concrete slab and driveway.
  - f. Miscellaneous electrical improvements as outlined in the Contract Documents.
  - g. Instrumentation improvements as outline in the Contract Documents.
3. Providing all compaction, dewatering, sheeting and shoring, turbidity control and monitoring, disposal of all excess material encountered including rock, backfill, and other substrate material not necessarily designated in the Contract Documents necessary for complete installation of the work.
  4. Sole responsibility for adequacy of Pump Station and equipment.
  5. Maintaining the Work area and site in a clean and acceptable manner.
  6. Maintaining existing facilities in service at all times except where specifically provided for otherwise herein.
  7. Protection of finished and unfinished Work.
  8. Repair and restoration of Work damaged during construction.
  9. Furnishing as necessary proper equipment and machinery, of a sufficient capacity, to facilitate the Work and to handle all emergencies normally encountered in Work of this character.
  10. Cooperating with the OWNER to pressure test, bacteriological test, clear the new main for use, and place it into service.
  11. Keeping and maintaining a record copy of the drawings as the work progresses and preparing and furnishing detailed Record Survey drawings and other closeout documents upon the completion of the Work.
  12. Furnishing, installing, and protecting all necessary guides, track rails, bearing plates, anchor and attachment bolts, and all other appurtenances needed for the installation of the devices included in the equipment specified. Make anchor bolts of appropriate size, strength and material for the purpose intended. Furnish substantial templates and shop drawings for installation.
- C. Implied and Normally Required Work: It is the intent of these Specifications to provide the OWNER with complete operable systems, subsystems and



other items of Work. Any part or item of Work which is reasonably implied or normally required to make each installation satisfactorily and completely operable is deemed to be included in the Work and the Contract Amount. All miscellaneous appurtenances and other items of Work incidental to meeting the intent of these Specifications are included in the Work and the Contract Amount even though these appurtenances may not be specifically called for in these Specifications.

- D. Quality of Work: Regard the apparent silence of the Contract Documents as to any detail, or the apparent omission from them of a detailed description concerning any Work to be done and materials to be furnished as meaning that only the best general practice is to prevail and that only materials and workmanship of the best quality are to be used. Interpretation of these specifications will be made upon this basis.

### 1.3 CONSTRAINTS

- A. The Contract Documents are intended to allow the CONTRACTOR flexibility in construction of the Work, however, the following constraints apply:
  - 1. The Pine Island WWTF and effluent pump station must remain in full operation during work, and the effluent will need to be transferred to the effluent lined pond or reject pond from the chlorine contact chamber.
  - 2. All inspection and testing shall be coordinated with Lee County Utilities (LCU) staff.

### 1.4 CONTRACTOR'S USE OF SITE

- A. In addition to the requirements of the General Conditions, limit use of site and premises for work and storage to allow for the following:
  - 1. Coordination of the Work under this CONTRACT with the work of the other contractors where Work under this CONTRACT encroaches on the Work of other contractors.
  - 2. OWNER occupancy and access to operate existing facilities.
  - 3. Coordination of site use with ENGINEER.
  - 4. Responsibility for protection and safekeeping of products under this CONTRACT.
  - 5. Providing additional off site storage at no additional cost to OWNER as needed.

## 1.5 WORK SEQUENCE

- A. Construct Work in stages to accommodate OWNER's use of premises during construction period and in accordance with the limitations on the sequence of construction specified. Coordinate construction schedules and operations with ENGINEER.
- B. Coordinate Work of all subcontractors.
- C. The suggested sequence of work is to first establish a temporary bypass system at the pump station prior to the demolition of the existing facilities, then remove all pumping equipment, piping, valves and appurtenances, hatch, demolition of existing slab and installation of new pumping facility equipment. After completion, miscellaneous work, clean-up and restoration will be performed.

## 1.6 OWNER OCCUPANCY

- A. OWNER will occupy premises during entire period of construction in order to maintain normal operations. Cooperate with OWNER's representative in all construction operations to minimize conflict, and to facilitate OWNER usage.
- B. Conduct operations so as to inconvenience the general public in the least.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

- A. Starting Work: Start Work within 10 days following the date stated in the Notice to Proceed and execute with such progress as may be required to prevent delay to other contractors or to the general completion of the project. Execute Work at such items and in or on such parts of the project, and with such forces, material and equipment, as to complete the Work in the time established by the Contract. At all times, schedule and direct the Work so that it provides an orderly progression to completion within the specified time for completion.

END OF SECTION

## SECTION 01026

### MEASUREMENT AND PAYMENT

#### PART 1 - GENERAL

##### 1.1 SECTION INCLUDES

- A. Explanation and Definitions
- B. Measurement
- C. Payment
- D. Schedule of Values
- E. Application for Payment

##### 1.2 EXPLANATION AND DEFINITIONS

- A. The following explanation of the Measurement and Payment for the bid form items is made for information and guidance. The omission of reference to any item in this description shall not, however, alter the intent of the bid form or relieve the CONTRACTOR of the necessity of furnishing such as a part of the Contract.

##### 1.3 MEASUREMENT

- A. The quantities set forth in the bid form are approximate and are given to establish a uniform basis for the comparison of bids. The OWNER reserves the right to increase or decrease the quantity of any class or portion of the work during the progress of construction in accord with the terms of the Contract.

##### 1.4 PAYMENT

- A. Payment shall be made for the items listed on the Bid Form on the basis of the work actually performed and completed, such work including but not limited to, the furnishing of all necessary labor, materials, equipment, transportation, clean up, restoration of disturbed areas, and all other appurtenances to complete the construction and installation of the work as shown on the drawings and described in the specifications.
- B. Unit prices are used as a means of computing the final figures for bid and Contract purposes, for periodic payments for work performed, for determining value of additions or deletions and wherever else reasonable.

## 1.5 SCHEDULE OF VALUES

- A. Approval of Schedule: Submit for approval a preliminary schedule of values, in duplicate, for all of the Work. Prepare preliminary schedule in accordance with the General Conditions. Submit preliminary schedule of values within ten (10) calendar days after the Effective Date of the Agreement. Submit final schedule of values in accordance with the General Conditions.
- B. Format: Utilize a format similar to the Table of Contents of the Project Specifications. Identify each line item with number and title of the major specification. Identify site mobilization, bonds and insurance. Include within each line item, a direct proportional amount of CONTRACTOR's overhead profit.
- C. Revisions: With each Application for Payment, revise schedule to list approved Change Orders.

## 1.6 APPLICATION FOR PAYMENT

- A. Required Copies: Present required information in typewritten form or on electronic media printout.
- B. Execute certification by signature of authorized officer.
- C. Use data from approved Schedule of Values.
- D. Stored Materials: When payment for materials stored is permitted, submit a separate schedule for Materials Stored showing line item, description, previous value received, value incorporated into the Work and present value.
- E. Change Orders: List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original item of work.
- F. Final Payment: Prepare Application for Final Payment as required in the General Conditions.
- G. Submit an updated construction schedule for each Application for Payment.
- H. Submit application for payment to ENGINEER on, or before, the first of each month.

## PART 2 – PRODUCTS (NOT USED)

## PART 3 – EXECUTION

### 3.1 MEASUREMENT AND PAYMENT

- A. Payment shall be made on the basis of work actually performed completing each item in the Bid, such work including, but not limited to, the furnishing of all necessary labor, materials, equipment, transportation, cleanup, and all other appurtenances to complete the construction and installation of the work to the configuration and extent as shown on the drawings and described in the specifications. Payment for each item includes compensation for cleanup and restorations. Cleanup and surface restorations (including pavement replacement) will be considered as ten percent (10%) of each pay item and complete payment will not be made until cleanup, restorations and as-builts are completed.
- B. Separate payment will be made for the Unit Price and Lump Sum items listed on the Bid Form. Related work not specifically listed or identified below in 2.1 C but evidently necessary for satisfactory completion of the Item shall be considered to be included.
- C. Retainage will be withheld from the final payment until written acceptance by the Owner's Representative for all final clean up, restoration and Record Drawings/As-Builts have been received.
- D. The following items apply to Bid Form Pay Items:
  - 1. Mobilization and Demobilization (Bid Item No. 1a-1e): Payment for mobilization/demobilization will be made for at the Contract lump sum price and shall be for full compensation for the preparatory work and operations in mobilizing for beginning work on the Project including, but not limited to, those operations necessary for the movement of personnel, equipment, supplies and incidentals to the project site, establishment of temporary office, for the establishment of safety equipment and first aid supplies, and any other pre-construction expense necessary for the start of the Work; the cost of field engineering including disposal of cleared and grubbed material and debris, permits and fees, construction schedules, field locating all existing utilities, shop drawings, laydown storage area, construction aids, erosion control, work associated with contractor support during Owner/Engineer reviews and inspection, re-inspections and any re-work resulting from the same, cleaning, project record documents, and operation and maintenance data, and for all other work required for demobilization. The costs of any other pre-construction or post-construction expense necessary to the start or completion of the work, excluding the cost of construction materials, shall also be included under this Contract Item. The cost of all other work as shown and specified that is not specifically included under other Contract Items shall also be included under this Contract Item, including but not limited to Performance and Payment Bond Premiums and Insurance, Pre-construction Audio-Video, Construction Layout, and

preparation of Record Survey (As-Built) Drawings. Pre-Construction Audio Video includes continuous color audio-video electronic media site recording and shall conform to Section 01390: Color Audio-Video Preconstruction Record. Prior to acceptance of the Project by the Board of County Commissioners, the Contractor shall submit two (2) prints, and one (1) set of electronic files in AutoCAD format marked as "Drawings of Record, which include the original design and all deviations that occurred during construction in accordance with Lee County regulations. The record drawings shall include field verification of existing underground facilities, layout of the proposed and survey of new pipe(s) after installation, vertical and horizontal alignment of all force mains, valves, tees, bends, reducers, air release valves and other pertinent structures. Record drawings shall be certified by a Professional Land Surveyor licensed in Florida. All elevations shall be based on NAVD '88 vertical datum and all horizontal coordinates in Florida West State Plane coordinates. Record drawings shall conform to all requirements in Section 01720: "Contract Closeout".

2. Bypass Pumping Requirements (Bid Item No. 2): Measurement of various items for bypass pumping will not be made for payment and all items shall be included in the lump sum price. Payment of the applicable Contract lump sum price shall be full compensation for furnishing all labor, materials, equipment as necessary for bypass operations and contingency plan as required to operate an automated temporary bypass pumping operations for 24 hours/day (including weekends) with backup auto-dialer for emergency situations, including pumps, piping and hoses; pumper trucks; temporary bypass and service piping; hauling and proper disposal of effluent; plugging; gasoline/diesel fuel with a maximum temporary fuel storage not to exceed 550 gallons; protection of existing facilities, utilities and property and all incidental work required to satisfactorily complete this item.
3. Miscellaneous Demolition and Demolition of Metal Support Plate (Bid Item No. 3): Measurement of various items for miscellaneous demolition will not be made for payment and all items shall be included in the lump sum price. Payment for miscellaneous demolition will be made at the contract lump sum price for the time, which price and payment shall be full compensation for all the labor, materials, equipment, services, testing, backfill, compaction, removal of debris from site, site restoration, cleaning, transportation and appropriate disposal of all items not retained by the Owner which generally includes: control panels, electrical wiring, concrete pads, metal support plates, landscaping, wet well tops, internal lift station components including piping and pipe fittings, pumps, conduits, controls, blowers, vents, and any additional demolition shown on the Drawings but not mentioned herein.

4. Furnish and Install Submersible Pumps (Bid Item No. 4): Payment for furnishing and installing submersible wastewater pumps will be made at the appropriate Contract unit price per pump acceptably installed. This item includes full compensation for all labor, material, and services required for the installation of the pumps including pumps, miscellaneous piping and appurtenances, guide rails, pressure gauges, cable, cable holders, supports, training, and test and startup of the pumps.
5. Furnish and Install Corrosion Resistant Air Blower (Bid Item No. 5): Payment for furnishing and installing the air blower will be made at the appropriate Contract unit price per blower acceptably installed. This item includes full compensation for all labor, material, and services required for the installation of the blower including blower and appurtenances, training, and test and startup of the blower.
6. Furnish and Install Air Release Valve Assemblies (Bid Item No. 6): Payment for furnishing and installing air release valve assemblies will be made at the appropriate Contract unit price per valve assembly acceptably installed. This item includes full compensation for furnishing, installing and testing the valve, complete with the saddle, nipple, valve, above grade enclosure, piping, other required appurtenances, and for all equipment and all other work necessary to complete the installation as specified.
7. Furnish and Install Emergency Pump-Outs (Bid Item No. 7): Payment for furnishing and installing permanent pump-outs will be made at the appropriate Contract unit price per pump-out acceptably installed. This item includes furnishing, installing and testing the pump-outs, complete with required appurtenances, and for all equipment and all other work necessary to complete the installation as specified.
8. Furnish and Install Utility Discharge Piping and Fittings (Bid Item Nos. 10 and 11): Payment for furnishing and installing discharge piping and fittings will be made at the Contract unit price per lineal foot (LF) for the pipe in place, and fittings will be included in the cost of the pipe. This item includes all necessary fittings, connections to existing piping, labor, equipment and materials for the furnishing and laying of the pipe, signs, dewatering, compaction, pipe bedding, backfilling, sheeting, restrained joint piping, mylar detectable tape, clamps, harnessing, plugs and caps, adapters, excavation of all material encountered including rock, backfill, replacement of grass, sod, clearing and grubbing, and other surface materials not specifically designated in the Bid, clean-up, sterilization, and tests. Measurement of the pipe shall be to the nearest foot along the centerline including the lengths of manholes, valves and fittings. LF measurement shall be horizontal.

9. Furnish and Install Additional Fittings: Payment for furnishing and installing additional fittings will be made at the Contract per unit price per ton for additional fittings installed in the work as ordered in writing by the ENGINEER. All fittings installed in the work not shown on the plans and not ordered by the ENGINEER in writing will not be measured for payment.
10. Furnish and Install Magnetic Flowmeters (Bid Item No. 9): Measurement and payment of magnetic flowmeters of the various sizes and types to be paid for will be determined by the actual count of units installed and accepted. Payment for flowmeters will be made at the Contract unit price per flowmeter for the respective type and size, which price and payment shall be full compensation for furnishing, installing, calibrating and testing the flowmeter complete with hardware and all other items required for a complete, acceptable and operable installation as detailed in the Specifications.
11. Furnish and Install Swing Check Valve (Bid Item No. 10): Measurement and payment of check valves of the various sizes and types to be paid for will be determined by the actual count of units installed and accepted. Payment for check valves will be made at the Contract unit price per valve for the respective type and size, which price and payment shall be full compensation for furnishing, installing and testing the valve complete with mechanical restraints, nut extensions, locate wire and access, disc, brass numbering plates and all other requirements as detailed in the Specifications.
12. Furnish and Install Plug Valves (Bid Item Nos. 11a and 11b): Measurement and payment of plug valves of the various sizes and types to be paid for will be determined by the actual count of units installed and accepted. Payment for plug valves will be made at the Contract unit price per valve for the respective type and size, which price and payment shall be full compensation for furnishing, installing and testing the valve complete with mechanical restraints, nut extensions, locate wire and access, disc, brass numbering plates and all other requirements as detailed in the Specifications.
13. Furnish and Install Motorized Butterfly Valve (Bid Item No. 12): Measurement and payment of butterfly valves of the various sizes and types to be paid for will be determined by the actual count of units installed and accepted. Payment for butterfly valves will be made at the Contract unit price per valve for the respective type and size, which price and payment shall be full compensation for furnishing, installing and testing the valve complete with mechanical restraints, numbering plates and all other requirements as detailed in the Specifications.



14. Furnish and Install Gate Valves (Bid Item Nos. 13a and 13b): Measurement and payment of gate valves of the various sizes and types to be paid for will be determined by the actual count of units installed and accepted. Payment for gate valves will be made at the Contract unit price per valve for the respective size and type, which price and payment shall be full compensation for furnishing, installing, and testing the valve complete with mechanical restraints, nut extensions, locate wire and access, filter fabric, No. 57 stone, tie rods, and concrete collar, disc, brass numbering plates and cover and all other requirements as detailed in the Specifications.
15. Furnish and Install Wet Well Coating System (Bid Item No. 14): Measurement for number of wet well coating system will not be made for payment and all items shall be included in the lump sum price. Payment for wet well coating installation will be made at the Contract lump sum price for the wet well modification, which price shall be full compensation for all labor, material, and services required for the installation of the coating system including coating of wet well floor, crack repairs, leak repairs, and all other work necessary to rehabilitate the wet well coating.
16. Furnish and Install Pump Station Wet Well Appurtenances (Bid Item No. 15): Payment for the pump station top slab, access hatch and vents will be made for at the Contract lump sum price. This item includes furnishing and installing stainless steel hardware, wet well cover and hatches, concrete top slab and vents and all other items necessary to complete the installation in accordance with the project plans.
17. Furnish and Install Structural Concrete Pad (Bid Item No. 16): Measurement for the concrete pad will be based on square yards of pad to be installed. This item pertains to concrete pads for equipment and piping and does not address driveways or other concrete components. Payment for concrete pads will be made at the contract unit price per square yard of pad installed which price and payment shall be for concrete, forms, compaction, reinforcement, expansion joints, control joints, and all other labor, equipment, and incidentals.
18. Furnish and Install Rock (Including Filter Fabric) (Bid Item No. 17): Payment for rock with filter fabric will be made at the Contract unit price per square yard for the respective gravel (Granite No. 57 stone), which price and payment shall be full compensation for all removing, protecting and replacing of the existing gravel and geomembrane liner per plan.
19. Electrical Improvements (Bid Item No. 18): Payment for the removal of existing equipment, and purchase and installation of electrical equipment will be made at the Contract lump sum price. This item includes wire,

conduit, wiring devices, new grounding infrastructure and all associated appurtenances in accordance with the project plans.

20. Grounding and Resistance Testing (Bid Item No. 19): Payment for ground resistance testing in advance of construction will be made at the contract lump sum price for the item, which price and payment shall be full compensation for all labor, materials, and equipment necessary to determine the resistance to ground present at the existing grounding electrode. The Contractor shall perform testing at least 14 calendar days in advance of construction and submit results to the Engineer and County. The Engineer will have seven (7) calendar days to respond with changes to the Contract Documents. This construction scheduling will allow all necessary decisions to be made prior to the contractor's crews reaching the work area and having a delay claim and/or a crew mobilization/demobilization claim.
  
21. Instrumentation Improvements (Bid Item No. 20): Payment for chlorine pacing control panel, chlorine control panel installation with dead front, PLC programming, HMI graphics modifications, network components, include hand switches and lights and instrumentation modifications shown on drawings will be made for at the Contract lump sum price. This item includes work on the existing effluent control panel and required programming modifications, testing, and commissioning for a fully functional system as detailed in the Specifications.

END OF SECTION

## SECTION 01027

### APPLICATIONS FOR PAYMENT

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Scope of Work: Submit Applications for Payment to the ENGINEER in accordance with schedule established by Conditions of the Contract and Agreement between Owner and Contractor. Contractor shall use the Application and Certificate for Payment Form as the official pay request form as provided by the County.
- B. Related Requirements Described Elsewhere:
  - 1. Agreement.
  - 2. Progress Schedule: Section 01310.
  - 4. Schedule of Values: Section 01370.
  - 5. Contract Closeout: Section 01720.

##### 1.2 FORMAT REQUIRED

- A. Submit applications typed on the form provided by the County, with itemized data typed on 8-1/2 inch x 11 inch or white paper continuation sheets.
- B. Provide itemized data on continuation sheets of format, schedules, line items, and values specified on the Application and Certificate for Payment Form. The Contractor shall use the item descriptions and contract values included in schedule of values, approved and accepted by the ENGINEER as a basis for preparation of the Application for Payment Form.

##### 1.3 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 percent complete for each activity and dollar values to agree with respective percents.
  - 3. Execute certification with signature of a responsible officer of Contractor.

B. Continuation Sheets:

1. Fill in total list of all scheduled component items of the 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. Round off values to nearest dollar, or as specified for Schedule of Values.
3. List each Change Order executed prior to date of submission, at the end of the continuation sheets. List by Change Order Number, and description, as for an original component item of the Work.
4. To receive approval for payment on component material stored on site, submit copies of the original invoices with the Application and Certificate for Payment.
5. As provided for in the Application and Certificate for Payment Form, the Contractor shall certify, for each current pay request, that all previous progress payments received from the Owner, under this Contract, have been applied by the Contractor to discharge in full, all obligations of the Contractor in connection with Work covered by prior Applications for Payment, and all materials and equipment incorporated into the Work are free and clear of all liens, claims, security interest, and encumbrances. Contractor shall attach to each Application and Certificate for Payment like affidavits by all Subcontractors.

1.4 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

A. 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.

B. Submit one (1) copy of data and cover letter for each copy of application.

- C. The Contractor is to maintain an updated set of drawings to be used as record drawings in accordance with Section 01720: Contract Closeout. As a prerequisite for monthly progress payments, the Contractor is to exhibit the updated record drawings for review by the Owner and the ENGINEER.
- D. Each monthly application for payment shall incorporate the corresponding "monthly progress status report" and updated construction schedule, prepared in accordance with the requirements of Section 01310: Progress Schedule.
- E. As a prerequisite for payment, Contractor shall submit a duly executed letter from surety consenting to payment due and progress to date.

#### 1.5 PREPARATION OF APPLICATION FOR FINAL PAYMENT

- A. Fill in application form as specified for progress payments. Provide information as required by the General Conditions and Section 01720: Contract Closeout.
- B. Furnish evidence of completed operations and insurance in accordance with the General Conditions.
- C. Provide close-out submittals as required by the General Conditions.

#### 1.6 SUBMITTAL PROCEDURE

- A. Submit Applications for Payment to the ENGINEER between the first (1<sup>st</sup>) and the tenth (10<sup>th</sup>) day after the end of each calendar month for which payment is requested as stipulated in the Agreement. Review the percents complete with the ENGINEER and resolve any conflicts or discrepancies.
- B. Number of copies for each Application for Payment: Five (5) copies plus additional copies for Contractor's needs.
- C. When the ENGINEER finds the Application and Certificate for Payment Form is properly completed and correct, he will execute the Certificate for Payment and transmit the forms to the Owner, with a copy to the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01040  
PROJECT MEETINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Coordination
- B. Preconstruction Conference
- C. Progress Meetings

1.2 COORDINATION

- A. General: Coordinate scheduling, submittals, and Contract work to assure efficient and orderly sequence of installation of interdependent construction elements.
- B. Accessory Placement: Place conduits, saddles, boxes, cabinets, sleeves, inserts, foundation bolts, anchors and other like work in floors, roofs or walls of buildings and structures in conformity with the construction program.

1.3 PRECONSTRUCTION CONFERENCE

- A. General: Prior to commencement of the Work, in accordance with the General Conditions, the OWNER will conduct a preconstruction conference to be held at a predetermined time and place.
- B. Delineation of Responsibilities: The purpose of the conference is to designate responsible personnel, to establish a working relationship among the parties and to identify the responsibilities of the OWNER, plant personnel and the CONTRACTOR/VENDOR. Matters requiring coordination will be discussed and procedures for handling such matters, established. The agenda will include:
  - 1. Submittal procedures
  - 2. Partial Payment procedures
  - 3. Maintenance of Records
  - 4. Schedules, sequences and maintenance of facility operations
  - 5. Safety and First Aid responsibilities
  - 6. Change Orders and Field Directive Changes
  - 7. Use of site
  - 8. Housekeeping
  - 9. Equipment delivery

- C. Attendees: The preconstruction conference is to be attended by the representatives of the CONTRACTOR/VENDOR, the OWNER and plant personnel that will be associated with the project. Representatives of regulatory agencies, subcontractors, and principal suppliers may also attend when appropriate.
- D. Chair and Minutes: The preconstruction conference will be chaired by the Owner who will also arrange for the keeping and distribution of minutes to all attendees.

#### 1.4 PROGRESS MEETINGS

- A. Meeting Frequency and Format: Schedule monthly progress meetings to review the Work, discuss changes in schedules, maintain coordination and resolve potential problems. Invite OWNER, ENGINEER and all SUBCONTRACTORS/VENDORS. Suppliers may be invited as appropriate. Minutes of the meeting will be maintained by CONTRACTOR/VENDOR and reviewed by ENGINEER prior to distribution by the CONTRACTOR/VENDOR. Distribute reviewed minutes to attendees within ten (10) calendar days after each meeting.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01050

### FIELD ENGINEERING AND CONTROLS

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Scope of Work: Provide and pay for field engineering service for Project.
1. Survey work required in execution of the Project.
  2. CONTRACTOR shall retain the services of a registered land surveyor licensed in the State of Florida to locate existing control points as identified by ENGINEER and maintain a survey during construction. Project grades, lines and levels shall be established from the existing reference points. The method of field staking for the construction of the Work shall be at the option of CONTRACTOR.
  3. The method and material of field staking shall be the CONTRACTOR'S option. The accuracy of any method of staking shall be the responsibility of CONTRACTOR. All engineering for vertical and horizontal control shall be the responsibility of CONTRACTOR.
  4. The owner shall supply the engineering survey and control to establish reference points which in his judgment are necessary for the CONTRACTOR to proceed with his work.

##### 1.2 QUALIFICATIONS OF SURVEYOR

- A. Florida Registered Land Surveyor, acceptable to the OWNER and the ENGINEER. Submit name and address of surveyor to ENGINEER prior to field services being performed.

##### 1.3 PROJECT SURVEY REQUIREMENTS

- A. Locate and protect existing control points prior to starting site work. Preserve all control points and reference marks throughout construction. Establish site control points, lines and levels, by appropriate means. The location of these points should minimize; the number of sightings necessary to control the work, and the likelihood of the points being disturbed.
1. All underground piping with elevations and dimensions. Changes to piping location. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc.; structure top



elevations; roadway cross sections every 50 feet including centerline of pavement; edge of pavement; edge of shoulder; centerline of swales; grades at right-of-way; driveway flow line elevations.

2. Make no changes or relocations without prior written notice to ENGINEER.
3. Report to ENGINEER when any control point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
4. Surveyor is to replace points that have been lost or destroyed based on original control.
5. If pipeline, valves, or appurtenances are covered prior to surveying, Contractor shall be responsible for exposing each area as required by 1.03.A.1.

#### 1.4 SURVEY CONTROL POINTS

- A. Use survey control points to layout such work tasks as the following:
  1. Clearing, grubbing and work limits.
  2. Building foundations, column locations and floor levels.
  3. Batter boards for structures.
  4. Site improvements:
    - i. Stakes for grading, fill and topsoil replacement.
    - ii. Utility slopes and invert elevations.
  5. Control points, lines and elevations required for any other project work.
  6. Other work items as necessary
- B. Periodically, verify layouts by same methods.

#### 1.5 RECORDS AND SUBMITTALS

- A. Maintain a complete, accurate log of all control and survey work as it progresses.
- B. Computer aided design and drafting methods shall be used in the preparation of the documents, a copy of the (.dwg or .dxf) file shall be provided.

- C. On request of ENGINEER, submit documentation to verify accuracy of field engineering work.
- D. Submit certificate signed by surveyor and Contractor certifying that elevations and locations of improvements are in conformance with the Contract Documents, or if not in conformance, certify as to variances from the Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01065

PERMITS AND FEES

PART 1 - GENERAL

- A. The Contractor shall obtain **all** permits and licenses related to his work, including but not limited to, the necessary construction permits except as otherwise provided herein. The Contractor shall also, if in effect and applicable at the date of bid opening, pay any governmental agency charges and inspection fees required for the prosecution of the work. If the Contractor desires connection of utility services (telephone or electricity) to a field office, he will be responsible for securing the necessary permits and any connection or disconnection charges involved.
- B. The Contractor shall adhere to all requirements stated in permits issued for this Project.
- C. Permits by Owner: The Owner prior to the advertisement of the project has applied for permits with the following agencies:

	Permit	Permit No.
1.	Lee County – Limited Development Order (LD) Permit Application	LDO2016-00003
2.	Florida Department of Environmental Protection (FDEP) Permit Form 62-620.910(a)	FLA176460-013-DWIP

- D. Permits Required by Contractor include, but are not limited to, the following:

	Permit
1.	Dewatering.
2.	All other permits required by the County.

END OF SECTION

## SECTION 01090

### REFERENCE STANDARDS

#### PART 1 - GENERAL

##### 1.1 SECTION INCLUDES

- A. Abbreviations and Symbols
- B. Reference Standards
- C. Definitions

##### 1.2 RELATED SECTIONS

- A. Information provided in this section is used where applicable in individual Specification Sections, Divisions 2 through 16.

##### 1.3 REFERENCE ABBREVIATIONS

- A. Reference to a technical society, trade association or standards setting organization, may be made in the Specifications by abbreviations in accordance with the following list:

ACI	American Concrete Institute
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
ASCE	American Society of Civil ENGINEERs
AWS	American Welding Society
AWWA	American Water Works Association
CAGI	Compressed Air and Gas Institute
CISPI	Cast Iron Soil Pipe Institute
CRSI	Concrete Reinforcing Steel Institute
DOT	Department of Transportation
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NIST	National Institute of Standards and Technology
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Act
PCI	Prestressed Concrete Institute
SSPC	Steel Structures Painting Council
TIMA	Thermal Insulation Manufacturers' Association

## 1.4 REFERENCE STANDARDS

- A. Latest Edition: Construe references to furnishing materials or testing, which conform to the standards of a particular technical society, organization, or body, to mean the latest standard, code, or specification of that body, adopted and published as of the date of bidding this Contract. Standards referred to herein are made a part of these Specifications to the extent which is indicated or intended.
- B. Precedence: The duties and responsibilities of the OWNER, CONTRACTOR or ENGINEER, or any of their consultants, agents or employees are set forth in the Contract Documents, and are not changed or altered by any provision of any referenced standard specifications, manuals or code, whether such standard manual or code is or is not specifically incorporated by reference in the Contract Documents. Any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority, to undertake responsibility contrary to the powers of the ENGINEER as set forth in the Contract Documents cannot be assigned to the ENGINEER or any of the ENGINEER's consultants, agents or employees.

## 1.5 DEFINITIONS

- A. In these Contract Documents the words furnish, install and provide are defined as follows:
  - 1. Furnish (Materials): to supply and deliver to the project ready for installation and in operable condition.
  - 2. Install (services or labor): to place in final position, complete, anchored, and connected in operable condition.
  - 3. Provide: to furnish and install complete. Includes the supply of specified services. When neither furnished, installed or provided is stated, provided is implied.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01092

### ABBREVIATIONS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Abbreviations
- B. Standards for Abbreviations

##### 1.2 RELATED SECTIONS

- A. Abbreviations provided in this section are used where applicable in individual Specification Sections, Divisions 2 through 16.

##### 1.3 1.3 ABBREVIATIONS

- A. Abbreviations which may be used in Divisions 1 through 16 for units of measure are as follows:

alternating current .....	ac	chemical oxygen demand .....	COD
American wire gauge .....	AWG	coefficient, valve flow .....	Cv
ampere(s) .....	amp	cubic .....	cu
ampere-hour(s) .....	AH	cubic centimeter(s) .....	cc
annual .....	ann	cubic feet per day .....	cf/d
Ampere Interrupting Capacity.....	AIC	cubic feet per hour .....	cf/h
atmosphere(s) .....	atm	cubic feet per minute .....	cfm
average .....	avg	cubic feet per minute, standard conditions .....	scfm
biochemical oxygen demand .....	BOD	cubic feet per second .....	cfs
Board Foot .....	FBM	cubic foot (feet) .....	cu ft
brake horsepower .....	bhp	cubic inch(es) .....	cu in
Brinell Hardness .....	BH	cubic yard(s) .....	cu yd
British thermal unit(s) .....	Btu	decibels .....	dB
calorie (s) .....	cal	decibels (A scale) .....	dBa
carbonaceous biochemical oxygen demand .....	CBOD	degree(s) .....	deg
Celsius (centigrade) .....	C	dewpoint temperature .....	dpt
Center to Center .....	C to C	diameter .....	dia
centimeter(s) .....	cm	direct current .....	dc
		dissolved oxygen.....	DO
		dissolved solids .....	DS
		dry-bulb temperature .....	dbt

efficiency .....	eff	inside diameter .....	ID
elevation.....	el	Jackson turbidity unit(s) .....	JTU
entering water temperature .....	ewt		
entering air temperature .....	eat	kelvin .....	K
equivalent direct radiation .....	edr	kiloamperes .....	kA
		kilogram(s) .....	kg
face area .....	fa	kilometer(s) .....	km
face to face .....	f to f	kilovar (kilovolt-amperes	
Fahrenheit .....	F	reactive) .....	kvar
feet per day .....	fpd	kilovolt(s) .....	kV
feet per hour .....	fph	kilovolt-ampere(s).....	kVA
feet per minute .....	fpm	kilowatt(s) .....	kW
feet per second .....	fps	kilowatt-hour(s) .....	kWh
foot (feet) .....	ft		
foot-candle .....	fc	linear foot (feet) .....	LF
foot-pound .....	ft-lb	liter(s) .....	L
foot-pounds per minute .....	ft-lb/min		
foot-pounds per second .....	ft-lb/sec	megavolt-ampere(s) .....	MVA
formazin turbidity unit(s) .....	FTU	meter(s).....	m
frequency .....	freq	micrograms per liter .....	ug/L
		miles per hour .....	mph
gallon(s) .....	gal	milliampere(s) .....	mA
gallons per day .....	gpd	milligram(s) .....	mg
gallons per day per cubic foot ....	gpd/cu ft	milligrams per liter .....	mg/L
gallons per day per square foot ..	gpd/sq ft	milliliter(s) .....	mL
gallons per hour .....	gph	millimeter(s) .....	mm
gallons per minute .....	gpm	million gallons .....	MG
gallons per second .....	gps	million gallons per day .....	mgd
gas chromatography and		millisecond(s) .....	ms
mass spectrometry .....	GC-MS	millivolt(s) .....	mV
gauge .....	ga	minute(s) .....	min
grain(s) .....	gr	mixed liquor suspended	
gram(s) .....	g	solids .....	MLSS
grams per cubic centimeter .....	gm/cc		
		nephelometric turbidity unit .....	NTU
Heat Transfer Coefficient .....	U	net positive suction head .....	NPSH
height .....	hgt	noise criteria .....	nc
Hertz .....	Hz	noise reduction coefficient .....	NRC
horsepower .....	hp	number .....	no
horsepower-hour .....	hp-hr		
hour(s) .....	hr	ounce(s) .....	oz
humidity, relative .....	rh	outside air .....	oa
hydrogen ion concentration .....	pH	outside diameter .....	OD
inch(es) .....	in	parts per billion .....	ppb
inches per second .....	ips	parts per million .....	ppm

percent .....	pct	square meter(s) .....	sq m
phase (electrical) .....	ph	square yard(s) .....	sq yd
pound(s) .....	lb	standard .....	std
pounds per cubic foot .....	pcf	static pressure .....	st pr
pounds per cubic foot per hour .....	pcf/hr	supply air .....	sa
pounds per day .....	lbs/day	suspended solids .....	SS
pounds per day per		temperature .....	temp
cubic foot .....	lbs/day/cu ft	temperature difference .....	TD
pounds per day per		temperature entering .....	TE
square foot .....	lbs/day/sq ft	temperature leaving .....	TL
pounds per square foot .....	psf	thousand Btu per hour .....	Mbh
pounds per square foot		thousand circular mils .....	kcmil
per hour .....	psf/hr	thousand cubic feet .....	Mcf
pounds per square inch .....	psi	threshold limit value .....	TLV
pounds per square inch		tons of refrigeration .....	tons
absolute .....	psia	torque .....	TRQ
pounds per square inch		total dissolved solids .....	TDS
gauge .....	psig	total dynamic head .....	TDH
power factor .....	PF	total kjeldahl nitrogen .....	TKN
pressure drop or difference .....	dp	total oxygen demand .....	TOD
pressure, dynamic (velocity) .....	vp	total pressure .....	TP
pressure, vapor .....	vap pr	total solids .....	TS
quart(s) .....	qt	total suspended solids .....	TSS
Rankine .....	R	total volatile solids .....	TVS
relative humidity .....	rh	vacuum .....	vac
resistance .....	res	viscosity .....	visc
return air .....	ra	volatile organic chemical .....	VOC
revolution(s) .....	rev	volatile solids .....	VS
revolutions per minute .....	rpm	volatile suspended solids .....	VSS
revolutions per second .....	rps	volt(s) .....	V
root mean squared.....	rms	volts-ampere(s) .....	VA
safety factor .....	sf	volume .....	vol
second(s) .....	sec	watt(s) .....	W
shading coefficient .....	SC	watthour(s) .....	Wh
sludge density index .....	SDI	watt-hour demand .....	WHD
Sound Transmission		watt-hour demand meter .....	WHDM
Coefficient .....	STC	week(s) .....	wk
specific gravity .....	sp gr	weight .....	wt
specific volume .....	Sp Vol	wet-bulb .....	WB
sp ht at constant pressure .....	Cp	wet bulb temperature .....	WBT
square .....	sq	yard(s) .....	yd
square centimeter(s) .....	sq cm	year(s) .....	yr
square foot (feet) .....	sq ft		
square inch (es) .....	sq in		



1.4 STANDARD FOR ABBREVIATIONS

- A. Use ASME Y1.1-1989, "Abbreviations for use on Drawings and in Text" for abbreviations for units of measure not included in Paragraph 1.3.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01100

### SPECIAL PROJECT PROCEDURES

#### PART 1 - GENERAL

##### 1.1 PUBLIC NUISANCE

- A. The Contractor shall not create a public nuisance including, but not limited to, encroachment on adjacent lands, flooding of adjacent lands, or excessive noise.
- B. Sound levels measured by the ENGINEER shall not exceed 50 dBA from 7 P.M. to 7 A.M. or 60 dBA 7 A.M. to 7 P.M. This sound level shall be measured at the exterior of the nearest exterior wall of the nearest residence. Levels at the equipment shall not exceed 85 dBA at any time. Sound levels in excess of these values are sufficient cause to have the Work halted until equipment can be quieted to these levels. Work stoppage by the ENGINEER or Owner for excessive noise shall not relieve the Contractor of the other portions of this Specification including, but not limited to, completion dates and bid amounts.
- C. No extra charge may be made for time lost due to work stoppage resulting from the creation of a public nuisance.

##### 1.2 SANITARY SEWER PIPE AND EXISTING UTILITIES

- A. Pipe Locations. All pipes 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. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.
- B. Utility Conflicts. Contractor must identify all locations where there is the possibility of conflicts with existing utilities. Contractor will promptly notify the Owner and ENGINEER in writing in accordance with these documents. Contractor acknowledges that resolving utility conflicts can sometimes require permitting. The Owner will grant additional days to the Contractor to cover the length of unanticipated delay in writing. However, under no circumstances will the Contractor be eligible for remobilization costs.

##### 1.3 LANDSCAPING RESTORATION

- A. Contractor shall be responsible for replacing all landscaping disturbed during construction with landscaping of equal or better quality, quantity, material and size. The extent of existing landscaping is not shown on drawing and shall be the responsibility of Contractor and field inspected prior to bidding.

#### 1.4 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 workmen.

#### 1.5 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. Test pits shall be backfilled immediately after their purpose has been satisfied and maintained in a manner satisfactory to the ENGINEER. The costs for such test pits shall be borne by the Contractor.

#### 1.6 JURISDICTIONAL DISPUTES

- A. It shall be the responsibility of the Contractor to pay all costs that may be required to perform any of the Work shown on the Drawings or specified herein in order to avoid any work stoppages due to jurisdictional disputes. The basis for subletting Work in question, if any, shall conform with precedent agreements and decisions on record with the Building and Construction Trades Department, AFL-CIO, dated June, 1973, including any amendments thereto.

#### 1.7 INCLEMENT WEATHER

- A. In the event of inclement weather, or whenever the ENGINEER directs; the Contractor shall, and shall 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 have been damaged or injured by reason of failure on the part of the Contractor or any subcontractors to so protect the Work, such Work and materials shall be removed and replaced at the expense of the Contractor.

#### 1.8 COORDINATION OF WORK

- A. The Contractor shall cooperate fully so as to eliminate or minimize the creation of conflicts. Adjustments from time to time may be required in the Contractor's work location and/or schedule provided a reasonable notice is given by the Owner or ENGINEER.

#### 1.9 USE OF PUBLIC/PRIVATE STREETS

- A. The use of public/private streets and roads shall be such as to provide a minimum of an inconvenience to the public and to other traffic. Any earth or

other excavated materials spilled from trucks shall be removed by the Contractor and the streets and roads cleaned to the satisfaction of the Owner.

- B. Access to properties along the Project must be maintained at all times throughout the duration of the Project as shown in the Drawings.

#### 1.10 TRAFFIC/PEDESTRIANS

- A. All safety precautions shall be taken and all traffic controls be furnished satisfactorily to the County, FDOT, and/or other government agencies having jurisdiction, where partial or complete obstruction of highways, roadways, streets, drives or sidewalks is required in the performance of the Work.

#### 1.11 CHEMICALS

- A. All chemicals used during project construction, or furnished for project operations, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of the State Department of Health, Florida Department of Environmental Protection and if required, also the EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with the manufacturer's instructions or recommended use procedures.

#### 1.12 SAFETY AND HEALTH REGULATIONS

- A. The Contractor shall comply with the Department of Labor Safety & Health Regulations for construction promulgated under the Occupational Safety & Health Act of 1970, (PL 91-596) and under Section 107 of the Contract Work Hours & Safety Standards Act (PL 91-54).
- B. All equipment furnished and installed under this Contract shall comply to Part 1910, Occupational Safety & Health Standards & Amendments thereto.
- C. The Contractor shall comply with the Florida Trench Safety Act (90-96, Florida Law).

#### 1.13 STATE AND FEDERAL PERMITS

- A. Construction in Florida Department of Transportation rights-of-way, wetlands and navigable water bodies will be governed by applicable State and Federal permits. All conditions set forth on the permits shall be a part of the Contract and they shall be attached by addendum.

#### 1.14 INSPECTION

- A. The authorized representatives and agents of the Environmental Protection Agency and Controlling State and Local Pollution Control Agencies shall be permitted to inspect all work, material, payrolls, personnel records, invoices of

materials and any other relevant data and records. The Owner and ENGINEER shall be permitted access to any work area for the inspection of work and materials. The Owner may, at the Contractor's expense, order the uncovering or removal of any finished work if circumstances indicate faulty work or materials were used in the original installation. The Owner and ENGINEER shall also be permitted to inspect material invoices, payrolls or any other relevant data or records as may be necessary or required to satisfy the requirements of the Contract.

## 1.15 ENVIRONMENTAL PROTECTION

### A. General:

1. Contractor shall comply with all Federal, State and Local laws and regulations controlling pollution of the environment. He shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, bitumens, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter. In the event of conflict between such laws and regulations and the requirements of the Specifications, the more restrictive requirements shall apply. Environmental protection requirements specified in other Sections shall be considered as supplementing the requirements of this Section.
2. Failure of the Contractor to fulfill any of the requirements of this Section may result in the Owner ordering the stopping of construction operations.
3. Failure on the part of the Contractor to perform the necessary measures to control erosion, siltation, and pollution will result in the Owner notifying the Contractor to take such measures. In the event that the Contractor fails to perform such measures within 24 hours after receipt of such notice, the Owner may stop the Work as provided above, or may proceed to have such measures performed by others. The cost of such work performed by others plus related fees by the ENGINEER will be deducted from monies due the Contractor on his Contract.
4. All erosion and pollution control features installed by the Contractor shall be acceptably maintained by the Contractor during the time that construction work is being done.
5. Repair or replace damaged or inoperative erosion and pollution control devices as directed by the ENGINEER or the Owner's Representative.
6. Where there is a high potential for erosion and possible water pollution, the Contractor shall not expose, by his construction methods or procedures, an area of erosive land at any one time larger than the

minimum amount required for the proper and efficient construction operation. If the exposure of any incomplete work corresponding to the exposure period required for erosion is anticipated, temporary protective measures shall be taken to prevent the erosion or collapse of land in that immediate construction area.

- B. Erosion and Pollution Control Schedule: At or prior to the preconstruction conference, the Contractor shall submit to the Owner for his information, three (3) copies of his erosion and pollution control work schedule. This schedule shall show the time relationship between phases of the Work which must be coordinated to reduce erosion and pollution, and shall describe construction practices and temporary control measures which will be used to minimize erosion and pollution. The schedule shall also show the Contractor's proposed method of erosion control on haul roads and borrow and material pits, and his plan for disposal of waste materials or other sources of pollution. Maps or other documents may also be required to show the proposed final surface gradient of proposed borrow pits, soil type base course pits, and waste areas. No work shall be started until the erosion and pollution control schedules and methods of operations have been submitted to the Owner for his information.
- C. Air Pollution Controls:
1. Contractor shall control dust caused by his operations in the construction of the Project, including but not specifically limited to the following:
    - a. Clearing, grubbing, and stripping.
    - b. Excavation and placement of embankment.
    - c. Cement and aggregate handling.
    - d. Limerock stabilization.
    - e. Use of haul roads.
    - f. Sandblasting or grinding.
  2. Contractor shall control air pollution from the following causes in constructing the project:
    - a. Volatiles escaping from asphalt and cutback materials.
    - b. Use of herbicides or fertilizers.
  3. Control of dust and other air pollutants by the Contractor shall include:

- a. Exposing the minimum area of land.
  - b. Applying temporary mulch with or without seeding.
  - c. Use of water sprinkler trucks.
  - d. Use of covered haul trucks.
  - e. Use of stabilizing agents in solution.
  - f. Use dust palliatives and penetration asphalt on temporary roads.
  - g. Use of wood chips in traffic and work areas.
  - h. Use of vacuum-equipped sandblasting systems.
  - i. Use of plastic sheet coverings.
  - j. Restricting the application rate of herbicides to recommended dosage. Materials shall be covered and protected from the elements. Application equipment and empty containers shall not be rinsed and discharged so as to pollute a stream, river, lake, pond, water impoundment, or the ground water.
  - k. Relay of operations until climate or wind conditions dissipate or inhibit the potential pollutants.
- D. Open Burning of Combustible Wastes: No open burning of combustible waste materials or vegetation shall be permitted. All waste materials shall be removed from the site or within public rights-of-way and disposed in a legal manner.
- E. Permanent and Temporary Water Pollution Control (Soil Erosion):
- 1. Sufficient precautions shall be taken during construction to minimize the run-off of polluting substances such as silt, clay, fuels, oils, bitumens, calcium chloride, or other polluting materials harmful to humans, fish, or other life, into the supplies and surface waters of the State. Control measures must be adequate to assure that turbidity in the receiving water will not be increased more than allowed by the State or controlling agency. Such measures may consist of construction of berms, dikes, dams, drains and sediment basins, or use of fiber mats, woven plastic filter cloths, gravel, mulches, quick growing grasses, sod, bituminous spray and other erosion control devices or methods approved by the State or controlling agency.

2. The Contractor shall promptly clear all waterways and drainage patterns of false work, piling, debris, or other obstructions placed during construction work and not a part of the finished work.
  3. The Contractor shall remove and dispose of silt accumulations as directed by the ENGINEER or the Owner's Representative.
  4. If new and additional erosion control structures are to be installed, under this project, to prevent possible future erosion as a result of work under this contract, they shall be constructed concurrently with the other work, as early as possible, and as conditions permit.
- F. Noise Control: The Contractor shall provide adequate protection against objectionable noise levels caused by the operation of construction equipment in order to comply with all current City ordinances and these Specifications. Sound levels shall be measured at the exterior of the nearest exterior wall of the nearest residence or building. Levels at construction equipment shall not exceed 85 dBA at any time. Sound levels in excess of allowable values are sufficient cause to have the work halted until equipment can be quieted to these levels. Work stoppage by the ENGINEER or Owner for excessive noise shall not relieve the Contractor of the other portions of this Specification including, but not limited to completion dates and bid amounts.

#### 1.16 TREE AND SHRUB PROTECTION AND TRIMMING

- A. Contractor shall exercise care to protect all trees and shrubs designated to remain. Trees and shrubs outside construction limits shall remain and shall be protected and where damaged, restored to original condition. Contractor shall obtain approval from the Owner prior to removing any trees. Trees damaged within construction limits due to negligence shall be restored to original condition.
- B. Tree limbs which interfere with construction operations and are approved for pruning shall be neatly cut with sharp pruning instruments; do not break or chop. All cut faces shall be coated with an approved tree pruning compound which is waterproof, antiseptic, elastic and free of kerosene, coal tar, creosote and other substances harmful to plants. Pruning operations shall be extended to restore the natural shape of the entire tree or shrub. Do not allow fires under or adjacent to trees or other plants which are to remain.
- C. Contractor shall protect tree and shrub root systems. Do not store construction materials, debris or excavated materials beyond construction limits. Do not permit vehicles or construction equipment beyond the limits of utility line construction. Restrict foot traffic to prevent excessive compaction of soil over root system. Excavated material shall be stockpiled away from tree drip lines as approved by the ENGINEER. Protect tree and shrub root systems from damage due to noxious materials in solution caused by run-off or spillage during construction operations, or drainage from stored materials.



Protect root systems from flooding, erosion or excessive wetting resulting from dewatering operations. Excavate within the drip line of trees only when approved by the ENGINEER. Where trees are designated to remain within the limits of construction and trenching for utilities is required within tree drip lines, cut roots with sharp pruning instruments; do not break or chop. Paint roots over 2-inch caliper with approved tree pruning compound.

- D. Trees damaged by construction operations shall be repaired promptly after damage occurs to prevent progressive deterioration of damaged trees. Removed trees, branches, roots and other excess materials shall be removed from the construction site to an approved landfill at the expense of the Contractor.

#### 1.17 SITE CLEANUP AND RESTORATION

- A. The Contractor shall keep the working area free at all times of tools, materials and equipment not essential to the progress of the Work. Debris, waste materials, and rubbish shall be properly disposed of and not allowed to accumulate. If the Contractor should fail to do this, the Owner will make the necessary arrangements to effect the cleanup by others and will back charge the cost to the Contractor. If such action becomes necessary on the part of and in the opinion of the Owner, the Owner will not be responsible for the inadvertent removal of material which the Contractor would not have disposed of had he effected the required cleanup.
- B. Where material or debris has washed or flowed into or been placed in watercourses, ditches, gutters, drains, catch basins, or elsewhere as result of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during progress of the Work, and the ditches, channels, drains etc., kept in a clean and neat condition.
- C. On or before the completion of the Work, the Contractor shall, unless otherwise especially directed or permitted in writing, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools, and machinery or other construction equipment furnished by him; shall remove, acceptably disinfect, and cover all organic matter and material containing organic matter in, under, and around privies, houses, and other buildings used by him; shall remove all rubbish from any grounds he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations, in a neat and satisfactory condition.
- D. The Contractor shall restore the entire project site to its original or better condition, with the exception of any area(s) designated for alteration by the Contract Documents. The Contractor shall restore or replace; when and as directed, any public or private property damaged by his work, equipment, or employees to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required

all necessary highway or driveway, walk, and landscaping work. Suitable materials, equipment, and methods shall be used for such restoration.

- E. The Contractor shall thoroughly clean all materials and equipment installed by him and his subcontractors and on completion of the Work shall deliver it undamaged and in fresh and new appearing condition.

#### 1.18 LAWS AND REGULATIONS

- A. It shall be the responsibility of the Contractor to give all notices and comply with all the laws, rules, regulations, ordinances, etc., that may be applicable at the time the Work is started on the project. Should the Contractor discover the Drawings or Specifications are contradictory to, or in variance with the above, he shall notify the ENGINEER immediately, in writing, in order that any required changes or modifications can be made. It is not the Contractor's responsibility to make certain that the Drawings or Specifications are in non-compliance with any of the above; however, should he be aware of any existing discrepancy, or have reason to believe such may exist and performs work without proper notice to the ENGINEER, the Contractor shall be responsible for any cost involved in making the necessary alterations or corrections.

#### 1.19 CONTRACTOR'S USE OF PREMISES

- A. All project construction work will be accomplished on the Owner's property, public/private rights-of-way/easements or within temporary construction easements and the Contractor shall confine his activity to those designated areas. The Contractor shall not enter upon private property for any reason without securing prior permission from the Owner. Such permission, including any stipulations, shall be in writing and a copy shall be delivered to the ENGINEER prior to the Contractor's entry or occupation of the subject property. This requirement will be rigidly enforced, particularly with regard to the utilization of vacant areas adjacent to the work site for the storage of materials or parking equipment.
- B. The Contractor shall perform his work in such manner that he will not damage adjacent public or private property. Any damage to existing physical structures or utility services shall be repaired or restored promptly at no expense to the Owner.
- C. The Contractor shall avoid damage to and preserve all existing vegetation (grass, shrubs, trees, etc.) on or near the work area which do not, within reason, interfere with construction. The Contractor will be responsible for and required to replace or restore all such vegetation damaged or destroyed at no cost to the Owner. The Contractor will also be responsible for any unauthorized cutting or damage to trees, shrubs, etc., and also damage caused by careless operation of equipment, storage of materials and rutting or tracking of grass by equipment.

- D. The Contractor shall conduct access, hauling, filling, and storage operations as specified herein and as shown on the Contract Drawings.
  - 1. On-site borrow areas are designated as follows: Suitable material, as approved by ENGINEER, from excavations for project structures. Any additional borrow material required shall be provided by the Contractor from off-site.
  - 2. On-site spoil areas will become property of the Contractor and are to be disposed off-site.
- E. Construct all fill areas so runoff will not flood improved areas.
- F. All connections to existing piping systems shall be made as shown or indicated on the Drawings after consultation, cooperation, and coordination with the Owner. Some such connections may have to be made during off-peak hours (late night or early morning hours). The Contractor shall give a minimum of 72 hours notice to the Owner when tie-ins with the existing plant utilities are required.
- G. For major utility pipeline tie-ins and relocations, the Contractor shall submit a detailed Plan of Action for review and approval by the Owner and the ENGINEER. No major utility relocation or tie-ins shall proceed until the Plan of Action for that Work is approved.

#### 1.20 HAZARDOUS LOCATIONS

- A. The Contractor shall be responsible for identification of hazardous locations, appropriate construction methods, and all other safety issues.

#### 1.21 ADDITIONAL PROVISIONS

- A. The Contractor shall provide at his own cost all necessary temporary facilities for access to, and for protection of, all existing structures. The Contractor is responsible for all damage to existing structures, equipment, and facilities caused by his construction operations, and must repair all such damage when and as ordered by the ENGINEER.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01310  
PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Form of Schedules
- B. Content of Schedules: Submit for approval, a preliminary progress schedule in accordance with the General Conditions.
- C. Schedule Revisions
- D. Submittal Requirements

1.2 FORM OF SCHEDULES

- A. Prepare schedules in form of a horizontal bar chart.
  - 1. Provide separate horizontal bar for each trade or operation.
  - 2. Utilize a horizontal time scale and identify first work day of each week.
  - 3. Utilize scale and spacings to allow space for notations and future revisions.
- B. Utilize a listing format which chronologically indicates the order of start of each item of work.
- C. Identify each listing by major specification section numbers.

1.3 CONTENT OF SCHEDULES

- A. Completion Dates: Show the beginning and ending contract dates stated in documents. Schedules showing completion prior to the contract completion date will be accepted but in no event will they be considered basis for a claim for delay against the OWNER by the CONTRACTOR for the period between the early completion date and the completion date provided in the Contract Documents.
- B. Show complete sequence of construction by activity.

- C. Show dates for beginning and completion of each major element of construction and installation dates for major items of equipment. Elements shall include, but not be limited to, the following:
1. Shop drawing receipt from supplier/manufacturer submitted to ENGINEER, review and return to supplier/manufacturer
  2. Material and equipment order, manufacturer, delivery, installation, and checkouts
  3. Performance tests and supervisory services activity
  4. Demolition and removal of existing equipment
  5. Construction of various facilities
  6. Excavation, sheeting, shoring, dewatering
  7. Concrete placement sequence
  8. Structural steel erection
  9. Piping and equipment installation
  10. Electrical work activity
  11. Connection to existing piping
  12. Miscellaneous concrete placement
  13. Subcontractor's items of work
  14. Backfilling, grading, seeding, sodding, landscaping, and paving
  15. Final cleanup
  16. Allowance for inclement weather
  17. Coordination with concurrent Work on site
- D. Show projected percentage of completion for each item as of first day of each month.

#### 1.4 SCHEDULE REVISIONS

- A. As a minimum, revise construction schedule every 30 calendar days to reflect changes in progress of Work for duration of Contract.
- B. Indicate progress of each activity at date of submittal.
- C. Show changes occurring since previous submittal of schedule.
  - 1. Major changes in scope
  - 2. Activities modified since previous submittal
  - 3. Revised projections of progress and completion
  - 4. Other identifiable changes
- D. Provide a written report as needed to define:
  - 1. Problem areas, anticipated delays, and impact on schedule
  - 2. Corrective action recommended, and its effect
  - 3. Effect of changes on schedules of other Contractors

#### 1.5 SUBMITTAL REQUIREMENTS

- A. Schedule: Submit final progress schedule in accordance with the General Conditions.
- B. For preliminary and final submittal of construction progress schedule and subsequent revisions thereof furnish three (3) copies to ENGINEER.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01340

### SHOP DRAWINGS, WORKING DRAWINGS, AND SAMPLES

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

###### A. Scope of Work:

1. The Contractor shall submit to the ENGINEER for review and approval, such Shop Drawings, Test Reports, and Product Data on materials and equipment (hereinafter in this Section called Data), and material samples (hereinafter in this Section called Samples) as are required for the proper control of work, including but not limited to those Shop Drawings, Data, and Samples for materials and equipment specified elsewhere in the Specifications and in the Drawings.
2. Within two (2) calendar days after the Effective Date of the Agreement, the Contractor shall submit to the ENGINEER a complete list of preliminary data on items for which Shop Drawings are to be submitted. Included in this list shall be the names of all proposed manufacturers furnishing specified 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 Contract Documents. This procedure is required in order to expedite final review of Shop Drawings.
3. The Contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the Owner and the ENGINEER. This log should include the following items:
  - a. Submittal description and number assigned.
  - b. Date to ENGINEER.
  - c. Date returned to Contractor (from ENGINEER).
  - d. Status of submittal (Approved, Approved as Noted, Amend and Resubmit, and Rejected).
  - e. Date of resubmittal and return (as applicable).
  - f. Date material release (for fabrication).
  - g. Projected date of fabrication.

- h. Projected date of delivery to site.
- i. Status of O&M manuals submittal.
- j. Specification Section.
- k. Drawings sheet number.

B. Related Requirements Described Elsewhere:

- 1. Progress Schedule: Section 01310.
- 2. Material and Equipment: Section 01600.
- 3. Contract Closeout: Section 01720.

## 1.2 CONTRACTOR'S RESPONSIBILITY

- A. It is the responsibility of the Contractor to check all drawings, data and samples prepared before submitting them to the ENGINEER for review. Each and every copy of the Drawings and data shall bear the Contractor's stamp showing that they have been so checked. Shop drawings submitted to the ENGINEER without the 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. If the Contractor takes exception to the specifications, the Contractor shall note the exception in the letter of transmittal to the ENGINEER.
- B. Determine and verify:
  - 1. Field measurements.
  - 2. Field construction criteria.
  - 3. Catalog numbers and similar data.
  - 4. Conformance with 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 and ending of manufacture, testing, and installation of materials, supplies, and equipment. This schedule shall indicate those that are critical to the progress schedule.



- D. The Contractor shall not begin any of the work covered by a Shop Drawing, Data, or a Sample returned for correction until a revision or correction thereof has been reviewed and returned to him, by the ENGINEER, with approval.
- E. The Contractor shall submit to the ENGINEER all drawings and schedules sufficiently in advance of construction requirements to provide no less than two (2) calendar days for checking and appropriate action from the time the ENGINEER receives them.
- F. All submittals shall be accompanied with a transmittal letter prepared in duplicate containing the following information:
1. Date.
  2. Project Title and Number.
  3. Contractor's name and address.
  4. The number of each Shop Drawings, Project Data, and Sample submitted.
  5. Notification of Deviations from Contract Documents.
    - a. The Contractor shall indicate in **bold type** at the top of the cover sheet of submittal of shop drawing if there is a deviation from the Drawings, Specifications, or referenced specifications or codes.
    - b. The Contractor shall also list any deviations from the Drawings, Specifications, or referenced specifications or codes and identify in green ink prominently on the applicable Shop Drawings.
  6. Submittal Log Number conforming to Specification Section Number.
- G. The Contractor shall submit five (5) copies of descriptive or product data information and Shop Drawings to the ENGINEER plus the number of copies which the Contractor requires returned. All blueprint Shop Drawings shall be submitted plus the number of copies which the Contractor requires returned. The ENGINEER will review the blueprints and return to the Contractor the set of marked-up shop drawings with appropriate review comments.
- H. The Contractor shall be responsible for and bear all costs of damages which may result from the ordering of any material or from proceeding with any part of Work prior to the completion of the review by the ENGINEER of the necessary Shop Drawings.

- I. The Contractor shall be fully responsible for observing the need for and making any changes in the arrangement of piping, connections, wiring, manner of installation, etc., which may be required by the materials/equipment he proposes to supply both as pertains to his own work and any work affected under other parts, headings, or divisions of the Drawings and Specifications.
- J. The Contractor shall not use Shop Drawings as a means of proposing alternate items to demonstrate compliance with the Drawings and Specifications.
- K. Each submittal will bear a stamp indicating that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal. The Contractor stamp shall be similar to the sample given below:

<p>(OWNER'S NAME)          (PROJECT NAME)          (PROJECT NUMBER)</p> <p>SHOP DRAWING NO.: _____</p> <p>SPECIFICATION SECTION: _____ DRAWING NO. _____</p> <p>WITH RESPECT TO THIS SHOP DRAWING OR SAMPLE, I HAVE DETERMINED AND VERIFIED ALL QUANTITIES, DIMENSIONS, SPECIFIED PERFORMANCE CRITERIA, INSTALLATION REQUIREMENTS, MATERIALS, CATALOG NUMBERS, AND SIMILAR DATA WITH RESPECT THERETO AND REVIEWED OR COORDINATED THIS SHOP DRAWING OR SAMPLE WITH OTHER SHOP DRAWINGS AND SAMPLES AND WITH THE REQUIREMENTS OF THE WORK AND THE CONTRACT DOCUMENTS.</p> <p>_____ NO VARIATION FROM CONTRACT DOCUMENTS</p> <p>_____ VARIATION FROM CONTRACT DOCUMENTS AS SHOWN</p> <p>(CONTRACTOR'S NAME)          (CONTRACTOR'S ADDRESS)          BY: _____</p> <p>_____ DATE: _____          AUTHORIZED SIGNATURE</p>
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- L. Drawings and schedules shall be checked and coordinated with the work of all trades and sub-contractors 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.

### 1.3 REVIEW OF SHOP DRAWINGS

- A. Shop Drawings will be reviewed by the ENGINEER and LCU. The ENGINEER's and the County's review of Shop Drawings, Data, and Samples as submitted by the Contractor will be to determine if the item(s) generally conforms to the information in the Contract Documents and is compatible with the design concept. The ENGINEER's and the County's review and exceptions, if any, will not constitute an approval of dimensions, connections, 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 Documents.
  - 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 schedules as submitted describe variations and show a departure from the Contract Documents which the ENGINEER finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or contract time, the ENGINEER may return the reviewed drawings without noting an exception.
- D. "Approved As Noted" - Contractor shall incorporate ENGINEER's comments into the submittal before release to manufacturer. The Contractor shall send a letter to the ENGINEER acknowledging the comments and their incorporation into the Shop Drawing.
- E. "Amend And Resubmit" - Contractor shall resubmit the Shop Drawing to the ENGINEER. The resubmittal shall incorporate the ENGINEER's comments highlighted on the Shop Drawing.
- F. "Rejected" - Contractor shall correct, revise and resubmit Shop Drawing for review by ENGINEER.

- G. Resubmittals will be handled in the same manner as 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.
- H. If the Contractor considers any correction indicated on the drawings to constitute a change to the Drawings or Specifications, the Contractor shall give written notice thereof to the ENGINEER.
- I. 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.
- J. No partial submittals will be reviewed. Submittals not deemed complete will be stamped "Rejected" and returned to the Contractor for resubmittal. Unless otherwise specifically permitted by the ENGINEER, make all submittals in groups containing all associated items for:
  - 1. Systems.
  - 2. Processes.
  - 3. As indicated in specific Specifications Sections.

All drawings, schematics, manufacturer's product data, certifications, and other Shop Drawing submittals required by a system specification shall be submitted at one time as a package to facilitate interface checking.

- K. Only the ENGINEER shall utilize the color "red" in marking Shop Drawing submittals.
- L. Shop drawing and submittal data shall be reviewed by the ENGINEER for each original submittal and first resubmittal; thereafter review time for subsequent resubmittals shall be charged to the Contractor and the Contractor shall reimburse the Owner for services rendered by the ENGINEER as specified in the Supplementary Conditions.

#### 1.4 SHOP DRAWINGS

- A. When used in the Contract Documents, the term "Shop Drawing" shall be considered to mean Contractor's plans for materials and equipment which become an integral part of the Project. Shop Drawings shall be complete and detailed and shall consist of fabrication, erection, setting and schedule drawings, manufacturer's scale drawings, and wiring and control diagrams. Catalogs cuts, catalogs, pamphlets, descriptive literature, and performance and test data shall be considered only as supportive information to required

Shop Drawings as defined above. As used herein, the term "manufactured" applies to standard units usually mass-produced; and "fabricated" means items specifically assembled or made out of selected materials to meet specific design requirements.

- B. Manufacturer's catalog sheets, brochures, diagrams, illustrations, and other standard descriptive data shall be clearly marked to identify pertinent materials, products, or models. Delete information which is not applicable to the Work by striking or cross-hatching.
- C. Each Shop Drawing shall be submitted with an 8-1/2 inches by 11 inches cover sheet which shall include a title block for the submittal. Each Shop Drawing cover sheet shall have a blank area 3-1/2 inches high by 4-1/2 inches wide, located adjacent to the title block. The title block/cover sheet shall display the following:
  - 1. Project Title and Number.
  - 2. Number and title of the Shop Drawing.
  - 3. Date of Shop Drawing or revision.
  - 4. Name of Contractor and subcontractor submitting drawing.
  - 5. Supplier/manufacturer.
  - 6. Separate detailer when pertinent.
  - 7. Specification title and Section number.
  - 8. Applicable Drawing number.
- D. Data on materials and equipment shall include, without limitation, materials and equipment lists, catalog data sheets, catalog cuts, performance curves, diagrams, verification of conformance with applicable standards or codes, 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.
- E. For all mechanical and electrical equipment furnished, the Contractor shall provide a list including the equipment name, and address, and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained.
- F. 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.

- G. All manufacturers or equipment suppliers who propose to furnish equipment or products shall submit an installation list to the ENGINEER along with the required shop drawings. The installation list shall include at least five (5) installations where identical equipment has been installed and has been in operation for a period of at least two (2) years unless specified otherwise in the Specification Section applicable.

## 1.5 WORKING DRAWINGS

- A. When used in the Contract Documents, the term "Working Drawings" shall be considered to mean the Contractor's plan for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, forming and falsework 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 Paragraph 1.5 A. above, shall be submitted to the ENGINEER where required by the Contract Documents or requested by the ENGINEER, and shall be submitted at least two (2) calendar days (unless otherwise specified by the ENGINEER) in advance of their being required for the 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, calculations 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. All risks to new or existing work are assumed by the Contractor; the Owner and ENGINEER shall have no responsibility therefor.

## 1.6 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 the 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.
  3. A minimum of three (3) 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/supplier and brand (if any).
  6. Location in Project.
  7. Submittal and specification numbers.

(Samples of finished materials shall have additional marking that will identify them under the finished schedules.)

- D. The Contractor shall prepare a transmittal letter and a description sheet for each shipment of samples. The description sheet shall contain the information required in Paragraphs 1.6 B and C above. He shall enclose a copy of the letter and description sheet with the shipment and send a copy of the letter and description sheet 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 the 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

SECTION 01370  
SCHEDULE OF VALUES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work:

1. Submit to the ENGINEER a Schedule of Values allocated to the various lump sum portions of the Work.
2. Upon request of the ENGINEER support the values with data which will substantiate their correctness. The data shall include, but not be limited to quantity of materials, all sub-elements of the activity, and their units of measure.
3. The Schedule of Values shall establish the actual value for each activity of the Work to be completed taken from the Critical Path Method (CPM) Construction Schedule, and shall be used as the basis for the Contractor's Applications for Payment.

B. Related Requirements Described Elsewhere:

1. Conditions of the Construction Contract.

1.2 FORM AND CONTENT OF SCHEDULE OF VALUES

A. Contractor shall use Schedule of Values Form as provided by the County. Type schedule on 8-1/2 inch x 11 inch white paper. Contractor's standard forms and computer printouts may be considered for approval by the ENGINEER upon Contractor's request. Identify schedule with:

1. Title of project and location.
2. Owner and purchase order number.
3. ENGINEER and project number.
4. Name and address of Contractor.
5. Contract designation.
6. Date of submission.



- B. Schedule shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing item prices for progress payments during construction.
- C. Identify each line item with the number and the title of the respective section of the Specifications.
- D. For each major item of the Work, list sub-values of major products or operations under the major item.
- E. For the various portions of the Work:
  - 1. The amount for each item shall reflect a total installed cost including a directly proportional amount of the Contractor's overhead and profit.
  - 2. For items on which progress payments will be requested for stored materials, break down the value into:
    - a. The cost of the materials, delivered and unloaded, with taxes paid. Paid invoices are required for materials. Payment for materials shall be limited to the invoiced amount only.
    - b. The total installed value.
- F. Round off figures to nearest dollar amount.
- G. The sum of the costs of all items listed in the schedule shall equal the total Contract Price.
- H. For each item which has an installed value of more than \$15,000, provide a breakdown of costs to list major products or operations under each item.

### 1.3 REVIEW AND RESUBMITTAL

- A. After review by ENGINEER, revise and resubmit Schedule of Values as required.
- B. Resubmit revised schedules in same manner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01390

### COLOR AUDIO-VIDEO PRECONSTRUCTION RECORD

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Scope of Work: Prior to commencing work, the Contractor shall have a continuous color audio-video DVD recording taken along the entire length of the Project and at all proposed construction sites within the Project area to serve as a record of pre-construction conditions.

##### 1.2 QUALITY ASSURANCE

- A. The Contractor shall engage the services of a professional electrographer. The color audio-video DVDs shall be prepared by a responsible commercial firm known to be skilled and regularly engaged in the business or preconstruction color audio-video DVD documentation.
- B. The electrographer shall furnish to the ENGINEER a list of all equipment to be used for the audio-video taping, i.e., manufacturer's name, model number, specifications and other pertinent information.
- C. Additional information to be furnished by the electrographer is the names and addresses of two references that the electrographer has performed color audio-video taping for, on projects of a similar nature, within the last 12 months.
- D. Owner's Representative must be present during filming. Provide Owner five (5) days notice prior to start of filming.
- E. No construction shall begin prior to review and approval of the DVDs covering the construction area by the Owner and ENGINEER. The ENGINEER shall have the authority to reject all or any portion of a video DVD not conforming to specifications and order that it be redone at no additional charge.
- F. The Contractor shall reschedule unacceptable coverage within five (5) days after being notified. The ENGINEER shall designate those areas, if any, to be omitted from or added to the audio-video coverage.
- G. DVD recordings shall not be made more than ninety (90) days prior to construction in any area. All DVDs and written records shall become property of Owner.

## PART 2 - PRODUCTS

### 2.1 AUDIO-VIDEO DVDS

- A. Audio-video DVDs shall be new. Reprocessed DVDs will not be acceptable.

## PART 3 - EXECUTION

### 3.1 EQUIPMENT

- A. All equipment, accessories, materials and labor to perform this service shall be furnished by the Contractor.
- B. The total audio-video system shall reproduce bright, sharp, clear pictures with accurate colors and shall be free from distortion, tearing, rolls or any other form of imperfection. The audio portion of the recording shall reproduce the commentary of the camera operator with proper volume, clarity and be free from distortion and interruptions.
- C. When conventional wheeled vehicles are used, the distance from the camera lens to the ground shall not be more than ten (10) feet. In some instances, audio-video DVD coverage may be required in areas not accessible by conventional wheeled vehicles. Such coverage shall be obtained by walking or special conveyance provided by the Contractor.
- D. The color video camera used in the recording system shall have a horizontal resolution of 350 lines at center, a luminance signal to noise ratio of 45 dB and a minimum illumination requirement of one (1) foot candle.

### 3.2 RECORDED INFORMATION - AUDIO

- A. Each DVD shall begin with the current date, project name and municipality and be followed by the general location, i.e., viewing side and direction of progress. The audio track shall consist of an original live recording. The recording shall contain the narrative commentary of the electrographer, recorded simultaneously with his fixed elevation video record of the zone of influence of construction.
- B. The Owner and ENGINEER reserves the right to supplement the audio portion of the taping as deemed necessary. A representative of the Owner or ENGINEER shall be selected to provide such narrative.

### 3.3 RECORDED INFORMATION - VIDEO

- A. All video recordings shall, by electronic means, display on the screen the time of day, the month, day and year of the recording. This time and date information must be continuously and simultaneously generated with the actual recording.
- B. Each video DVD shall have a log of that video DVD's contents. The log shall describe the various segments of coverage contained on that video DVD in terms of the names of streets or easements, coverage beginning and end, directions of coverage, video unit counter numbers, engineering stationing numbers and the date.

### 3.4 LIGHTING

- A. All audio-video shall be done during time of good visibility. No recording shall be done during precipitation, mist or fog. The recording shall only be done when sufficient sunlight is present to properly illuminate the subjects of recording and to produce bright, sharp video recordings of those subjects.

### 3.5 SPEED OF TRAVEL

- A. The rate of speed in the general direction of travel of the vehicle used during recording shall not exceed 44 feet per minute. Panning, zoom-in and zoom-out rates shall be sufficiently controlled to maintain a clear view of the object.

### 3.6 AREA OF COVERAGE

- A. Coverage shall include all surface features located within the zone of influence of construction supported by appropriate audio coverage. Such coverage shall include, but not be limited to, existing driveways, sidewalks, curbs, pavements, ditches, mailboxes, landscaping, culverts, fences, signs, and headwalls within the area covered.

END OF SECTION

## SECTION 01410

### TESTING AND TESTING LABORATORY SERVICES

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

###### A. Scope of Work:

1. The Contractor and City shall employ and pay for services of an Independent Testing Laboratory to perform testing specifically indicated in the specifications (Section 1.01.C) and may at any other time elect to have materials and equipment tested for conformity with the Contract Documents.
2. Contractor shall cooperate with the laboratory to facilitate the execution of its required services.
3. The Contractor shall provide ENGINEER with all test results herein within five (5) days of receipt.

###### B. Related Requirements Described Elsewhere:

1. Conditions of the Contract.
2. Respective section of the Specifications: Certification of products.
3. Each Specification section listed: Laboratory tests required, and standards for testing.
4. Testing laboratory inspection, sampling and testing is required for, but not limited to the following:
  - a. Excavating, Backfilling, and Compaction.
  - b. Stabilized Sub-Base.
  - c. Limerock Base.
  - d. Asphaltic Concrete Pavement.
  - e. Cast-in-Place Concrete.
5. Compaction and Backfill: Schedule for Structures, Table 02220-A.

C. The following schedule defines the responsibilities of various tests.

<u>Test</u>	<u>Notes</u>	<u>Paid for By</u>
Soil Compaction	Pipe Work: At min. of 2 points along 8-inch DIP bypass piping	Contractor
Settlement Monitoring	As required by testing laboratory	Contractor
Asphaltic Concrete Pavement	Surface Course: At least 1 per 100 SF. Subgrade: At least 1 per 100 SF Base: At least 1 per 100 SF	Contractor
Pressure	As per Specification Section 15044	Contractor

D. Additional Tests: In the event that first test samples do not meet the applicable material specifications, the Contractor shall take measures to conform the material and equipment to the Specifications. All subsequent tests after the first test required to show compliance with the Specifications shall be paid for by the Contractor.

## 1.2 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with Owner's personnel and laboratory personnel. Provide access to Work and manufacturer's operations.
- B. 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.
- C. Materials and equipment used in the performance of work under this Contract are subject to inspection and testing at the point of manufacturer or fabrication. Standard specifications for quality and workmanship are indicated in the Contract Documents. 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 Contract Documents. All costs of 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.
- D. Furnish incidental labor and facilities:
  - 1. To provide access to Work to be tested.

2. To facilitate inspections and tests.
- E. Notify Owner a minimum of one (1) working day in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01500

### CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

#### PART 1 - GENERAL

##### 1.1 SECTION INCLUDES

- A. General Requirements
- B. Temporary Utilities
- C. Temporary Construction
- D. Barricades and Enclosures
- E. Fences
- F. Security
- G. Temporary Controls
- H. Field Offices and Sheds

##### 1.2 GENERAL REQUIREMENTS

- A. Plant and Facilities: Furnish, install, maintain and remove all false work, scaffolding, ladders, hoistways, braces, pumping plants, shields, trestles, roadways, sheeting, centering forms, barricades, drains, flumes, and the like, any of which may be needed in the construction of any part of the Work and which are not herein described or specified in detail. The CONTRACTOR shall accept responsibility for the safety and efficiency of such works and for any damage that may result from their failure or from their improper construction, maintenance or operation.
- B. First Aid: Maintain a readily accessible, completely equipped first aid kit at each location where work is in progress.
- C. Safety Responsibility: Accept sole responsibility for safety and security at the site.
- D. Indemnify and hold harmless the OWNER and the OWNER's Authorized Representatives, including the ENGINEER, for any safety violation, or noncompliance with governing bodies and their regulations, and for accidents,



deaths, injuries, or damage at the site during occupancy or partial occupancy of the site by CONTRACTOR's forces while performing any part of the Work.

- E. Hazard Communication: Furnish two (2) copies of the CONTRACTOR's Hazard Communication Program required under OSHA regulations before beginning on site activities. Furnish two copies of amendments to Hazard Communications Program as they are prepared.

### 1.3 TEMPORARY UTILITIES

- A. Water: Provide all necessary and required water without additional cost, unless otherwise specified. If necessary, provide and lay water lines to the place of use; secure all necessary permits; pay for all taps to water mains and hydrants and for all water used at the established rates.
- B. Light and Power: Provide without additional cost to the OWNER temporary lighting and power facilities required for the proper construction and inspection of the Work. If, in the ENGINEER's opinion, these facilities are inadequate, do NOT proceed with any portion of the Work affected thereby. Maintain temporary lighting and power until the Work is accepted.
- C. Sanitary Facilities: Provide sufficient sanitary facilities for construction personnel. Prohibit and prevent nuisances on the site of the Work or on adjoining property. Discharge any employee who violates this rule. Abide by all environmental regulations or laws applicable to the Work.
- D. Connections to Existing Utilities:
  - 1. Unless otherwise specified or indicated, make all necessary connections to existing facilities including structures, drain lines, and utilities such as water, sewer, gas, telephone, and electricity. In each case, obtain permission from the OWNER or the owning utility prior to undertaking connections. Protect facilities against deleterious substances and damage.
  - 2. Thoroughly plan in advance all connections to existing facilities. Have on hand at the time of undertaking the connections, all material, labor and required equipment. Proceed continuously to complete connections in minimum time. Arrange for the operation of valves or other appurtenances on existing utilities, under the direct supervision of the owning utility.

### 1.4 BARRICADES AND ENCLOSURES

- A. Protection of Workmen and Public: Effect and maintain at all times during the prosecution of the Work, barriers and lights necessary for the protection of

Workmen and the Public. Provide suitable barricades, lights, "danger" or "caution" or "street closed" signs and watchmen at all places where the Work causes obstructions to normal traffic, excavation sites, or constitutes in any way a hazard to the public.

B. Barricades and Lights:

1. Protect all streets, roads, highways, excavations and other public thoroughfares which are closed to traffic; use effective barricades which display acceptable warning signs. Locate barricades at the nearest public highway or street on each side of the blocked section.
2. Statutory Requirements: Install and maintain all barricades, signs, lights, and other protective devices within highway rights-of-way in strict conformity with applicable statutory requirements by the authority having jurisdiction.

1.5 FENCES

- A. Existing Fences: Obtain written permission from the OWNER prior to relocating or dismantling fences which may interfere with construction operations. Reach agreements with the fence owner as to the period the fence may be left relocated or dismantled. Install adequate gates where fencing must be maintained. Keep gates closed and locked at all times when not in use.
- B. Restoration: Restore all fences to their original or better condition and to their original location on completion of the Work.

1.6 SECURITY

A. Preservation of Property:

1. Preserve from damage, all property along the line of the Work, in the vicinity of or in any way affected by the Work, the removal or destruction of which is not called for by the Drawings. Preserve from damage, public utilities, trees, lawn areas, building monuments, fences, pipe and underground structures, and public streets. Note: Normal wear and tear of streets resulting from legitimate use by the CONTRACTOR are not considered as damage. Whenever damages occur to such property, immediately restore to its original condition. Costs for such repairs are incidental to the Contract.
2. In case of failure on the part of the CONTRACTOR to restore property or make good on damage or injury, the OWNER may, upon 24 hours written notice, proceed to repair, rebuild, or otherwise restore such property as

may be deemed necessary, and the cost thereof will be deducted from any moneys due or which may become due the CONTRACTOR under this Contract. If removal, repair or replacement of public or private property is made necessary by alteration of grade or alignment authorized by the OWNER and not contemplated by the Contract Documents, the CONTRACTOR will be compensated, in accordance with the General Conditions, provided that such property has not been damaged through fault of the CONTRACTOR or the CONTRACTOR's employees.

B. Public Utility Installations and Structures:

1. Public utility installations and structures include all poles, tracks, pipes, wires, conduits, vaults, manholes, and other appurtenances and facilities, whether owned or controlled by public bodies or privately owned individuals, firms or corporations, used to serve the public with transportation, gas, electricity, telephone, storm and sanitary sewers, water, or other public or private utility services. Facilities appurtenant to public or private property which may be affected by the Work are deemed included hereunder.
2. The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. Existing public utility installations and structures are indicated on the Drawings only to the extent such information was made available to, or found by, the ENGINEER in preparing the Drawings. These data are not guaranteed for completeness or accuracy, and the CONTRACTOR is responsible for making necessary investigations to become fully informed as to the character, condition, and extent of all public utility installations and structures that may be encountered and that may affect the construction operations.
3. Contact utility locating service sufficiently in advance of the start of construction to avoid damage to the utilities and delays to the completion date.
4. Remove, replace, relocate, repair, rebuild, and secure any public utility installations and structures damaged as a direct or indirect result of the Work under this Contract. Costs for such work are incidental to the Contract. Be responsible and liable for any consequential damages done to or suffered by any public utility installations or structures. Assume and accept responsibility for any injury, damage, or loss which may result from or be consequent to interference with, or interruption or discontinuance of, any public utility service.

5. Repair or replace any water, electric, sewer, gas, or other service connection damaged during the Work with no addition to the Contract price.
  6. At all times in performance of the Work, employ proven methods and exercise reasonable care and skill to avoid unnecessary delay, injury, damage, or destruction to public utility installations and structures. Avoid unnecessary interference with, or interruption of, public utility services. Cooperate fully with the owners thereof to that end.
  7. Give written notice to the owners of all public utility installations and structures affected by proposed construction operations, sufficiently in advance of breaking ground in any area or on any unit of the Work, to obtain their permission before disrupting the lines and to allow them to take measures necessary to protect their interests. Advise the Chiefs of Police, Fire and Rescue Services of any excavation in public streets or the temporary shut-off of any water main. Provide at least 24 hours notice to all affected property owners whenever service connections are taken out of service.
- C. Work on Private Property: Work on this project will require operations on private property, rights of way or easements. The OWNER has secured the appropriate easements or rights of entry from the affected property owners. Comply with all easement or rights of entry provisions.
- D. Conduct operations along rights-of-way and easements through private property to avoid damage to the property and to minimize interference with its ordinary use. Upon completion of the Work through such property, restore the surface and all fences or other structures disturbed by the construction as nearly as possible to the preconstruction conditions. Do not remove any material from private property without the consent of the property owner or responsible party in charge of such property.
- E. Save the OWNER harmless from any claim or damage arising out of or in connection with the performance of work across and through private property.
- F. Miscellaneous Structures: Assume and accept responsibility for all injuries or damage to culverts, building foundations and walls, retaining walls, or other structures of any kind met with during the prosecution of the Work. Assume and accept liability for damages to public or private property resulting therefrom. Adequately protect against freezing all pipes carrying liquid.

G. Protection of Trees and Lawn Areas:

1. Protect with boxes, trees and shrubs, except those ordered to be removed. Do not place excavated material so as to cause injury to such trees or shrubs. Replace trees or shrubs destroyed by accident or negligence of the CONTRACTOR or CONTRACTOR's employees with new stock of similar size and age, at the proper season, at no additional cost to the OWNER.
2. Leave lawn areas in as good condition as before the start of the Work. Restore areas where sod has been removed by seeding or sodding.

1.7 TEMPORARY CONTROLS

A. During Construction:

1. Keep the site of the Work and adjacent premises free from construction materials, debris, and rubbish. Remove this material from any portion of the site if such material, debris, or rubbish constitutes a nuisance or is objectionable.
2. Remove from the site all surplus materials and temporary structures when they are no longer needed.
3. Neatly stack construction materials such as concrete forms and scaffolding when not in use. Promptly remove splattered concrete, asphalt, oil, paint, corrosive liquids, and cleaning solutions from surfaces to prevent marring or other damage.
4. Properly store volatile wastes in covered metal containers and remove from the site daily.
5. Do not bury or burn on the site or dispose of into storm drains, sanitary sewers, streams, or waterways, any waste material. Remove all wastes from the site and dispose of in a manner complying with applicable ordinances and laws.

B. Smoke Prevention:

1. Strictly observe all air pollution control regulations.
2. Open fires will be allowed only if permitted under current ordinances.

C. Noises:

1. Maintain acceptable noise levels in the vicinity of the Work. Limit noise production to acceptable levels by using special mufflers, barriers, enclosures, equipment positioning, and other approved methods.
2. Supply written notification to the OWNER sufficiently in advance of the start of any work which violates this provision. Proceed only when all applicable authorizations and variances have been obtained in writing.

D. Hours of Operation:

1. Operation of construction equipment between the hours of 7:00 p.m. and 6:00 a.m. the following day is prohibited. For operation of this equipment during this period obtain written consent from the OWNER.
2. Do not carry out nonemergency work, including equipment moves, on Sundays without prior written authorization by the OWNER.

E. Dust Control:

1. Take measures to prevent unnecessary dust. Keep earth surfaces exposed to dusting moist with water or a chemical dust suppressant. Cover materials in piles or while in transit to prevent blowing or spreading dust.
2. Adequately protect buildings or operating facilities which may be affected adversely by dust. Protect machinery, motors, instrument panels, or similar equipment by suitable dust screens. Include proper ventilation with dust screens.

F. Temporary Drainage Provisions:

1. Provide for the drainage of stormwater and any water applied or discharged on the site in performance of the Work. Provide adequate drainage facilities to prevent damage to the Work, the site, and adjacent property.
2. Supplement existing drainage channels and conduits as necessary to carry all increased runoff from construction operations. Construct dikes as necessary to divert increased runoff from entering adjacent property (except in natural channels), to protect the OWNER's facilities and the Work, and to direct water to drainage channels or conduits. Provide ponding as necessary to prevent downstream flooding.
3. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

- G. Pollution: Prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. Do not permit sanitary wastes to enter any drain or watercourse other than sanitary sewers. Do not permit sediment, debris, or other substances to enter sanitary sewers. Take reasonable measures to prevent such materials from entering any drain or watercourse.

## 1.8 TRAFFIC REGULATION

- A. Parking: Provide and maintain suitable parking areas for the use of all construction workers and others performing work or furnishing services in connection with the Contract, to avoid any need for parking personal vehicles where they may interfere with public traffic or construction activities.
- B. Access: Conduct Work to interfere as little as possible with public travel, whether vehicular or pedestrian. Provide and maintain suitable and safe bridges, detours, or other temporary expedients for the accommodation of public and private travel. Whenever it is necessary to cross, obstruct, or close roads, driveways, and walks, whether public or private, give reasonable notice to owners of private drives before interfering with them. Such maintenance of traffic will not be required when the CONTRACTOR has obtained permission from the owner or tenant of private property, or from the authority having jurisdiction over the public property involved, to obstruct traffic at the designated point.

## 1.9 FIELD OFFICES AND SHEDS

- A. CONTRACTOR's Office: Erect, furnish, and maintain a field office with a telephone. Have an authorized agent present at this office at all times while the Work is in progress. Keep readily accessible copies of the Contract Documents, required record documents, and the latest approved shop drawings at this field office.
- B. Material Sheds and Temporary Structures: Provide material sheds and other temporary structures of sturdy construction and neat appearance.
- C. Location: Coordinate location of field offices, material sheds and temporary structures with ENGINEER and OWNER.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01525  
CONSTRUCTION AIDS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope of Work: Furnish, install and maintain required construction aids, remove on completion of Work.
- B. Related Requirements Described Elsewhere:
  - 1. Summary of Project: Section 01010.
- C. Comply with applicable requirements specified in Sections of Divisions 2 and 3.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials may be new or used, suitable for the intended purpose, but must not violate requirements of applicable codes and standards.

2.2 CONSTRUCTION AIDS

- A. Provide construction aids and equipment required by personnel and to facilitate execution of the Work: scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes and other such facilities and equipment such as temporary valves and fittings. Refer to respective Sections for particular requirements for each trade.
- B. When permanent stair framing is in place, provide temporary treads, platforms and railings, for use by construction personnel.
- C. Maintain facilities and equipment in first-class condition.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Consult with the ENGINEER, review site conditions and factors which affect construction procedures and construction aids, which may be affected by execution of the Work.



### 3.2 GENERAL

- A. Comply with applicable requirements specified in sections of Divisions 2 through 16.
- B. Relocate construction aids as required by progress of construction, by storage of work requirements and to accommodate legitimate requirements of Owner and other contractors employed at the site.

### 3.3 REMOVAL

- A. Completely remove temporary materials, equipment and services:
  - 1. When construction needs can be met by use of permanent construction.
  - 2. At completion of work.
- B. Clean and restore areas damaged by installation by use of temporary facilities.
  - 1. Remove foundations and underground installations for construction aids.
  - 2. Grade and grass areas of site affected by temporary installations to required elevations, slopes, ground cover and clean the area.
- C. Restore permanent facilities used for temporary purposes to specified condition or in kind if not specified.

END OF SECTION

SECTION 01600  
MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Description
- B. Substitutions
- C. Manufacturer's Written Instructions
- D. Transportation and Handling
- E. Storage, Protection and Maintenance
- F. Manufacturer's Field Quality Control Services
- G. Post Startup Services
- H. Special Tools and Lubricating Equipment
- I. Lubrication

1.2 DESCRIPTION

- A. Proposed Manufacturers List: Within 15 calendar days of the date of the Notice to Proceed, submit to the ENGINEER a list of the names of proposed manufacturers, materialmen, suppliers and subcontractors, obtain approval of this list by OWNER prior to submission of any working drawings. Upon request submit evidence to ENGINEER that each proposed manufacturer has manufactured a similar product to the one specified and that it has previously been used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.
- B. Furnish and install Material and Equipment which meets the following:
  - 1. Conforms to applicable specifications and standards.
  - 2. Complies with size, make, type, and quality specified or as specifically approved, in writing, by ENGINEER.

3. Will fit into the space provided with sufficient room for operation and maintenance access and for properly connecting piping, ducts and services, as applicable. Make the clear spaces that will be available for operation and maintenance access and connections equal to or greater than those shown and meeting all the manufacturers' requirements. Make all provisions for installing equipment furnished at no increase in Contract Price.
4. Manufactured and fabricated in accordance with the following:
  - a. Design, fabricate, and assemble in accordance with best engineering and shop practices.
  - b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
  - c. Provide two or more items of same kind identical, by same manufacturer.
  - d. Provide materials and equipment suitable for service conditions.
  - e. Adhere to equipment capabilities, sizes, and dimensions shown or specified unless variations are specifically approved, in writing, in accordance with the Contract Documents.
  - f. Adapt equipment to best economy in power consumption and maintenance. Proportion parts and components for stresses that may occur during continuous or intermittent operation, and for any additional stresses that may occur during fabrication or installation.
  - g. Working parts are readily accessible for inspection and repair, easily duplicated and replaced.
5. Use material or equipment only for the purpose for which it is designed or specified.

### 1.3 SUBSTITUTIONS

#### A. Substitutions:

1. CONTRACTOR's requests for changes in equipment and materials from those required by the Contract Documents are considered requests for substitutions and are subject to CONTRACTOR's

representations and review provisions of the Contract Documents when one of following conditions are satisfied:

- a. Where request is directly related to an "or equal" clause or other language of same effect in Specifications.
- b. Where required equipment or material cannot be provided within Contract Time, but not as result of CONTRACTOR's failure to pursue Work promptly or to coordinate various activities properly.
- c. Where required equipment or material cannot be provided in manner compatible with other materials of Work, or cannot be properly coordinated therewith.

2. CONTRACTOR'S Options:

- a. Where more than one choice is available as options for CONTRACTOR's selection of equipment or material, select option compatible with other equipment and materials already selected (which may have been from among options for other equipment and materials).
- b. Where compliance with specified standard, code or regulation is required, select from among products which comply with requirements of those standards, codes, and regulations.
- c. "Or Equal": For equipment or materials specified by naming one or more equipment manufacturer and "or equal", submit request for substitution for any equipment or manufacturer not specifically named.

B. Conditions Which are Not Substitution:

1. Requirements for substitutions do not apply to CONTRACTOR options on materials and equipment provided for in the Specifications.
2. Revisions to Contract Documents, where requested by OWNER or ENGINEER, are "changes" not "substitutions".
3. CONTRACTOR's determination of and compliance with governing regulations and orders issued by governing authorities do not constitute substitutions and do not constitute basis for a Change Order, except as provided for in Contract Documents.

#### 1.4 MANUFACTURER'S WRITTEN INSTRUCTIONS

- A. Instruction Distribution: When the Contract Documents require that installation, storage, maintenance and handling of equipment and materials comply with manufacturer's written instructions, obtain and distribute printed copies of such instructions to parties involved in installation, including six (6) copies to ENGINEER.
1. Maintain one (1) set of complete instructions at jobsite during storage and installation, and until completion of work.
- B. Manufacturer's Requirements: Store, maintain, handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's written instructions and in conformity with Specifications.
1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult ENGINEER for further instructions.
  2. Do not proceed with Work without written instructions.
- C. Performance Procedures: Perform Work in accordance with manufacturer's written instructions. Do not omit preparatory steps or installation procedures, unless specifically modified or exempted by Contract Documents.

#### 1.5 TRANSPORTATION AND HANDLING

- A. Coordination with Schedule: Arrange deliveries of materials and equipment in accordance with the Progress Schedule. Coordinate to avoid conflict with work and conditions at site.
1. Deliver materials and equipment in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
  2. Protect bright machined surfaces, such as shafts and valve faces, with a heavy coat of grease prior to shipment.
  3. Immediately upon delivery, inspect shipments to determine compliance with requirements of Contract Documents and approved submittals and that material and equipment are protected and undamaged.

- B. Handling: Provide equipment and personnel to handle material and equipment by methods recommended by manufacturer to prevent soiling or damage to materials and equipment or packaging.

## 1.6 STORAGE, PROTECTION, AND MAINTENANCE

### A. On-site storage areas and buildings:

1. Conform storage buildings to requirements of Section 01500.
2. Coordinate location of storage areas with ENGINEER and OWNER.
3. Arrange on site storage areas for proper protection and segregation of stored materials and equipment with proper drainage. Provide for safe travel around storage areas and safe access to stored materials and equipment.
4. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.
5. Store materials such as pipe, reinforcing and structural steel, and equipment on pallets, blocks or racks, off ground.
6. PVC Pipe may be damaged by prolonged exposure to direct sunlight and the CONTRACTOR shall take necessary precautions during storage and installation to avoid this damage. Pipe shall be stored under cover, and installed with sufficient backfill to shield it from the sun.
7. Store fabricated materials and equipment above ground, on blocking or skids, to prevent soiling or staining. Cover materials and equipment which are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.

### B. Interior Storage:

1. Store materials and equipment in accordance with manufacturer's instructions, with seals and labels intact and legible.
2. Store materials and equipment, subject to damage by elements, in weathertight enclosures.
3. Maintain temperature and humidity within ranges required by manufacturer's instructions.

- C. Accessible Storage: Arrange storage in a manner to provide easy access for inspection and inventory. Make periodic inspections of stored materials or equipment to assure that materials or equipment are maintained under specified conditions and free from damage or deterioration.
  - 1. Perform maintenance on stored materials of equipment in accordance with manufacturer's instructions, in presence of OWNER or ENGINEER.
  - 2. Submit a report of completed maintenance to ENGINEER with each Application for Payment.
  - 3. Failure to perform maintenance, to notify ENGINEER of intent to perform maintenance or to submit maintenance report may result in rejection of material or equipment.
- D. OWNER's Responsibility: OWNER assumes no responsibility for materials or equipment stored in buildings or on-site. CONTRACTOR assumes full responsibility for damage due to storage of materials or equipment.
- E. CONTRACTOR's Responsibility: CONTRACTOR assumes full responsibility for protection of completed construction. Repair and restore damage to completed Work equal to its original condition.
- F. Special Equipment: Use only rubber tired wheelbarrows, buggies, trucks, or dollies to wheel loads over finished floors, regardless if the floor has been protected or not. This applies to finished floors and to exposed concrete floors as well as those covered with composition tile or other applied surfacing.
- G. Surface Damage: Where structural concrete is also the finished surface, take care to avoid marking or damaging surface.

## 1.7 MANUFACTURER'S FIELD QUALITY CONTROL SERVICES

- A. General:
  - 1. Provide manufacturer's field services in accordance with this subsection for those tasks specified in other sections.
  - 2. Include and pay all costs for suppliers' and manufacturers' services, including, but not limited to, those specified.
- B. Installation Instruction: Provide instruction by competent and experienced technical representatives of equipment manufacturers or system suppliers as

necessary to resolve assembly or installation procedures which are attributable to, or associated with, the equipment furnished.

C. Installation Inspection, Adjustments and Startup Participation:

1. Provide competent and experienced technical representatives of equipment manufacturers or system suppliers to inspect the completed installation as follows.
  - a. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions which may cause damage.
  - b. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
  - c. Verify that wiring and support components for equipment are complete.
  - d. Verify that equipment or system is installed in accordance with the manufacturer's recommendations, approved shop drawings and the Contract Documents.
  - e. Verify that nothing in the installation voids any warranty.
2. Provide manufacturer's representatives to perform initial equipment and system adjustment and calibration conforming to the manufacturer's recommendations and instructions, approved shop drawings and the Contract Documents.
3. Obtain ENGINEER's approval before start-up of equipment. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.
4. Furnish ENGINEER with three (3) copies of the following. When training is specified, furnish the copies at least 24 hours prior to training.
  - a. "Certificate of Installation, Inspection and Start-up Services" by manufacturers' representatives for each piece of equipment and each system specified, certifying:



- (1) That equipment is installed in accordance with the manufacturers' recommendations, approved shop drawings and the Contract Documents.
  - (2) That nothing in the installation voids any warranty.
  - (3) That equipment has been operated in the presence of the manufacturer's representative.
  - (4) That equipment, as installed, is ready to be operated by others.
- b. Detailed report by manufacturers' representatives, for review by ENGINEER of the installation, inspection and start-up services performed, including:
- (1) Description of calibration and adjustments if made; if not in Operation and Maintenance Manuals, attach copy.
  - (2) Description of any parts replaced and why replaced.
  - (3) Type, brand name, and quantity of lubrication used, if any.
  - (4) General condition of equipment.
  - (5) Description of problems encountered, and corrective action taken.
  - (6) Any special instructions left with CONTRACTOR or ENGINEER.
- D. Field Test Participation: Provide competent and experienced technical representatives of all equipment manufacturers and system suppliers as necessary to participate in field testing of the equipment specified in Section 01410.
- E. Trouble-Free Operation: Provide competent and experienced technical representatives of all equipment manufacturers and system suppliers as necessary to place the equipment in trouble-free operation after completion of start-up and field tests.

## 1.8 POST START-UP SERVICES

- A. General: Provide Post Start-up Services in accordance with this subsection for equipment specified in other sections.

- B. Site Visit: Provide the services of an authorized service representative for each equipment manufacturer or system supplier to make a final site visit after the equipment or system has been in operation for at least 6 months, but no longer than 11 months. Furnish assistance to OWNER's operating personnel in making adjustments and calibrations required to determine that the equipment and system is operating in conformance with design, manufacturer's, and specification requirements. Instruct the personnel in a review of proper operation and maintenance procedures.
- C. Certificate: Furnish "Certificate of Post Start-up Services" cosigned by ENGINEER and the manufacturer's representative, certifying that this service has been performed. Use form provided in this section, and furnish OWNER with three (3) copies.

#### 1.9 SPECIAL TOOLS AND LUBRICATING EQUIPMENT

- A. General: Furnish, per manufacturer's recommendations, special tools required for checking, testing, parts replacement, and maintenance. (Special tools are those which have been specially designed or adapted for use on parts of the equipment, and which are not customarily and routinely carried by maintenance mechanics.)
- B. Time of Delivery: Deliver special tools and lubricating equipment to OWNER when unit is placed into operation and after operating personnel have been properly instructed in operation, repair, and maintenance of equipment.
- C. Quality: Provide tools and lubricating equipment of a quality meeting equipment manufacturer's requirements.

#### 1.10 LUBRICATION

- A. General: Where lubrication is required for proper operation of equipment, incorporate in the equipment the necessary and proper provisions in accordance with manufacturer's requirements. Where possible, make lubrication automated and positive.
- B. Oil Reservoirs: Where oil is used, supply reservoir of sufficient capacity to lubricate unit for a 24-hour period.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

**CERTIFICATE OF INSTALLATION, INSPECTION AND START-UP SERVICES**

Project \_\_\_\_\_

Equipment \_\_\_\_\_

Specification Section \_\_\_\_\_

Contract \_\_\_\_\_

I hereby certify that the named equipment has been inspected, adjusted and operated by the Manufacturers' Representative and further certify:

1. That the equipment is installed in accordance with the manufacturer's recommendations, approved shop drawings and the Contract Documents.
2. That nothing in the installation voids any warranty.
3. That equipment has been operated in the presence of the manufacturer's representative.
4. That equipment, as installed, is ready to be operated by others.

**MANUFACTURERS' REPRESENTATIVE**

Signature \_\_\_\_\_ Date \_\_\_\_\_

Name (print) \_\_\_\_\_

Title \_\_\_\_\_

Representing \_\_\_\_\_

**CONTRACTOR**

Signature \_\_\_\_\_ Date \_\_\_\_\_

Name (print) \_\_\_\_\_

Title \_\_\_\_\_

Attach the detailed report called for by Specification Section 01600.

Complete and submit three copies of this form with the detailed report to ENGINEER as specified.

**CERTIFICATE OF POST START-UP SERVICES**

Project \_\_\_\_\_

Equipment \_\_\_\_\_

Specification Section \_\_\_\_\_

Contract \_\_\_\_\_

I hereby certify the Manufacturers' Representative has inspected this equipment, made adjustments and calibrations, and that it is operating in conformance with the design, specifications, and manufacturer's requirements. Detailed notation of improper operation with corresponding recommendations, if any, are made and attached to this form.

**MANUFACTURERS' REPRESENTATIVE**

Signature \_\_\_\_\_ Date \_\_\_\_\_

Name (print) \_\_\_\_\_

Title \_\_\_\_\_

Representing \_\_\_\_\_

**CONTRACTOR**

Signature \_\_\_\_\_ Date \_\_\_\_\_

Name (print) \_\_\_\_\_

Title \_\_\_\_\_

**ENGINEER**

Signature \_\_\_\_\_ Date \_\_\_\_\_

Name (print) \_\_\_\_\_

Title \_\_\_\_\_

Complete and submit three copies of this form to OWNER upon completion of 6 to 11 months reinspection as required by Specification Section 01600.

SECTION 01720  
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Warranties and Bonds
- B. Record Drawings
- C. Special Tools

1.2 WARRANTIES AND BONDS

Prior to final payment deliver to the OWNER the original and one (1) copy of all bonds, warranties, guarantees and similar documents, including those customarily provided by manufacturers and suppliers which cover a period greater than the one year correction period. Show OWNER as beneficiary of these documents.

1.3 RECORD DRAWINGS

At the site, keep and maintain one (1) record copy of all Contract Documents, reference documents and all technical documents submitted in good order. As the work progresses, the ENGINEER or his designated representative shall record on one (1) set of reproducible drawings all changes and deviations from the original Plans. He shall record the exact location of all changes in vertical and horizontal alignment by offsets and ties at each; sewer, water, electric, gas, communication and other services by offset distance to permanent improvements such as building and curbs.

Prior to acceptance of the project and before final payment is made, the ENGINEER shall submit one (1) set of reproducible drawings, two (2) sets of blueline or blackline prints, all marked "Drawings of Record". These Record Drawings must be certified by the Florida Registered Professional ENGINEER, who prepared the plans and signs and seals these plans, and submits an AutoCAD compatible diskette copy of the drawings, and other applicable related records to the County.

These Record Drawings must be certified by the Florida Registered Professional ENGINEER, who prepared the plans and signs and seals these plans. The Record Drawings shall include vertical and horizontal alignment of all water, sewer, and effluent reclaimed lines, valves, tees, bends, reducers, hydrants, pump stations, service connections, meter boxes and/or pads, and other pertinent structures. Pipeline runs in excess of 152.4m, (500'), without fittings shall include vertical

alignment information at 152.4m, (500') intervals. Said alignment shall be tied to permanent improvements, such as roadway and/or railroad centerlines and rights-of-way, building and property corners, and shall be certified by a Professional Land Surveyor, licensed in the State of Florida. The Professional Land Surveyor can coordinate with the Contractor to install the necessary appurtenances on buried utilities to facilitate the survey after construction is completed. In addition, property strap numbers and street names shall be shown on the plan.

On a case by case basis, LCU may waive the requirement for certification by a Professional Land Surveyor, licensed in the State of Florida. However, prior consent must first be obtained from LCU. The County shall withhold final acceptance of the project until the requirement for record drawings and related records has been met. Record Drawings without detailed field verified horizontal and vertical locations of all facilities shown will be rejected.

#### 1.4 SPECIAL TOOLS

Special tools are considered to be those tools which, because of their limited use, are not normally available but which are necessary for maintenance of particular equipment.

For each type of equipment provided under this CONTRACT, furnish a complete set of all special tools including grease guns and other lubricating devices, which may be needed for the adjustment, operation, maintenance, and disassembly of such equipment. Furnish only tools of high grade, smooth forged alloy tool steel. Manufacture grease guns of the lever type.

Furnish and erect one (1) or more neat and substantial steel wall cases or cabinets with flat key locks and clips or hooks to hold each special tool in a convenient arrangement.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01730

### OPERATION AND MAINTENANCE MANUALS

#### PART 1 - GENERAL

##### 1.1 SECTION INCLUDES

- A. Description
- B. Quality Assurance
- C. Submittals
- D. Format and Contents

##### 1.2 DESCRIPTION

- A. Scope: Furnish to the ENGINEER ten (10) copies of an Operation and Maintenance Manual for all equipment and associated control systems furnished and installed.

##### 1.3 QUALITY ASSURANCE

- A. Reference Codes and Specifications: No current government or commercial specifications or documents apply.

##### 1.4 SUBMITTALS

- A. Prior to the completion of construction reaching 50 percent, submit to the ENGINEER for approval two (2) copies of the manual with all specified material. Submit the approval copies with the partial payment request for the specified completion. Within 30 days after the ENGINEER's approval of the two-copy submittal, furnish to the ENGINEER the remaining 8 copies of the manual. Provide space in the manual for additional material. Submit any missing material for the manual prior to requesting certification of substantial completion.

##### 1.5 FORMAT AND CONTENTS

- A. Prepare and arrange each copy of the manual as follows:
  - 1. One (1) copy of an equipment data summary (see sample form) for each item of equipment.

2. One (1) copy of an equipment preventive maintenance data summary (see sample form) for each item of equipment.
  3. One (1) copy of the manufacturer's operating and maintenance instructions. Operating instructions include equipment start-up, normal operation, shutdown, emergency operation and troubleshooting. Maintenance instructions include equipment installation, calibration and adjustment, preventive and repair maintenance, lubrication, troubleshooting, parts list and recommended spare parts.
  4. List of electrical relay settings and control and alarm contact settings.
  5. Electrical interconnection wiring diagram for equipment furnished including all control and lighting systems.
  6. One (1) valve schedule giving valve number, location, fluid, and fluid destination for each valve installed. Group all valves in same piping systems together in the schedule. Obtain a sample of the valve numbering system from the ENGINEER.
  7. Furnish all O&M Manual material on 8-1/2 by 11 commercially printed or typed forms or an acceptable alternative format.
- B. Organize each manual into sections paralleling the equipment specifications. Identify each section using heavy section dividers with reinforced holes and numbered plastic index tabs. Use 3-ring, hard-back binders Type No. VS11 as manufactured by K&M Company, Torrence, CA, or equal. Punch all loose data for binding. Arrange composition and printing so that punching does not obliterate any data. Print on the cover and binding edge of each manual the project title, and manual title, as furnished and approved by the ENGINEER.
- C. Leave all operating and maintenance material that comes bound by the equipment manufacturer in its original bound state. Cross-reference the appropriate sections of the CONTRACTOR's O&M manual to the manufacturers' bound manuals.
- D. Label binders Volume 1, 2, and so on, where more than one binder is required. Include the table of contents for the entire set, identified by volume number, in each binder.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



Lee County Utilities

Pine Island WWTP Effluent Pump Station

Equipment Data Summary

Equipment Name:                      Specification Reference:

Manufacturer:

    Name:

    Address:

    Telephone:

Number Supplied:                      Location/Service:

Model No:                                  Serial No:

Type:

Size/Speed/Capacity/Range (as applicable):

Power Requirement (Phase/Volts/Hertz):

Local Representative:

    Name:

    Address:

    Telephone:

NOTES:

Lee County Utilities

Pine Island WWTP Effluent Pump Station

Preventive Maintenance Summary

Equipment Name:

Location:

Manufacturer:

Name:

Address:

Telephone:

Model No:

Serial No:

Maintenance Reference	O&M Manual	Task	Lubricant/Part	D	W	M	Q	SA	A
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NOTES:

\*D-Daily W-Weekly M-Monthly Q-Quarterly SA-Semi-Annual A-Annual

SECTION 01740  
WARRANTIES AND BONDS

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Compile specified warranties and bonds, as in Articles 6 and 13 of the General Conditions.
- 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.

1.2 SUBMITTAL REQUIREMENTS

- A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.
- B. Two original signed copies are required.
- C. Table of Contents. Neatly typed in orderly sequence. Provide complete information for each items.
  - 1. Product or work item.
  - 2. Firm, with name of principal, address and telephone number.
  - 3. Scope.
  - 4. Date of beginning 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.

### 1.3 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.
    - a. Fold larger sheets to fit into binders.
  - 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 binder, with durable and cleanable plastic covers and maximum post width of 2 inches.

### 1.4 WARRANTY SUBMITTAL REQUIREMENTS

- A. For all major pieces of equipment, submit a warranty from the equipment manufacturer. The manufacturer's warranty period shall be concurrent with the CONTRACTOR's for one (1) year, unless otherwise specified, commencing at the time of substantial completion.
- B. The CONTRACTOR shall be responsible for obtaining certificates for equipment warranty for all major equipment specified under Division 11, 15, and 16 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.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

**DIVISION 2**  
**SITE WORK**

## SECTION 02050

### DEMOLITION

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes: All work necessary for the removal and disposal of structures, foundations, piping, equipment, or any part thereof including masonry, steel, reinforced concrete, plain concrete, electrical facilities, and any other material or equipment shown or specified to be removed.
- B. Basic Procedures and Schedule: Carry out demolition so that adjacent structures, which are to remain, are not endangered. Schedule the work so as not to interfere with the day to day operation of the existing facilities. Do not block doorways or passageways in existing facilities.
- C. Additional Requirements: Provide dust control and make provisions for safety.

##### 1.2 SUBMITTALS

- A. Provide all submittals, including the following, as specified in Division 1.
- B. Site Inspection: Visit the site and inspect all existing structures. Observe and record any defects which may exist in buildings or structures adjacent to but not directly affected by the demolition work. Provide the OWNER with a copy of this inspection record and obtain the OWNER's approval prior to commencing the demolition.

##### 1.3 QUALITY ASSURANCE

- A. Limits: Exercise care to prevent damage to the concrete. Where only parts of a structure are to be removed, cut the concrete along limiting lines with a suitable saw so that damage to the remaining structure is held to a minimum.

#### PART 2 - PRODUCTS (NOT USED)

#### PART 3 - EXECUTION

##### 3.1 EXAMINATION OF EXISTING DRAWINGS

- A. Drawings of existing structures and equipment will be available for inspection at the office of the OWNER.

### 3.2 PROTECTION

- A. General Safety: Provide warning signs, protective barriers, and warning lights as necessary adjacent to the work as approved or required. Maintain these items during the demolition period.
- B. Existing Services: Undertake no demolition work until all mechanical and electrical services affected by the work have been properly disconnected. Cap, reroute or reconnect interconnecting piping or electrical services that are to remain in service either permanently or temporarily in a manner that will not interfere with the operation of the remaining facilities.
- C. Hazards: Perform testing and air purging where the presence of hazardous chemicals, gases, flammable materials or other dangerous substances is apparent or suspected, and eliminate the hazard before demolition is started.

### 3.3 DEMOLITION REQUIREMENTS

- A. Explosives: The use of explosives will not be permitted.
- B. Protection: Carefully protect all mechanical and electrical equipment against dust and debris.
- C. Removal: Remove all debris from the structures during demolition and do not allow debris to accumulate in piles.
- D. Access: Provide safe access to and egress from all working areas at all times with adequate protection from falling material.
- E. Protection: Provide adequate scaffolding, shoring, bracing railings, toe boards and protective covering during demolition to protect personnel and equipment against injury or damage. Cover floor openings not used for material drops with material substantial enough to support any loads placed on it. Properly secure the covers to prevent accidental movement.
- F. Lighting: Provide adequate lighting at all times during demolition.
- G. Closed Areas: Close areas below demolition work to anyone while removal is in progress.
- H. Material Drops: Do not drop any material to any point lying outside the exterior walls of the structure unless the area is effectively protected.

### 3.4 DISPOSAL OF MATERIALS

- A. Final Removal: Remove all debris, rubbish, scrap pieces, equipment, and materials resulting from the demolition unless otherwise indicated. Take title to all demolished materials and remove such items from the site.
  
- B. OWNER's Property: In addition to any items which may be shown, the following items remain the property of the OWNER. Remove carefully, without damage, all items listed or shown, and stockpile as directed.

END OF SECTION



## SECTION 02140

### DEWATERING

#### PART 1 – GENERAL

##### 1.1 DESCRIPTION

###### A. Scope of Work

The Work to be performed under this section shall include furnishing all equipment and labor necessary to remove storm or subsurface waters from excavation areas in accordance with the requirements set forth, as shown on the Drawing, including obtaining jurisdictional agency approval for such activities.

##### 1.2 QUALITY ASSURANCE

A. The dewatering of any excavation areas and the disposal of the water shall be in strict accordance with the latest revision of all local and state government rules and regulations.

B. The CONTRACTOR shall obtain all required permits from the appropriate Water Management District(s), and shall comply with all conditions of such permits issued by the District(s).

##### 1.3 SUBMITTALS

A. Submit proposed dewatering construction methods to the Water Management District (and other jurisdictional permitting agencies) with copy to ENGINEER.

B. Notify Water Management District at least (minimum) seven (7) days prior to beginning dewatering operations. Notify other jurisdictional permitting agencies in accordance with the requirements of the respective agency.

C. Submit records showing daily withdrawals to the permitting agency(ies) within seven (7) days after completing all dewatering operations.

#### PART 2 – PRODUCTS (Not Applicable)

#### PART 3 – EXECUTION

##### 3.1 GENERAL

A. Construct temporary infiltration basins, turbidity barriers and other devices as specified, shown on the plans or as required by the permitting agency(ies).

- B. Install flow measurement equipment in compliance with jurisdictional permitting agencies.
- C. Notify jurisdictional permitting agency(ies) prior to beginning dewatering operations (Section 1.3 B above).
- D. Protect abutting properties from construction and dewatering operations (see Division 1 - General Requirements).

### 3.2 DEWATERING

- A. Provide adequate equipment for the removal of storm or subsurface waters which may accumulate in the excavation.
- B. If subsurface water is encountered, utilize suitable equipment to adequately dewater the excavation so that it will be dry for work and pipe laying. A wellpoint system or other dewatering method approved by the respective jurisdictional agency(ies) shall be utilized if necessary to maintain the excavation in a dry condition for preparation of the trench bottom and for pipe laying.
- C. Dewatering by trench pumping will not be permitted if migration of fine-grained natural material from bottom, sidewalls, or bedding material will occur.
- D. In the event that satisfactory dewatering cannot be accomplished due to subsurface conditions or where dewatering could damage existing structures, obtain the ENGINEER's approval of wet trench construction or procedure before commencing construction.

### 3.3 DISPOSAL

- A. Discharge water as required by permits.
- B. Discharge to temporary infiltration pits or to partially backfilled trenches.
- C. Discharge to storm sewers, canals, stream, or wetlands only if specifically allowed by the jurisdictional agency.
- D. In no case, shall discharge result in turbidity reaching wetlands or any waterways.
- E. If turbidity exceeds limits allowed by jurisdictional permitting agency(ies), stop all activities, install additional erosion and sedimentation control.
- F. Construct temporary culverts, barricades and other protective measures to prevent damage to property or injury to any person or persons.

- G. Flooding of streets, roadways, driveways, or private property will not be permitted.
- H. Engines driving dewatering pumps shall be equipped with residential type mufflers.

END OF SECTION

## SECTION 02222

### EXCAVATION - EARTH AND ROCK

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes: Requirements for performing opencut excavations to the widths and depths necessary for constructing structures, pipelines and conduits including excavation of any material necessary for any purpose pertinent to the construction of the Work.
- B. Related Work Specified In Other Sections Includes:
  - 1. Section 02050 - Demolition
  - 2. Section 02223 - Backfilling
  - 3. Section 03311 – Concrete for Non-Plant Work

##### 1.2 DEFINITIONS

- A. Earth: "Earth" includes all materials which, in the opinion of the ENGINEER, do not require blasting, barring, wedging or special impact tools for their removal from their original beds, and removal of which can be completed using standard excavating equipment. Specifically excluded are all ledge and bedrock and boulders or pieces of masonry larger than one cubic yard in volume.
- B. Rock: "Rock" includes all materials which, in the opinion of the ENGINEER, require blasting, barring, wedging and/or special impact tools such as jack hammers, sledges, chisels, or similar devices specifically designed for use in cutting or breaking rock for removal from their original beds and which have compressive strengths in their natural undisturbed state in excess of 300 psi. Boulders or masonry larger than one cubic yard in volume are classed as rock excavation.

##### 1.3 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.

##### 1.4 SITE CONDITIONS

- A. Geotechnical Investigation: A geotechnical investigation and report was not prepared for this project.

- B. Actual Conditions: Make any geotechnical investigations deemed necessary to determine actual site conditions.
- C. Underground Utilities: Locate and identify all existing underground utilities prior to the commencement of Work.
- D. Quality and Quantity: Make any other investigations and determinations necessary to determine the quality and quantities of earth and rock and the methods to be used to excavate these materials.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Clearing: Clear opencut excavation sites of obstructions preparatory to excavation. Clearing in accordance with Section 02050, includes removal and disposal of vegetation, trees, stumps, roots and bushes, except those specified to be protected during trench excavation.
- B. Safety: Whenever an excavation site or trench is left unattended by the CONTRACTOR or when an area is not within 100 feet of observation by the CONTRACTOR, the excavation site or trench shall be filled and/or, at the OWNER's discretion, protected by other means to prevent accidental or unauthorized entry. Such protection shall include barricades and other protection devices requested by the ENGINEER or OWNER, including temporary fencing, snow fencing, or temporary "structure" tape. Such safety items shall not relieve the CONTRACTOR of any site safety requirements or liabilities established by Federal, State and local laws and agencies, including OSHA, but is intended as additional safety measures to protect the general public.
- C. Hazardous Materials: If encountered, take care of hazardous materials not specifically shown or noted in accordance with Section 01500.
- D. During excavation and any site work, storm water pollution prevention measures shall be taken to ensure that water quality criteria are not violated in the receiving water body and all state and local regulatory requirements are met.

### 3.2 STRUCTURE EXCAVATION

- A. Excavation Size: Provide excavations of sufficient size and only of sufficient size to permit the Work to be economically and properly constructed in the manner and of the size specified.
- B. Excavation Shape: Shape and dimension the bottom` of the excavation in earth or rock to the shape and dimensions of the underside of the structure or drainage blanket wherever the nature of the excavated material permits.
- C. Compaction: Before placing foundation slabs, footings or backfill, proof roll the bottom of the excavations to detect soft spots.
  - 1. For accessible areas, proof roll with a ten wheel tandem axle dump truck loaded to at least 15 tons or similarly loaded construction equipment.
  - 2. For small areas, proof roll with a smooth-faced steel roller filled with water or sand, or compact with a mechanical tamper.
  - 3. Make one complete coverage, with overlap, of the area.
  - 4. Overexcavate soft zones and replace with compacted select fill in accordance with Part 3, Section 3.9.

### 3.3 TRENCH EXCAVATION

- A. Preparation: Properly brace and protect trees, shrubs, poles and other structures which are to be preserved. Unless shown or specified otherwise, preserve all trees and large shrubs. Hold damage to the root structure to a minimum. Small shrubs may be preserved or replaced with equivalent specimens.
- B. Adequate Space: Keep the width of trenches to a minimum, however provide adequate space for workers to place, joint and backfill the pipe properly.
  - 1. The minimum width of the trench shall be equal to the outside diameter of the pipe at the joint plus 8-inches for unsheeted trench or 12 inches for sheeted trench.

The maximum width of trench, measured at the top of the pipe, shall not exceed the outside pipe diameter plus 2 feet, unless otherwise shown on the drawing details or approved by the ENGINEER. Trench walls shall be maintained vertical from the bottom of the trench to a line measured one foot

above the top of the pipe. From one foot above the top of the pipe to the surface the trench walls shall conform to OSHA Regulations.

1. In sheeted trenches, measure the clear width of the trench at the level of the top of the pipe to the inside of the sheeting.
2. Should the maximum trench widths specified above be exceeded without written approval, provide concrete cradle or encasement for the pipe as directed. No separate payment will be made for such concrete cradle or encasement.

C. Depth:

1. Excavate trenches to a minimum depth of 8 inches below the bottom of the pipe or the bottom of encasement for electrical ducts, unless otherwise shown, specified or directed, so that bedding material can be placed in the bottom of the trench and shaped to provide a continuous, firm bearing for duct encasement, pipe barrels and bells.
2. Standard trench grade shall be defined as the bottom surface of the utility to be constructed or placed within the trench. Trench grade for utilities in rock or other non-cushioning material shall be defined as additional undercuts backfilled with #57 stone compacted in 6-inch lifts, below the standard 8-inches minimum trench undercut. Excavation below trench grade that is not ordered in writing by the ENGINEER shall be backfilled to trench grade and compacted.

D. Unstable or Unsuitable Materials: If unstable or unsuitable material is exposed at the level of the bottom of the trench excavation, excavate the material in accordance with the subsection headed "Authorized Additional Excavation".

1. Material shall be removed for the full width of the trench and to the depth required to reach suitable foundation material.
2. When in the judgment of the ENGINEER the unstable or unsuitable material extends to an excessive depth, the ENGINEER may advise, in writing, the need for stabilization of the trench bottom with additional select fill material, crushed stone, washed shell, gravel mat or the need to provide firm support for the pipe or electrical duct by other suitable methods.
3. Crushed stone, washed shell and gravel shall be as specified in Section 02223.

4. Payment for such trench stabilization will be made under the appropriate Contract Items or where no such items exist, as a change in the Work.
- E. Length of Excavation: Keep the open excavated trench preceding the pipe or electrical duct laying operation and the unfilled trench, with pipe or duct in place, to a minimum length which causes the least disturbance. Provide ladders for a means of exit from the trench as required by applicable safety and health regulations.
- F. Excavated Material: Excavated material to be used for backfill shall be neatly deposited at the sides of the trenches where space is available. Where stockpiling of excavated material is required, the Contractor shall be responsible for obtaining the sites to be used and shall maintain his operations to provide for natural drainage and not present an unsightly appearance.
- G. Water: Allow no water to rise in the trench excavation until sufficient backfill has been placed to prevent pipe or duct flotation.

#### 3.4 SHORT TUNNEL EXCAVATION

- A. Short Tunnel Requirements: In some instances, trees, shrubs, utilities, sidewalks and other obstructions may be encountered, the proximity of which may be a hindrance to open cut trench excavation. In such cases, excavate by means of short tunnels in order to protect such obstructions against damage.
  1. Construct the short tunnel by hand, auger or other approved method approximately 6 inches larger than the diameter of pipe bells or outer electrical duct encasement.
  2. Consider such short tunnel work incidental to the construction of pipelines or conduits and all appurtenances. The need for short tunnels will not be grounds for additional payment.

#### 3.5 EXCAVATION FOR JACKING AND AUGERING

- A. Jacking and Augering Requirements: Allow adequate length in jacking pits to provide room for the jacking frame, the jacking head, the reaction blocks, the jacks, auger rig, and the jacking pipe. Provide sufficient pit width to allow ample working space on each side of the jacking frame. Allow sufficient pit depth such that the invert of the pipe, when placed on the guide frame, will be at the elevation desired for the completed line. Tightly sheet the pit and keep it dry at all times.



### 3.6 ROCK EXCAVATION

- A. Rock Excavation: Excavate rock within the boundary lines and grades as shown, specified or required.
  - 1. Rock removed from the excavation becomes the property of the CONTRACTOR. Transport and dispose of excavated rock at an offsite disposal location. Obtain the offsite disposal location.
  - 2. Remove all shattered rock and loose pieces.
- B. Structure Depths: For cast-in-place structures, excavate the rock only to the bottom of the structure, foundation slab, or drainage blanket.
- C. Trench Width: Maintain a minimum clear width of the trench at the level of the top of the pipe of the outside diameter of the pipe barrel plus 4 feet, unless otherwise approved.
- D. Trench Depth: For trench excavation in which pipelines or electrical ducts are to be placed, excavate the rock to a minimum depth of 8 inches below the bottom of the pipe or duct encasement. Provide a cushion of sand or suitable crushed rock. Refill the excavated space with pipe bedding material in accordance with Section 02223. Include placing, compacting and shaping pipe bedding material in the appropriate Contract Items.
- E. Manhole Depths: For manhole excavation, excavate the rock to a minimum depth of 8 inches below the bottom of the manhole base for pipelines 24 inches in diameter and larger and 6 inches below the bottom manhole base for pipelines less than 24 inches in diameter. Refill the excavated space with pipe bedding material in accordance with Section 02223. Include placing, compacting and shaping pipe bedding material for manhole bases in the appropriate Contract Items.
- F. Over-excavated Space: Refill the excavated space in rock below structures, pipelines, conduits and manholes, which exceeds the specified depths with 2,500 psi concrete, crushed stone, washed shell, or other material as directed. Include refilling of over-excavated space in rock as part of the rock excavation.
- G. Other Requirements: Follow, where applicable, the requirements of the subsections on "Trench Excavation" and "Structure Excavation".
- H. Payment: Rock excavation, including placing, compacting and shaping of the select fill material, will be paid for under the appropriate Contract Items or where no such items exist, as a change in the Work.

- I. Blasting: Perform authorized blasting by authorized and qualified workers as approved as to the number, length, placing and direction, and loading of holes. Do not use charges which will make the excavation unduly large or irregular, nor shatter the rock upon or against which masonry is to be built, nor injure masonry or existing structures at the site or in the vicinity.
  1. Cover each blast with a woven wire cable mat weighted with heavy timbers. Blasting will not be permitted within 25 feet of existing or of the completed pipeline or structure. Control blasts in tunnels so that the material surrounding the tunnel base proper is not loosened or displaced.
  2. Discontinue blasting whenever it is determined that further blasting may injure or damage adjacent rock, masonry, utility lines, or other structures. In such cases, excavate the remaining rock by barring, wedging, or other approved methods.
  3. Where sewers, gas, water, steam, or other utility ducts or lines, catch basin connections, or other structures have been exposed during excavation, adequately protect such structures from damage before proceeding with the blasting. Promptly repair any structure damaged by blasting at no addition to the Contract Price.
  4. Take due precautions to prevent accidental discharge of electric blasting caps from current induced by radar, radio transmitters, lightning, adjacent power lines, dust storms or other sources of extraneous electricity.
  5. Keep a sufficient quantity of explosives on hand to avoid delay to the Work on the site when rock excavation is in progress. At no time keep a quantity in excess of that which will be required for use within the following 12 hours.
  6. Store, handle and use such explosives in conformity with all laws, ordinances, and regulations of the County or governing body governing the storage and use of explosives at the construction site.
  7. Provide a magazine keeper to keep accurate daily records and account for each piece of explosive, detonator and equipment from time of delivery at the magazine until used or removed from the site. Abandon no explosives or blasting agents.
  8. Take sole responsibility for the methods of handling, use, and storage of explosives and any damage to persons or property resulting therefrom. Approval of these methods or failure to order that blasting

be discontinued does not relieve the CONTRACTOR of any of this responsibility.

### 3.7 FINISHED EXCAVATION

- A. Finish: Provide a reasonably smooth finished surface for all excavations, which is uniformly compacted and free from irregular surface changes.
- B. Finish Methods: Provide a degree of finish which is ordinarily obtainable from bladegrade operations, except as otherwise specified in Section 02223.

### 3.8 PROTECTION

- A. Traffic and Erosion: Protect newly graded areas from traffic and from erosion.
- B. Repair: Repair any settlement or washing away that may occur from any cause, prior to acceptance. Re-establish grades to the required elevations and slopes.
- C. It shall be the CONTRACTOR's responsibility to acquaint himself with all existing conditions and to locate all structures and utilities along the proposed utility alignment in order to avoid conflicts. Where actual conflicts are unavoidable, work shall be coordinated with the facility owner and performed so as to cause as little interference as possible with the service rendered by the facility disturbed. Facilities or structures damaged in the prosecution of the work shall be repaired and/or replaced immediately, in conformance with current standard practices of the industry, or according to the direction of the owner of such facility, at the CONTRACTOR's expense.
- D. Other Requirements: Conduct all Work in accordance with the environmental protection requirements specified in Division 1.

### 3.9 AUTHORIZED ADDITIONAL EXCAVATION

- A. Additional Excavation: Carry the excavation to such additional depth and width as authorized in writing, for the following reasons:
  - 1. In case the materials encountered at the elevations shown are not suitable.
  - 2. In case it is found desirable or necessary to go to an additional depth, or to an additional depth and width.
- B. Refill Materials: Refill such excavated space with either authorized 2500 psi concrete or compacted select fill material, in compliance with the applicable provisions of Section 02223.

- C. **Compaction:** Where necessary, compact fill materials to avoid future settlement. As a minimum, unless otherwise specified or directed, backfill layers shall not exceed 6 inches in thickness for the full trench width and compaction shall equal 95% of maximum density, or 98% if under paved area of roadway, as determined by using ASTM D 1557. Compaction density tests shall be made at all such backfill areas with spacing not to exceed 100 feet apart and on each 6-inch compacted layer.
- D. **Payment:** Additional earth excavations so authorized and concrete or select fill materials authorized for filling such additional excavation and compaction of select fill materials will be paid for under the appropriate Contract Items or where no such items exist, as a change in the Work.

### 3.10 UNAUTHORIZED EXCAVATION

- A. **Stability:** Refill any excavation carried beyond or below the lines and grades shown, except as specified in the subsection headed "Authorized Additional Excavation", with such material and in such manner as may be approved in order to provide for the stability of the various structures.
- B. **Refill Materials:** Refill spaces beneath all manholes, structures, pipelines, or conduits excavated without authority with 2500 psi concrete or compacted select fill material, as approved.
- C. **Payment:** Refill for unauthorized excavation will not be measured and no payment will be made therefor.

### 3.11 SEGREGATION STORAGE AND DISPOSAL OF MATERIAL

- A. **Stockpiling Suitable Materials:** Stockpile topsoil suitable for final grading and landscaping and excavated material suitable for backfilling or embankments separately on the site in approved locations.
- B. **Stockpile Locations:** Store excavated and other material a sufficient distance away from the edge of any excavation to prevent its falling or sliding back into the excavation and to prevent collapse of the wall of the excavation. Provide not less than 2 feet clear space between the top of any stockpile and other material and the edge of any excavation.
- C. **Excess Materials:** CONTRACTOR shall be responsible to transport and dispose of surplus excavated material and excavated material unsuitable for backfilling or embankments at an offsite disposal location secured by the CONTRACTOR.

### 3.12 REMOVAL OF WATER

- A. Water Removal: At all times during the excavation period and until completion and acceptance of the WORK at final inspection, provide ample means and equipment with which to remove promptly and dispose of properly all water entering any excavation or other parts of the WORK.
- B. Dry Excavations: Keep the excavation dry.
- C. Water Contact: Allow no water to rise over or come in contact with masonry and concrete until the concrete and mortar have attained a set and, in any event, not sooner than 12 hours after placing the masonry or concrete.
- D. Discharge of Water: Dispose of water pumped or drained from the Work in a safe and suitable manner without damage to adjacent property or streets or to other work under construction.
- E. Protection: Provide adequate protection for water discharged onto streets. Protect the street surface at the point of discharge.
- F. Sanitary Sewers: Discharge no water into sanitary sewers.
- G. Storm Sewers: Discharge no water containing settleable solids into storm sewers.
- H. Repair: Promptly repair any and all damage caused by dewatering the Work.

END OF SECTION

## SECTION 02223

### BACKFILLING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. General Requirements: Backfill all excavation to the original surface of the ground or to such other grades as may be shown or required. For areas to be covered by topsoil, leave or stop backfill (12) inches below the finished grade or as shown. Obtain approval for the time elapsing before backfilling against masonry structures. Remove from all backfill, any compressible, putrescible, or destructible rubbish and refuse and all lumber and braces from the excavated space before backfilling is started. Leave sheeting and bracing in place or remove as the work progresses.
- B. Equipment Limitations: Do not permit construction equipment used to backfill to travel against and over cast-in-place concrete structures until the specified concrete strength has been obtained, as verified by concrete test cylinders. In special cases where conditions warrant, the above restriction may be modified providing the concrete has gained sufficient strength, as determined from test cylinders, to satisfy design requirements for the removal of forms and the application of load.
- C. Related Work Specified In Other Sections Includes:
  - 1. Section 02050 – Demolition
  - 2. Section 02222 – Excavation – Earth and Rock

##### 1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
  - 1. ASTM D 1557 - Standard Test Methods for Moisture-Density Relations of Soil and Soil-Aggregate Mixtures Using 10 lb Rammer and 18 in Drop.

#### PART 2 - PRODUCTS

##### 2.1 BACKFILL MATERIAL - GENERAL

- A. General: Backfill with sound materials, free from waste, organic matter, rubbish, boggy or other unsuitable materials.

- B. General Materials Requirements: Conform materials used for backfilling to the requirements specified. Follow common fill requirements whenever drainage or select fill is not specified. Determine and obtain the approval of the appropriate test method where more than one compaction test method is specified.
- C. Frozen Materials: Do not use frozen material for backfilling.

2.2 DRAINAGE FILL

- A. Materials for Drainage Fill: Use clean gravel, crushed stone, or other suitable material conforming to the gradation specified for drainage fill. Clay and fine particles are unacceptable in drainage fill. Provide drainage fill of a grade between the following limits:

U.S. Standard Sieve	Percent Passing By Weight
1-1/2 inch	100
1 inch	95-100
1/2 inch	45-65
#4	5-15
#16	0-4

2.3 SELECT FILL

- A. Materials for Select Fill: Use clean gravel, crushed stone, washed shell, or other granular or similar material as approved which can be readily and thoroughly compacted to 95 percent of the maximum dry density obtainable by ASTM D 1557.

- 1. Allowed Materials: Grade select fill between the following limits:

U.S. Standard Sieve	Percent Passing By Weight
2 inch	100
1-1/2 inch	90-100
1 inch	75-95
1/2 inch	45-70
#4	25-50
#10	15-40
#200	5-15

2. Unallowed Materials: Very fine sand, uniformly graded sands and gravels, sand and silt, soft earth, or other materials that have a tendency to flow under pressure when wet are unacceptable as select fill.

## 2.4 COMMON FILL

- A. Materials for Common Fill: Material from on-site excavation may be used as common fill provided that it can be readily compacted to 90 percent of the maximum dry density obtainable by ASTM D 1557, and does not contain unsuitable material. Select fill may be used as common fill at no change in the Contract Price.
- B. Granular Materials On-Site: Granular on-site material, which is fairly well graded between the following limits may be used as granular common fill:

U.S. Standard Sieve	Percent Passing by Weight
3 inch	100
#10	50-100
#60	20-90
#200	0-20

- C. Cohesive Materials On-Site: Cohesive site material may be used as common fill.
  1. The gradation requirements do not apply to cohesive common fill.
  2. Use material having a liquid limit less than or equal to 40 and a plasticity index less than or equal to 20.
- D. Material Approval: All material used as common fill is subject to approval. If there is insufficient on-site material, import whatever additional off-site material is required which conforms to the specifications and at no additional cost.

## 2.5 UTILITY PIPE BEDDING

- A. Class A (special utility bedding). Should special bedding be required due to depth of cover, impact loadings or other conditions, Class A bedding shall be installed, as shown in Section 9 of the LCU Operations Manual.
- B. Class B (minimum utility bedding). The bottom of the trench shall be shaped to provide a firm bedding for the utility pipe. The utility shall be firmly bedded in undisturbed firm soil or hand shaped unyielding material. The bedding shall



be shaped so that the pipe will be in continuous contact therewith for its full length and shall provide a minimum bottom segment support for the pipe equal to 0.3 times the outside diameter of the barrel.

## PART 3 - EXECUTION

### 3.1 PIPE BEDDING AND INITIAL BACKFILL

- A. Hand Placement: Place select fill by hand for initial pipe backfill from top of bedding to 1 foot over top of pipes in uniform layers not greater than 6 inches in loose thickness. Tamp under pipe haunches and thoroughly compact in place the select fill with suitable mechanical or pneumatic tools to not less than 95 percent of the maximum dry density as determined by ASTM D 1557.
- B. Stone Placement: Do not place large stone fragments in the pipe bedding or backfill to 1 foot over the top of pipes, nor nearer than 2 feet at any point from any pipe, conduit or concrete wall.
- C. Unallowed Materials: Pipe bedding containing very fine sand, uniformly graded sands and gravels, sand and silt, soft earth, or other materials that have a tendency to flow under pressure when wet is unacceptable.

### 3.2 BEDDING PLACEMENT AND BACKFILL FOR PIPE IN SHORT TUNNEL

- A. Bed pipelines or electrical ducts placed in short tunnels in select fill or 2500 psi concrete. Completely fill the remainder of the annular space between the outside of the pipe wall and the tunnel wall with select fill, suitable job-excavated material, or 2500 psi concrete, as approved. Suitably support pipelines or ducts in short tunnels to permit placing of backfill suitably tamped in place.

### 3.3 TRENCH BACKFILL

- A. General: Backfill material shall be clean earth fill composed of sand, clay and sand, sand and stone, crushed stone, or an approved combination thereof. Backfilling shall be accomplished under two specified requirements: First Lift, from trench grade to a point 12 inches above the top of the utility, and, Second Lift, from the top of the First Lift to the ground surface. Where thrust blocks, encasements, or other below-grade concrete work have been installed, backfilling shall not proceed until the concrete has obtained sufficient strength to support the backfill load.
- B. First Lift: Fine material shall be carefully placed and tamped around the lower half of the utility. Backfilling shall be carefully continued in compacted and tested layers not exceeding 6 inches in thickness for the full trench width, until the fill is 12 inches above the top of the utility, using the best available material

from the excavation, if approved. The material for these first layers of backfill shall be lowered to within 2 feet above the top of pipes before it is allowed to fall, unless the material is placed with approved devices that protect the pipes from impact. The "First Lift" shall be thoroughly compacted and tested before the "Second Lift" is placed. Unless otherwise specified, compaction shall equal 98% of maximum density, as determined by ASTM D 1557. The "First Lift" backfill shall exclude stones, or rock fragments larger than the following:

<u>Pipe Type</u>	<u>(Greatest Dimension-Inches) Fragment Size (Inches)</u>
Steel	2
Concrete	2
Ductile Iron	2
Plastic	1
Fiberglass	1

- C. Second Lift: The remainder of the trench, above the "First Lift", shall be backfilled and tested in layers not exceeding 6 inches. The maximum dimension of a stone, rock, or pavement fragment shall be 6 inches. When trenches are cut in pavements or areas to be paved, compaction, as determined by ASTM D 1557, shall be equal to 98% of maximum density, with compaction in other areas not less than 95% of maximum density in unpaved portions of the Rights-of-Way or 90% of maximum density in other areas.

As an alternative, or if required under roadways, Flowable Fill may be substituted. If Flowable Fill is to be used, a fabric mesh shall be installed between the "first lift" and the Flowable Fill. Flowable Fill shall be in accordance with Section 4.7.AH of the LCU Operations Manual.

- D. Compaction Methods: The above specified compaction shall be accomplished using accepted standard methods (powered tampers, vibrators, etc.), with exception that the first two feet of backfilling over the pipe shall be compacted by hand-operated tamping devices. Flooding or puddling with water to consolidate backfill is not acceptable, except where sand is the only material utilized and encountered and the operation has been approved by the OWNER.
- E. Density Tests: Density tests for determination of the above specified compaction shall be made by an independent testing laboratory and certified by a Florida Registered, Professional ENGINEER at the expense of the Developer or CONTRACTOR. Test locations will be determined by the OWNER but in any case, shall be spaced not more than 100 feet apart where the trench cut is continuous. If any test results are unsatisfactory, the CONTRACTOR shall re-excavate and re-compact the backfill at his expense until the desired compaction is obtained. Additional compaction tests shall be

made to each site of an unsatisfactory test, as directed, to determine the extent of re-excavation and re-compaction if necessary.

Copies of all density test results shall be furnished on a regular basis by the ENGINEER, to LCU. Failure to furnish these results will result in the project not being recommended for acceptance by Lee County

- F. Dropping of Material on Work: Do trench backfilling work in such a way as to prevent dropping material directly on top of any conduit or pipe through any great vertical distance. Do not allow backfilling material from a bucket to fall directly on a structure or pipe and, in all cases, lower the bucket so that the shock of falling earth will not cause damage.
- G. Distribution of Large Materials: Break lumps up and distribute any stones, pieces of crushed rock or lumps which cannot be readily broken up, throughout the mass so that all interstices are solidly filled with fine material.

### 3.4 STRUCTURE BACKFILL

- A. Use of Select Fill: Use select fill underneath all structures, and adjacent to structures where pipes, connections, electrical ducts and structural foundations are to be located within this fill. Use select fill beneath all pavements, walkways, and railroad tracks, and extend to the bottom of pavement base course or ballast.
  - 1. Place backfill in uniform layers not greater than 8 inches in loose thickness and thoroughly compact in place with suitable approved mechanical or pneumatic equipment.
  - 2. Compact backfill to not less than 95 percent of the maximum dry density as determined by ASTM D 1557.
- B. Use of Common Fill: Use common granular fill adjacent to structures in all areas not specified above, unless otherwise shown or specified. Select fill may be used in place of common granular fill at no additional cost.
  - 1. Extend such backfill from the bottom of the excavation or top of bedding to the bottom of subgrade for lawns or lawn replacement, the top of previously existing ground surface or to such other grades as may be shown or required.
  - 2. Place backfill in uniform layers not greater than 8 inches in loose thickness and thoroughly compact in place with suitable equipment, as specified above.

3. Compact backfill to not less than 90 percent of the maximum dry density as determined by ASTM D 1557.
- C. Use of Clay: In unpaved areas adjacent to structures for the top 1 foot of fill directly under lawn subgrades use clay backfill placed in 6-inch lifts. Compact clay backfill to not less than 90 percent of the maximum dry density as determined by ASTM D 1557.
1. Use clay having a liquid limit less than or equal to 40 and a plasticity index less than or equal to 20.

### 3.5 DRAINAGE BLANKET

- A. Drainage Fill Placement: Provide a drainage blanket where shown consisting of drainage fill.
1. Place drainage fill underneath all structures and adjacent to structures where pipes, connections, electrical ducts and structural foundations located within this fill, in uniform layers not greater than 8 inches in loose thickness. Compact drainage fill with suitable mechanical or pneumatic equipment to not less than 95 percent of the maximum dry density as determined by ASTM D 1557.
  2. Place drainage fill adjacent to structures in all areas not specified above in uniform layers not greater than 8 inches in loose thickness. Compact drainage fill with suitable mechanical or pneumatic equipment to not less than 90 percent of the maximum dry density as determined by ASTM D 1557.

### 3.6 EARTH EMBANKMENTS

- A. Use of Cohesive Materials: Make all earth embankments of approved cohesive common fill material.
1. Place fill in uniform layers not greater than 10 inches in loose thickness. Compact in place with suitable approved mechanical equipment.
  2. Compact earth embankments to not less than 90 percent of the maximum dry density as determined by ASTM D 1557.
  3. Do not use cohesionless, granular material as earth embankment backfill, unless otherwise shown or required.

### 3.7 COMPACTION EQUIPMENT

- A. Equipment and Methods: Carry out all compaction with suitable approved equipment and methods.
  - 1. Compact clay and other cohesive material with sheep's-foot rollers or similar equipment where practicable. Use hand held pneumatic tampers elsewhere for compaction of cohesive fill material.
  - 2. Compact low cohesive soils with pneumatic-tire rollers or large vibratory equipment where practicable. Use small vibratory equipment elsewhere for compaction of cohesionless fill material.
  - 3. Do not use heavy compaction equipment over pipelines or other structures, unless the depth of fill is sufficient to adequately distribute the load.

### 3.8 BORROW

- A. Should there be insufficient material from the excavations to meet the requirements for fill material, borrow shall be obtained from pits secured and tested by the CONTRACTOR and approved by the OWNER. Copies of all test results shall be submitted to LCU.

### 3.9 FINISH GRADING

- A. Final Contours: Perform finish grading in accordance with the completed contour elevations and grades shown and blend into conformation with remaining natural ground surfaces.
  - 1. Leave all finished grading surfaces smooth and firm to drain.
  - 2. Bring finish grades to elevations within plus or minus 0.10 foot of elevations or contours shown.
- B. Surface Drainage: Perform grading outside of building or structure lines in a manner to prevent accumulation of water within the area. Where necessary or where shown, extend finish grading to ensure that water will be carried to drainage ditches, and the site area left smooth and free from depressions holding water.

### 3.10 RESPONSIBILITY FOR AFTERSSETTLEMENT

- A. Aftersettlement Responsibility: Take responsibility for correcting any depression which may develop in backfilled areas from settlement within one year after the work is fully completed. Provide as needed, backfill material, pavement base replacement, permanent pavement, sidewalk, curb and

driveway repair or replacement, and lawn replacement, and perform the necessary reconditioning and restoration work to bring such depressed areas to proper grade as approved.

### 3.11 INSPECTION AND TESTING OF BACKFILLING

- A. Sampling and Testing: Provide sampling, testing, and laboratory methods in accordance with the appropriate ASTM Standard Specification. Subject all backfill to these tests.
- B. Compaction density tests shall be made at all such backfill areas with spacing not to exceed 100 feet apart and on each 6-inch compacted layer.
- C. Correction of Work: Correct any areas of unsatisfactory compaction by removal and replacement, or by scarifying, aerating or sprinkling as needed and recompaction in place prior to placement of a new lift.

END OF SECTION

## SECTION 02276

### TEMPORARY EROSION AND SEDIMENTATION CONTROL

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. The work specified in this Section consists of designing, providing, maintaining and removing temporary erosion and sedimentation controls as necessary.
- B. Temporary erosion controls include, but are not limited to, grassing, mulching, setting, watering, and reseeding onsite surfaces and spoil and borrow area surfaces and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the OWNER.
- C. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the OWNER.
- D. CONTRACTOR is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.

##### 1.2 REFERENCE DOCUMENTS

- A. South Florida Building Code and Standard Building Code.

#### PART 2 - PRODUCTS

##### 2.1 EROSION CONTROL

- A. Seeding and Sodding is specified in Section 02400.
- B. Netting - fabricated of material acceptable to the OWNER.

##### 2.2 SEDIMENTATION CONTROL

- A. Bales - clean, seed free cereal hay type.
- B. Netting - fabricated of material acceptable to the OWNER.

- C. Filter Stone - crushed stone conforming to Florida Department of Transportation specifications.
- D. Concrete Block - hollow, non-load-bearing type.
- E. Concrete - exterior grade not less than one inch thick.

## PART 3 - EXECUTION

### 3.1 EROSION CONTROL

- A. Minimum procedures for grassing are:
  1. Scarify slopes to a depth of not less than six inches and remove large clods, rock, stumps, roots larger than 1/2 inch in diameter and debris.
  2. Sow seed within twenty-four (24) hours after the ground is scarified with either mechanical seed drills or rotary hand seeders.
  3. Apply mulch loosely and to a thickness of between 3/4 inch and 1-1/2 inches.
  4. Apply netting over mulched areas on sloped surfaces.
  5. Roll and water seeded areas in a manner which will encourage sprouting of seeds and growing of grass. Reseed areas which exhibit unsatisfactory growth. Backfill and seed eroded areas.

### 3.2 SEDIMENTATION CONTROL

- A. Install and maintain silt dams, traps, barriers, and appurtenances as shown on the approved descriptions and working drawings, hay bales which deteriorate and filter stone which is dislodged shall be replaced.

### 3.3 PERFORMANCE

- A. Should any of the temporary erosion and sediment control measures employed by the CONTRACTOR fail to produce results which comply with the requirements of the State of Florida, CONTRACTOR shall immediately take whatever steps are necessary to correct the deficiency at his own expense.

END OF SECTION



## SECTION 02485

### SEEDING AND SODDING

#### PART 1 - GENERAL

##### 1.1 SCOPE OF WORK

- A. Furnish all labor, materials, and equipment necessary to satisfactorily return all construction areas to their original conditions or better.
- B. Work includes furnishing and placing seed or sod, fertilizer, planting, watering, and maintenance until acceptance by the Owner.

##### 1.2 QUALITY ASSURANCE

###### A. Requirements

It is the intent of this specification that the Contractor is obliged to deliver a satisfactory strand of grass as specified. If necessary, the Contractor shall repeat any or all of the work, including grading, fertilizing, watering, and seeding or sodding at no additional cost to the owner until a satisfactory strand is obtained.

###### B. Satisfactory Strand

For purposes of grassing, a satisfactory strand of grass is herein defined as a full lawn cover over areas to be seeded or sodded, with grass free of weeds, alive and growing, leaving no bare spots larger than 3/4 sq. yd. within a radius of 10 ft.

#### PART 2 - PRODUCTS

##### 2.1 MATERIALS

###### A. Fertilizer

Fertilizer shall be of the slow-release type meeting the following minimum requirements: 12 percent nitrogen, 3 percent phosphorus, 6 percent potassium; 40 percent other available materials derived from organic sources. Fertilizer shall be uniform in composition, dry and free flowing delivered to sites in original unopened containers bearing manufacturer's statement or guarantee.

## B. Grassing

The Contractor shall grass all unpaved areas disturbed during construction which do not require sod. All grassing shall be completed in conformance with FDOT Specifications Sections 570 and 981. The grassed areas shall be mulched and fertilized in accordance with FDOT Specifications.

## C. Sodding

Sod shall be provided as required in accordance with Florida Department of Transportation Specifications 575 and 981. The Contractor shall furnish sod equal to and similar in type as that disturbed. Placement and watering requirements shall be in accordance with FDOT Specifications Section 575.

## D. Topsoil

Topsoil stockpiled during excavation may be used. If additional topsoil is required to replace topsoil removed during construction, it shall be obtained off site at no additional cost to the Owner. Topsoil shall be fertile, natural surface soil, capable of producing all trees, plants, and grassing specified herein.

## E. Mulch

Mulch shall be fresh cypress mulch. Rate of application specified herein shall correspond to depth not less than 1 inch or more than 3 inches according to texture and moisture content of much material.

## F. Water

It is the Contractor's responsibility to supply all water to the site, as required during seeding and sodding operations and through the maintenance period and until the work is accepted. The Contractor shall make whatever arrangements may be necessary to ensure an adequate supply of water to meet the needs for his work. He shall also furnish all necessary hose, equipment, attachments, and accessories for the adequate irrigation of lawns and planted areas as may be required. Water shall be suitable for irrigation and free from ingredients harmful to plant life.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

#### A. Time of Seeding and Sodding

When the trench backfill has stabilized sufficiently, the Contractor shall commence work on lawns and grassed areas, including fine grading as required.

B. Finish Grading

Areas to be seeded or sodded shall be finish graded, raked, and debris removed. Soft spots and uneven grades shall be eliminated; the ENGINEER shall approve the finish grade of all areas to be seeded or sodded prior to application of seed or sod.

C. Protection

Seeded and sodded areas shall be protected against the traffic or other use by placing warning signs or erecting barricades as necessary. Any areas damaged prior to actual acceptance by the Owner shall be repaired by the Contractor as directed by the ENGINEER.

3.2 CLEANUP

A. Soil, mulch, seed, or similar materials spilled onto paved areas shall be removed promptly, keeping those areas as clean as possible at all times. Upon completion of seeding and sodding operations, all excess soil, stones, and debris remaining shall be removed from the construction areas.

3.3 LANDSCAPE MAINTENANCE

A. Any existing landscape items damaged or altered during construction by the Contractor shall be restored or replaced as directed by the ENGINEER.

B. Maintain landscape work for a period of 90 days immediately following complete installation of work or until Owner accepts project. Watering, seeding, cultivating, restoration of grade, mowing and trimming grass, protection from insects and diseases, fertilizing and similar operations as needed to ensure normal growth and good health for live plant material shall be the responsibility of the Contractor and at no additional cost to the Owner.

3.4 REPAIRS TO LAWN AREAS DISTURBED BY CONTRACTOR'S OPERATIONS

A. Lawn areas planted under this Contract and all lawn areas damaged by the Contractor's operation shall be repaired at once by proper soil preparation, fertilizing, and reseeding or sodding, in accordance with these Specifications.

END OF SECTION

SECTION 02606  
IET COATING SYSTEM

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This section provides details for furnishing and installing the Integrated Environmental Technologies (IET) coating system where shown on the drawings for protection of concrete structures against hydrogen sulfide corrosion. Coating materials shall be as manufactured by Integrated Environmental Technologies or approved equal. Installation shall be performed by workers experienced in the application of the coating to be used.

PART 2 - PRODUCTS

2.1 IET COATING SYSTEM

- A. The IET Coating System shall be as distributed by Integrated Environmental Technologies, Santa Barbara, CA, or equal.
- B. Polymorphic Resin shall be a 100% solids, two-component, highly modified polyester resin system, exhibiting no adhesion-interfering shrinkage upon curing. Resin shall cure rapidly within fifteen minutes to one hour without the use of heat or cooling at surface temperatures ranging from -30 degrees Fahrenheit to over +150 degrees. Excellent resistance to a broad range of corrosive chemicals, including sulfuric acid created by hydrogen sulfide gas as well as other chemicals typically found in sanitary sewers, and impact and abrasion attack shall be provided.

PART 3 - EXECUTION

3.1 EIT COATING

- A. All pipes in service shall be plugged or bypassed before any work is started on the structure. No debris is to be flushed down the line.
- B. Anyone entering the structure must conform to all OSHA requirements for "Confined Space Entry" equipment and permitting.
- C. Surface preparation shall meet the requirements of IET Systems Data Sheets on Concrete Preparation and interior surfaces of manhole shall be sound, porous, dry, and free of dust, dirt, oil, grease and other contaminants prior to application of lining.

- D. Interior surface of structure must be pressure washed at 5,000 psi and must be abrasive-blasted with black beauty steel slag to remove all loose patching, old coatings and any contamination in the concrete. No silica sand shall be used.
1. "New" structures shall be abrasive-blasted to remove all oils and patch mud and to open pin holes and expose aggregate.
  2. "Rehab" structures shall be abrasive-blasted to remove all loose patching, old coatings, and any contamination that penetrated the concrete. The finished interior of the structure shall be gray. The exposed invert/floor shall also be coated. Where there is severe deterioration of the mortar, place new concrete to match the original interior dimensions after abrasive-blasting and removal of all loose material and by-products of corrosion. Restore invert/floor to the original elevation.
  3. Vacuum to remove all abrasives and debris.
- E. Repair all leaks by injecting grout using Avanti Multi-grout AV-202 or equivalent. Hydraulic cement shall not be used to stop any water leaks.
- F. Clean and remove dust material with pressure washing for maximum adhesion. Blow dry concrete at 250 cfm with 120 psi.
- G. Apply IET Systems Coating by the use of the IET Systems Spray Unit and IET Systems Spincaster. Apply IET coating at least three different intervals – prime coat, intermediate coat and finish coat, per IET Systems manufacturer instructions and specifications. The total thickness of the IET coating shall be at least 125 mils.
- H. Inspect lining system for holidays, cracks and pinholes. Take particular care to check lining over brick, block, heavy spalled surfaces, and other very rough surfaces and locate holes in the lining caused by voids in bricks, block, concrete and structure joints. Fill voids and holidays in accordance with the lining system manufacturer's instructions.
- I. Provide a five (5) year unlimited warranty on all workmanship and products. The work includes the surface preparation and application of the IET coating system, shall protect the structure for at least five (5) years from all leaks, and from failure due to corrosion from exposure to corrosive gases such as hydrogen sulfide.

END OF SECTION

SECTION 02630  
DUCTILE IRON PIPE AND FITTINGS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required, and install ductile iron pipe, fittings and appurtenances as shown on the Drawings and as specified herein.
  
- B. NOTE: No buried ductile iron pipe shall be acceptable for sanitary force main construction. All water mains larger than 12 inches shall be constructed of Ductile Iron Pipe and shall be used for all vertical deflections ditch crossings, subaqueous crossings, and all paved surfaces unless otherwise approved by LCU.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 015050 – Utility Piping, Fittings, Valves, and Accessories

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Commercial Standards: (Latest Revision)
  - 1. ANSI/AWWA C104/A21.4 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
  - 2. ANSI/AWWA C105/A21.5 Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids.
  - 3. ANSI/AWWA C110/A21.10 Ductile-Iron Fittings, 3 in. Through 48 Inches, for Water and Other Liquids. (C110 2-48 inches).
  - 4. ANSI/AWWA C111/A21.11 Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  - 5. ANSI/AWWA C115/A21.15 Flanged Ductile-Iron Pipe with Threaded Flanges.
  - 6. ANSI/AWWA C150/A21.50 Thickness Design of Ductile-Iron Pipe.
  - 7. ANSI/AWWA C151/A21.51 Ductile-Iron Pipe, Centrifugally Cast for Water or Other Liquids.

8. ANSI/AWWA C153/A21.53 Ductile-Iron Compact Fittings, 3 inches through 16 inches, for Water and Other Liquids.
9. AWWA C600 - Installation of Ductile Iron Water Mains and Their Appurtenances.
10. AWWA F477 - Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Material

#### 1.4 CONTRACTOR SUBMITTALS

- A. Shop Drawings: Submit shop drawings of pipe and fittings in accordance with the requirements in the General Conditions, the requirements of the referenced standards and the following supplemental requirements as applicable:
  1. Certified dimensional drawings of all valves, fittings, and appurtenances.
  2. For pipe 48 inches in diameter and larger, a line layout and marking diagram shall indicate the specific number and location (station) of each fitting.
  3. In all cases, a line layout to indicate the limits of each reach of restrained joints, or of concrete encasement shall be supplied.
- B. Certifications: Furnish a certified affidavit of compliance for all pipe and other products or materials furnished under this Section of the Specifications, which indicates that all tests have been made and that all results comply with the requirements of AWWA C151, including but not necessarily limited to the following:
  1. Acceptance Tests.
  2. Hydrostatic Tests.
  3. Low Temperature Impact Tests.
- C. Additional Documentation: Foundry records shall be furnished in the form of written transcripts upon request.
- D. All expenses incurred for certification, testing, and data submittal shall be borne by the CONTRACTOR or the Supplier.

## 1.5 QUALITY ASSURANCE

- A. Inspection: All pipe shall be available for inspection at the place of manufacture prior to shipping in accordance with the provisions of the referenced standards. Notify the ENGINEER in writing not less than 10 calendar days prior to the shipping of the pipe.
- B. The ENGINEER shall be given access to all areas where manufacturing and testing is performed and shall be permitted to make all inspections necessary to confirm manufacturer compliance with these Specifications.
- C. Tests: Except as modified herein, all materials used in the manufacture of the pipe shall be tested in accordance with the requirements of the referenced standards as applicable.
- D. Provide data on material tests at no additional cost to the OWNER.
- E. In addition to those tests specifically required, the ENGINEER may request additional samples of any material including lining and coating samples for testing by the OWNER. The additional samples shall be furnished at no additional cost to the OWNER.

## 1.6 CORROSION PROTECTION

- A. The allowed force main pipe materials are polyvinyl chloride (PVC) or high density polyethylene (HDPE) or fiberglass. Use of ductile iron pipe (DIP) and DIP fittings are not allowed without the specific approval of LCU. Where a force main is expected to flow full pipe at all times, DIP may be used after specific approval by LCU. The DIP pipe will be required to have a Polybond Plus lining or approved equal. The Polybond Plus lining consist of a minimum of 60 mils thick polyethylene lining with a fusion bonded epoxy primer layer to the DIP pipe. This lining must extend through the bell of the pipe to a point under the sealing gasket. To ensure a holiday-free lining, documentation must be provided, prior to shipment, showing each section of the lined pipe has passed the holiday testing at production per ASTM G62 with a minimum of 10,000 volt charge.
- B. If specifically approved by LCU for use, exterior protection shall be provided for underground ductile iron pipe and fittings within areas of severe corrosive conditions. This shall be accomplished by the installation of polyethylene encasement through the area of concern. The soil test evaluation to determine the necessity for extra protection in suspect areas shall be those set forth in ANSI Standard A21.5. Additionally, where other existing utilities are known to be cathodically protected, ductile iron pipe crossing said utility shall be



protected for a distance of 20 feet to each side. If ductile iron pipe is to be installed parallel to and within 10 feet of cathodically protected pipe, then protection shall be provided for the entire length. Steel pipe shall not be installed in severe corrosion areas.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Cement mortar lined ductile iron pipe shall conform to ANSI/AWWA C151 and C104, subject to the following supplemental requirements. The pipe shall be of the diameter and class shown, shall be furnished complete with rubber gaskets as indicated in the Contract Documents, and all specials and fittings shall be provided as required under the Contract Documents.
- B. Markings: Legibly mark specials 48 inches in diameter and larger in accordance with the laying schedule and marking diagram. All fittings shall be marked at each end with top field centerline.
- C. Handling and Storage: The pipe shall be handled by wide slings, padded cradles, or other devices designed and constructed to prevent damage to the pipe and its lining. The use of equipment or handling, which might injure the pipe and its lining, will not be permitted. Stockpiled pipe shall be suitably supported and shall be secured to prevent accidental rolling. All other pipe handling equipment and methods shall be acceptable to the ENGINEER.
- D. Laying lengths: Maximum pipe laying lengths shall be 20 feet.
- E. Finish: The pipe shall have smooth dense interior surfaces and shall be free from fractures, excessive interior surface crazing and roughness, in accordance with ANSI/AWWA C104.
- F. Closures and Correction Pieces: Closures and correction pieces shall be provided as required so that closures may be made due to different headings in the pipe laying operation and so that correction may be made to adjust the pipe laying to conform to pipe stationing shown on the Drawings or line layouts where applicable.

### 2.2 PIPE DESIGN CRITERIA

- A. General: Ductile Iron pipe shall be designed in accordance with the requirements of ANSI/AWWA C150 as applicable and as modified in this Section.

- B. Pipe Wall Thickness for Internal Pressure: The pipe shall be designed with a net thickness to withstand the design internal pressure in accordance with the hoop stress formula. In addition to the requirements of the Section, the minimum wall thickness shall be in accordance with the minimum thickness wall depicted in table 50.5 of ANSI/AWWA C150.
- C. Ductile Iron Pipe shall be a minimum of Class 50 or pressure Class 250 and will be accepted in any diameter for use within the water distribution system.
- D. All aboveground water main pipe shall be painted blue. The pipe wall thickness shall not be less than that required by a working pressure of 250 psi in laying condition Type 4 "B" with 5-foot cover in conformance with ANSI Standard A21.50.

### 2.3 MATERIALS

- A. Ductile Iron Pipe: Pipe materials shall conform to the requirements of ANSI/AWWA C151.
- B. Cement: Cement for mortar lining shall conform to the requirements of ANSI/AWWA C104; provided that cement for mortar lining shall be Type II or V. A fly ash or pozzolan shall not be used.

### 2.4 SPECIALS AND FITTINGS

- A. Adapters to connect ductile iron pipe or fittings to pipe or fittings of dissimilar materials shall be supplied by the CONTRACTOR in accordance with the pipe manufacturer recommendations, and as approved by the ENGINEER.
- B. Fittings for ductile iron pipe shall conform to the requirements of ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10 for diameters 3 inches through 48 inches and shall have a minimum pressure rating of 250 psi. Ductile iron fittings shall be cement lined, seal coated and outside coated as specified. Ductile Iron fittings larger than 48 inches shall conform to the above referenced standard with the necessary modifications for the larger size manufacturer's standard.
- C. All above-ground fittings in direct contact with wastewater shall be HDPE or ductile iron flanged joints with a minimum pressure rating of 250 psi conforming to ANSI A21.10. If above-ground ductile iron fitting is used, the fitting shall be lined with Protecto 401 applied in strict accordance with the manufacturer's specifications to a dry film thickness of 40 mils. All DIP fittings for wastewater service shall have an internal fusion bonded epoxy coating to a minimum of 20 mil thickness. All aboveground fittings shall have a factory applied exterior epoxy coating in accordance with AWWA C550.

## 2.5 DESIGN OF PIPE

- A. General: The pipe furnished shall be ductile iron pipe, mortar-lined, with rubber gasketed joints.
- B. The pipe shall be designed, manufactured, tested, inspected, and marked according to applicable requirements previously stated and except as hereinafter modified, shall conform to ANSI/AWWA C151.
- C. Pipe Dimensions: The pipe shall be of the diameter and class shown. The minimum wall thickness for each pipe size shall be as specified herein or shown on the Drawings.
- D. Fitting Dimensions: The fittings shall be of the diameter shown and class specified.
- E. Joint Design: Ductile Iron pipe and fittings shall be furnished with mechanical joints, push-on joints and flanged joints as follows:
  - 1. For buried pipe applications, unless otherwise indicated, mechanical and push-on joints shall conform to ANSI/AWWA C111/A21.11, with the minimum pressure rating of 250 psi.
  - 2. For above-ground or buried vault applications, unless otherwise indicated, flanged joints shall conform to ANSI/AWWA C115/A21.15, with the minimum pressure rating of 250 psi. All above-ground fittings shall be painted blue.
- F. Restraining Devices: Restraining joints shall be placed at all bends, tees, plugs, reducers, and other fittings to provide lateral support, and shall conform to the details shown on the drawings in Sections 9 of the LCU Operations Manual. Concrete thrust blocks may be utilized as additional restraint if approved by LCU.
  - 1. Joint restraint devices for ductile iron mechanical joint pipe and ductile iron mechanical joint fittings to ductile iron pipe shall be EBAA Iron Inc., Series 1100 Megalug (R), Star Pipe Products, L.P., or approved equal.
  - 2. Bell joint restraint devices for ductile iron push joint pipe shall be EBAA Iron Inc., Series 1700 Megalug (R) for bell restraint, Star Pipe Products L.P., or approved equal.
- G. For bell-and-spigot ends with rubber gaskets, the clearance between the bells and spigots shall be such that when combined with the gasket groove configuration and the gasket itself will provide watertight joints under all

operating conditions when properly installed. Require the pipe manufacturer to submit details complete with significant dimensions and tolerances and also to submit performance data indicating that the proposed joint has performed satisfactorily under similar conditions. In the absence of a history of field performance, the results of a test program shall be submitted.

- H. Gaskets shall be a Buna N, Neoprene, or a Nitril-based rubber product approved by the County. Gaskets shall have clean tips unless otherwise specified. Elastomeric gaskets conforming to ASTM F-477 shall also be acceptable.
- I. Shop-applied interior linings and exterior coatings shall be applied evenly to the nominal thickness specified. Holiday free cement is not possible to manufacture. Exterior coatings: asphalt coating for buried pipe or primed pipe cannot be furnished holiday free.

2.6 CEMENT-MORTAR LINING

A. Cement-Mortar Lining For Shop Application: Except as otherwise provided herein, interior surfaces of all ductile iron pipe shall be cleaned and lined in the shop with cement-mortar lining applied centrifugally in conformity with ANSI/AWWA C104. Ductile-Iron pipefittings need not have the cement-mortar lining applied centrifugally. The lining machines shall be of a type that has been used successfully for similar work. Every precaution shall be taken to prevent damage to the lining. If lining is damaged or found faulty at delivery site, the damaged or unsatisfactory portions shall be repaired in the filed in accordance with ANSI/AWWA C104.

B. The nominal wet lining thickness shall be as follows:

Nominal Factory Nominal Replacement		
Nominal Pipe Diameter (in.)	Applied Lining Thickness (in.)	Lining Thickness (in.)
3-12	1/8	1/8
14-24	3/16	3/16
30-64	1/4	1/4

C. Protection of Pipe Lining/Interior: All shop-applied cement mortar lining shall be given a seal coat of asphaltic material in conformance with ANSI/AWWA C104.

## 2.7 EXTERIOR COATING OF PIPE

- A. Exterior Coating of Exposed Piping: The exterior surfaces of pipe which will be exposed to the atmosphere inside structures or above ground shall be thoroughly cleaned and then given a shop coat of rust-inhibitive primer conforming to the requirements of Section 09900, "Painting and Coating". All above-ground pipe shall be painted blue.
- B. Exterior Coating of Buried Piping: The exterior coating shall be an asphaltic coating approximately 1 mil thick, conforming to ANSI/AWWA C151.

## 2.8 CORROSION PROTECTION

- A. The allowed force main pipe materials are polyvinyl chloride (PVC) or high density polyethylene (HDPE) or fiberglass. Use of ductile iron pipe (DIP) and DIP fittings are not allowed without the specific approval of LCU. Where a force main is expected to flow full pipe at all times, DIP may be used after specific approval by LCU. The DIP pipe will be required to have a Polybond Plus lining or approved equal. The Polybond Plus lining consist of a minimum of 60 mils thick polyethylene lining with a fusion bonded epoxy primer layer to the DIP pipe. This lining must extend through the bell of the pipe to a point under the sealing gasket. To ensure a holiday-free lining, documentation must be provided, prior to shipment, showing each section of the lined pipe has passed the holiday testing at production per ASTM G62 with a minimum of 10,000 volt charge.
- B. If specifically approved by LCU for use, exterior protection shall be provided for underground ductile iron pipe and fittings within areas of severe corrosive conditions. This shall be accomplished by the installation of polyethylene encasement through the area of concern. The soil test evaluation to determine the necessity for extra protection in suspect areas shall be those set forth in ANSI Standard A21.5. Additionally, where other existing utilities are known to be cathodically protected, ductile iron pipe crossing said utility shall be protected for a distance of 20 feet to each side. If ductile iron pipe is to be installed parallel to and within 10 feet of cathodically protected pipe, then protection shall be provided for the entire length. Steel pipe shall not be installed in severe corrosion areas.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF PIPE

- A. Handling and Storage: All pipe, fittings, etc., shall be carefully handled and protected against damage, impact shocks, and free fall and in accordance with ANSI/AWWA C600. Pipe shall not be placed directly on rough rocky ground

but in such instances shall be supported in a manner which will protect the pipe against injury whenever stored at such trench site or elsewhere. No pipe shall be installed where the lining or coating show defects that may be harmful as determined by the ENGINEER. Such damaged lining or coating shall be repaired, or a new undamaged pipe shall be furnished and installed.

- B. All pipe damaged prior to Substantial Completion or during warrantee period shall be repaired or replaced by the CONTRACTOR.
- C. Inspect each pipe and fitting prior to installation to insure that no damaged portions of the pipe get installed.
- D. Before placement of pipe in the trench, each pipe or fitting shall be thoroughly cleaned of any foreign substance, which may have collected therein and shall be kept clean at all times thereafter. For this purpose, the openings of all pipes and fittings in the trench shall be closed during any interruption to the work.
- E. Pipe Laying: The pipe shall be installed in accordance with ANSI/AWWA C600.
- F. Pipe shall be laid directly on the bedding material. No blocking will be permitted, and the bedding shall be such that it forms a continuous, solid bearing for the full length of the pipe. Excavations shall be made as needed to facilitate removal of handling devices after the pipe is laid. Bell holes shall be formed at the ends of the pipe to prevent point loading at the bells or couplings. Excavation shall be made as needed outside the normal trench section at field joints to permit adequate access to the joints for field connection operations and for application of coating on field joints.
- G. Where necessary to raise or lower the pipe due to unforeseen obstructions or other causes, the ENGINEER may change the alignment and/or the grades. Such change shall be made by the deflection of joints, by the use of bevel adapters, or by the use of additional fittings. However, in no case shall the deflection in the joint exceed 70 percent of the maximum deflection recommended by the pipe manufacturer. No joint shall be misfit any amount which will be detrimental to the strength and water tightness of the finished joint.
- H. Pipe and Specials Protection: The openings of all pipe and specials shall be protected with suitable bulkheads to prevent unauthorized access by persons, animals, water, or any undesirable substance. At all times, means shall be provided to prevent the pipe from floating.
- I. Pipe Cleanup: As pipe laying progresses, keep the pipe interior free of all debris. Completely clean the interior of the pipe of all sand, dirt, mortar splatter and any other debris following completion of pipe laying, pointing of joints, and

any necessary interior repairs per ANSI/AWWA C600 and C602 prior to testing and disinfecting the completed pipeline. Pipe larger than 12 inches in diameter will utilize a polyurethane foam plug "Poly Pig" to remove all debris from main.

### 3.2 RUBBER GASKETED JOINTS

- A. Rubber Gasketed Joints: Immediately before jointing pipe, the bell end of the pipe shall be thoroughly cleaned, and a clean rubber gasket shall be placed in the bell groove. The bell and spigot end of push-on joint pipe shall be carefully cleaned and lubricated with a vegetable-based lubricant or per manufacturer's recommendation. The spigot end of the pipe section shall then be inserted into the bell of the previously laid joint and telescoped into its proper position. Tilting of the pipe to insert the spigot into the bell will not be permitted.

### 3.3 INSTALLATION OF PIPE APPURTENANCES

- A. Installation of Valves: All valves shall be handled in a manner to prevent any injury or damage to any part of the valve. All joints shall be thoroughly cleaned and prepared prior to installation. Adjust all stem packing and operate each valve prior to installation to insure proper operation.
- B. All valves shall be installed so that the valve stems are plumb and in the location shown on the Drawings.
- C. Mechanical joints consisting of bell, socket, gland, gasket, bolts, and nuts shall conform to ANSI Standard A21.11. Bolts and nuts shall be high strength, low alloy, Cor-Ten, T-Head Type having hexagonal nuts. Bolts and nuts shall be machined through and nuts shall be tapped at right angles to a smooth bearing surface. Single sealed gasket push-on type joints shall conform to the requirements of ANSI A21.11 and shall be Tyton, Fastite, Superbelltite, Alltite, or approved equal.
- D. Mechanical joint retainer glands may be used to restrain mechanical joint pipe and fittings to the plain end of ductile iron pipe and fittings when used in conjunction with thrust blocks of reduced size. The Utilities ENGINEER must approve thrust block size. Joint flexibility shall be maintained.

### 3.4 TESTING AND DISINFECTION

- A. Test completed water pipeline in accordance with Section 02676. Disinfect completed water pipeline in accordance with Section 2675.

END OF SECTION

**DIVISION 3**  
**CONCRETE**



SECTION 03100  
CONCRETE FORMWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide concrete formwork for structural concrete as specified to form concrete to profiles shown.
  - 1. Provide concrete with smooth rubbed finish.
- B. Related Work Specified in Other Sections Includes:
  - 1. Section 03200 - Concrete Reinforcement
  - 2. Section 03250 - Concrete Accessories
  - 3. Section 03310 - Cast-In-Place Concrete

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
  - 1. ACI 318 - Building Code Requirements for Reinforced Concrete
  - 2. ACI SP-4 - Formwork for Concrete

1.3 SUBMITTALS

- A. Provide all submittals, including the following, as specified in Division 1.
  - 1. CONTRACTORS Shop Drawings: Proposed form layout drawings and tie pattern layout drawings for Concrete. Review of these drawings does not relieve the CONTRACTOR of responsibility for adequately designing and constructing forms.
  - 2. Samples: Pieces of each type of sheeting, chamfer strips, form ties, form liners and rustication strips

1.4 QUALITY ASSURANCE

- A. Formwork Compliance: Use formwork complying with ACI SP-4, ACI 347 and ACI 303R.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Structural Concrete: Provide structural concrete form materials as follows:

1. Obtain approval for form material before construction of the forms.
2. Use a barrier type form release agent.
3. Use form ties, hangers, and clamps of such type that, after removal of the forms, no metal will be closer than one inch from concrete surface. Wire ties will not be permitted.
4. Provide ties with swaged washers or other suitable devices to prevent seepage of moisture along the ties. Leave the ties in place.
5. Use lugs, cones, washers, or other devices which do not leave holes or depressions greater than 7/8-inch in diameter.

## PART 3 - EXECUTION

### 3.1 CONSTRUCTION DETAILS FOR FORMWORK

B. Structural Concrete Details: Follow the following details for all structural concrete:

1. Provide forms which are substantial, properly braced, and tied together to maintain position and shape and to resist all pressures to which they may be subjected. Make forms sufficiently tight to prevent leakage of concrete.
2. Determine the size and spacing of studs and wales by the nature of the work and the height to which concrete is placed. Make forms adequate to produce true, smooth surfaces with not more than 1/8-inch variation in either direction from a geometrical plane. Provide horizontal joints which are level, and vertical joints which are plumb.
3. Supply forms for repeated use in sufficient number to ensure the required rate of progress.
4. Thoroughly clean all forms before reuse and inspect forms immediately before concrete is placed. Remove deformed, broken, or defective forms from the work.

5. Provide temporary openings in forms at convenient locations to facilitate cleaning and inspection.
6. Coat the entire inside surfaces of forms with a suitable form release agent just prior to placing concrete. Form release agent is not permitted on the reinforcing steel.
7. Assume and take responsibility for the adequacy of all forms and remedying any defects resulting from their use.

### 3.3 FORM REMOVAL

A. Structural Concrete Form Removal: Do not remove forms for structural concrete until the concrete has hardened sufficiently to support its own load safely, plus any superimposed load that might be placed thereon. Leave the forms in place for the minimum length of time indicated below or until the concrete has reached the minimum strength indicated as determined by testing, whichever time is reached first.

1. The times indicated represent cumulative days or hours, not necessarily consecutive, during which the air surrounding the concrete is above 50 degrees F. These times may be decreased if reshores are installed.

	<u>Minimum Time</u>	<u>Minimum Strength (psi)</u>
a. Bottom forms of slabs		
Under 10 feet clear span	4 days	2300
10 to 20 feet clear span	7 days	2700
Over 20 feet clear span	10 days	2900
b. Bottom forms of beams and girders		
Under 10 feet clear span	7 days	2700
10 to 20 feet clear span	14 days	3000
Over 20 feet clear span	21 days	3500

2. Increase form removal times as required if concrete temperature following placement is permitted to drop below 50 degrees F or if fly ash or ground granulated blast furnace slag is used in the concrete mix.
3. Withdraw the removable portion of form ties from the concrete immediately after the forms are removed. Clean and fill holes left by such ties with grout as specified in Cast-In-Place Concrete, Subsection Structural Concrete Surfaces.

4. Plug tie holes flush with the surface using portland cement mortar. Prewet tie holes with clean water and apply a neat cement slurry bond coat. Densely tamp mortar of a dry-tamp consistency into the tie holes exercising care so as not to smear mortar onto the finished concrete surface. Include sufficient white cement in the mortar mix to cause the plugged holes to blend in with the adjacent surfaces. Make sample patches with different mixes to assure that this requirement is met.

### 3.4 RESHORING

- A. Reshoring Method: Develop a system for reshoring and early removal of forms, in the event early stripping of forms becomes necessary. Include details and schedules in this system for each element which is to be reshored.
- B. Construction Load Support: Do not support construction loads upon any unshored portion of the structure exceeding the structural design loads.

### 3.5 TOLERANCES

- A. A. Tolerance Limits: Design, construct and maintain concrete form and place the concrete to provide completed concrete work within the tolerance limits set forth in ACI SP-4.

END OF SECTION

## SECTION 03200

### CONCRETE REINFORCEMENT

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes: Requirements for providing concrete reinforcement as shown and specified herein. Reinforcement includes all steel bars, wire and welded wire fabric as shown and specified.
- B. Related Work Specified in Other Sections Includes:
  - 1. Section 03100 - Concrete Formwork
  - 2. Section 03310 - Cast-In-Place Concrete

##### 1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
  - 1. ACI SP66 - ACI Detailing Manual
  - 2. ACI 318 - Latest edition "Building Code Requirements for Reinforced Concrete"
  - 3. ASTM A 185 - Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
  - 4. ASTM A 615/  
A615M - Deformed and Plains Billet-Steel Bars for Concrete
  - 5. ASTM A 706/  
A706M - Low Alloy Steel Deformed Bars for Concrete Reinforcement
  - 6. ASTM A 775/  
A775M - Epoxy Coated Reinforcing Steel Bars
  - 7. AWS D1.4 - Structural Welding Code - Reinforcing Steel

### 1.3 SUBMITTALS

- A. Provide all submittals, including the following, as specified in Division 1.
1. Product Data and Information: Submit manufacturers literature with product data, and material description of fusion bonded epoxy coating for reinforcement and reinforcement accessories, including manufacturer's recommendations for field touch-up of mars and cut ends when epoxy coated reinforcement is specified to be used.
  2. CONTRACTORS' Shop Drawings: Submit checked Working Drawings, including bar lists, schedules, bending details, placing details and placing plans and elevations for fabrication and placing reinforcing steel conforming to "ACI Detailing Manual - 88".
    - a. Do not bill wall and slab reinforcing in sections. Show complete elevations of all walls and complete plans of all slabs, except that, when more than one wall or slab are identical, only one such elevation or plan is required. These plans and elevations need not be true views of the walls or slabs shown. Bill every reinforcing bar in a slab on a plan. Bill every reinforcing bar in a wall on an elevation. Take sections to clarify the arrangement of the steel reinforcement. Identify all bars, but do not bill on such sections.
    - b. For all reinforcing bars, unless the location of a bar is clear, give the location of such bar or bars by a dimension to some structural feature which will be readily distinguishable at the time bars are placed.
    - c. Make the reinforcing steel placing drawings complete for placing reinforcement including the location of support bars and chairs, without reference to the design drawings.
    - d. Submit Detailer certification that every reinforcing steel placing drawing and bar list is completely checked and corrected before submittal for approval.
    - e. If, after reinforcing steel placing drawings and bar lists have been submitted for approval, a review reveals that the drawings and lists obviously have not been checked and corrected they will be returned for checking and correcting by the Detailer.

3. Certificates: Test certificates of the chemical and physical properties covering each shipment of reinforcing steel bars.

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all products and materials as specified in Division 1 (and as follows):
  1. Delivery Requirements: Have reinforcing steel delivered to the work in strongly tied bundles. Identify each group of both bent and straight bars with a metal tag giving the identifying number corresponding to the reinforcing steel placing drawings and bar lists.
  2. Storage: Properly store all bars in an orderly manner, with all bars completely off the ground. Keep bars clean after delivery to the site of the work.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted.
  1. Mechanical connections
    - a. Dowel Bar Splicer/Dowel-In System and Coupler Splice System of the Richmond Screw Anchor System
    - b. Cadweld Rebar Splice by Erico Products Inc.
    - c. Bar Grip Splice by Barsplice Products Inc.

#### 2.2 MATERIALS

- A. Steel Bars: Use new billet steel bars, deformed bars, meeting the requirements of ASTM A 615/A625M Grade 60 for reinforcing steel bars.
  1. Roll all reinforcing steel bars with special deformations or identifying marks indicating the ASTM Specification and Grade.
  2. Use bars free from defects, kinks and from bends that cannot be readily and fully straightened in the field.

3. Supply reinforcing bars in lengths which will allow convenient placement in the work and provide the required lap of joints as shown. Provide dowels of proper length, size and shape for tying walls, beams, floors, and the like together.
- B. Epoxy Coating: Conform fusion bonded epoxy coated reinforcing steel bars to ASTM A 775/A775M when used. Leave portions of the reinforcing steel bars uncoated where mechanical connections are shown.
- C. Welded Wire Fabric: Use welded wire fabric of the electrically welded type, with wires arranged in rectangular patterns, of the sizes shown or specified and meeting the requirements of ASTM A 185.
- D. Supports and Accessories: Provide bar supports and other accessories and, if necessary, additional supports to hold bars in proper position while concrete is being placed.
1. Use side form spacers against vertical or sloping forms to maintain prescribed side cover and cross position of bars.
  2. Use individual hi-chairs with welded cross ties or circular hoops to support top bars in slabs thicker than 8 inches.
  3. Bolsters, chairs and other accessories:
    - a. Use hot-dipped galvanized or provide plastic coated legs when in contact with forms for surfaces of concrete other than architectural surfaces.
    - b. Use stainless steel when in contact with forms for architecturally exposed surfaces.
    - c. Use epoxy coated bolsters, chairs and accessories including wire ties for epoxy coated reinforcing bars.
    - d. Use chairs of an approved type and space them properly to support and hold reinforcing bars in position in all beams and slabs including slabs placed directly on the subgrade or work mat. Do not use continuous hichairs for supporting of top bars in slabs over 8 inches in thickness.
- E. Mechanical Connections: Provide mechanical connections that develop at least 125 percent of the specified yield strength of the bar in tension.



- F. Stirrups and Ties: Provide stirrups and ties as shown and specified and meeting the requirements of ASTM A 185.

## 2.3 FABRICATION

- A. Drawing Review Prior to Fabrication: Do not fabricate any material before final review and approval of shop drawings.
- B. Bending and Cutting: Cut bars to required length and bend accurately before placing. Bend bars in the shop unless written approval for field bending is obtained. If field bending is permitted, do it only when the air temperature, where the bending operation is performed, is above 30 degrees F. Do not field bend bars which have been partially embedded in concrete.
- C. Splices: Use lapped splices for tension and compression splices unless otherwise noted.
- D. Cleaning: Clean and bend reinforcement in accordance with ACI 315 and ACI 318.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Placement: Place all bars in accordance with CRSI "Recommended Practice for Placing Reinforcing Bars".
- B. Tolerances: Place bars used for top reinforcement in slabs to a vertical tolerance of plus or minus 1/4-inch. Place all other reinforcement to the tolerances given to ACI 318.
- C. Cleaning: Have reinforcing steel delivered without rust other than that accumulated during transportation to the work. At all times, fully protect reinforcing steel from moisture, grease, dirt, mortar and concrete. Before being placed in position, thoroughly clean reinforcing steel of all loose mill scale and rust and of any dirt, oil, grease coatings, or other material that might reduce the bond. If there is a delay in depositing concrete, inspect and satisfactorily clean the steel immediately before the concrete is placed.
- D. Bar Positioning: Place bars in the exact positions shown with the required spacing and cross wire bars securely in position at intersections to prevent displacement during the placing of the concrete. Fasten the bars with annealed wire of not less than 17 gauge or other approved devices.

- E. Bar Extension Beyond Formwork: On any section of the work where horizontal bars extend beyond the length of the forms, perforate the form or head against which the work ends or at the proper places to allow the bars to project through a distance at least equal to the lap specified.
- F. Unacceptable Materials: Do not place reinforcing steel with damaged, unsuitably bonded epoxy-coating or rusting. If approved, mars, exposed threads of mechanical connections and cut ends may be field coated with approved epoxy coating material.
- G. Review of Placement: Have reinforcing placement reviewed by the ENGINEER before concrete is placed.
- H. Welding - Not Approved: Do not use reinforcing bar assemblies made by welding of any kind, or accessories of any kind which require field welding to reinforcing bars.
- I. Welding - Approved: Where welding of reinforcing steel is shown, AWS D1.4 "Structural Welding Code - Reinforcing Steel" applies.
- J. Tension and Compression Lap Splices: Conform tension and compression lap splices to ACI 318 with all supplements. Avoid splices at points of maximum tensile stress wherever possible. Provide temperature bars with the clear spacing shown. Stagger all bar splices in hoop tension bars in circular tanks with not more than 50 percent of the bars spliced in any one direction. Have welded splices made by certified welders in accordance with AWS D1.4.
- K. Welded Wire Fabric: Place welded wire fabric in the positions shown, specified or required to fit the work. Furnish and place suitable spacing chairs or supports, as specified for bars, to maintain the fabric in the correct location. Where a flat surface of fabric is required, provide flat sheets, when available. Otherwise reverse roll the fabric or otherwise straighten to make a perfectly flat surface before placing. Obtain approval for the length of laps not indicated.
- L. Concrete Cover: Place reinforcing steel and welded wire fabric and hold in position so that the concrete cover, as measured from the surface of the bar or wire to the surface of the concrete, is as shown or specified.

END OF SECTION

SECTION 03250  
CONCRETE ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing concrete accessories shown and specified herein such as waterstops, dovetail anchor slots, cast-in-place reglets, inserts, joint filler, preformed joint seal, joint sealant and neoprene pads.
- B. Products Installed: Waterstops, dovetail anchor slots, cast-in-place reglets, inserts, joint filler, preformed joint seal, joint sealant and neoprene pads.
- C. Related Work Specified in Other Sections Includes:
  - 1. Section 03100 - Concrete Formwork
  - 2. Section 03200 - Concrete Reinforcement
  - 3. Section 03310 - Cast-in-Place Concrete

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
  - 1. AASHTO - Standard Specifications for Highway Bridges
  - 2. ASTM A 240 - Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels
  - 3. ASTM A 536 - Standard Specifications for Ductile-Iron Castings
  - 4. ASTM D 412 - Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
  - 5. ASTM D 3545 - Test Methods for Alcohol Content and Purity of Acetate esters by Gas Chromatography
  - 6. ASTM D 3575 - Test Methods for Flexible Cellular Materials Made From Olefin Polymers
  - 7. CRD-C513 - Specifications for Rubber Waterstops
  - 8. CRD-C572 - Specifications for Polyvinyl Chloride Waterstop

9. Fed. Spec. TT-S-00227 - Sealing Compound, Elastomeric Type, Multicomponent (for Calking, Sealing, and Glazing in Buildings and Other Structures)
10. Fed. Spec. TT-S-00230 - Sealing Compound, Elastomeric Type, Single Component (for Calking, Sealing, and Glazing in Buildings and Other Structures)

### 1.3 SUBMITTALS

- A. General: Provide all Work related submittals, including the following, as specified in Division 1.
- B. Product Data and Information:
  1. Manufacturer's Data and Specifications: Submit printed manufacturer's data and specifications for each item used on this project.
  2. Samples: Provide one sample of each item used.
  3. Joint Sealant and Preformed Joint Seal: Indicate special procedures, surface preparation and perimeter conditions requiring special attention. All products in contact with potable water, shall be "NSF Standard 61" certified. Submit certified material records indicating approval for use with potable water.

### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all products and materials as specified in Division 1 and as follows:

## PART 2 - PRODUCTS

### 2.1 MANUFACTURER

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted.
  1. Joint Filler
    - a. Sonoflex F Foam by Sonneborn Building Products
    - b. PVC Joint Filler No. 327 by A.C. Horn

2. Sealant Backup Material
  - a. Sealtight Backer Rod
  - b. Sonofoam Backer Rod
3. Preformed Joint Seal
  - a. Evazote 380, ESF by Epoxy Industries
4. Wedge Inserts
  - a. Type F-7 by Dayton Superior, Miamisburg, OH

## 2.2 MATERIALS

- A. Joint Sealant Requirements: Finish expansion joints with a joint sealant where shown or specified.
  1. Joint sealant materials may be either a single component urethane compound meeting the requirements of Fed. Spec. TT-S-00230C, or a 2component urethane compound meeting the requirements of Fed. Spec. TTS-00227E, except as modified in this specification.
  2. Provide the urethane sealant of 100 percent polymer, non-extended, containing no solvent, lime, or coal tar. Color as selected by the ENGINEER, but not black. Conform sealant properties to the following:

Property	Value	Test Method
a. Maximum final cure	3 days	--
b. Minimum tensile strength	140 to 200 psi	ASTM D 412
c. Minimum elongation	400%	ASTM D 412
d. Modulus at 100% elongation	40-60 psi	ASTM D 412
e. Shore A hardness	25-40	ASTM D 2240
f. Solid content	98-100%	--
g. Peel strength	20-40 lb/in.	Fed. Spec. TT-S00230C Fed. Spec. TT-S-00227E
h. Minimum recovery	80-90%	Fed. Spec. TT-S00230C Fed. Spec. TT-S-00227E
i. Initial tack-free cure	24-48 hrs.	Fed. Spec. TT-S00230C Fed. Spec. TT-S-00227E

3. Provide primer as recommended by the manufacturer of the sealant, subject to approval.

4. Provide fillers and backup materials in contact with sealant which are nonimpregnated and free from asphalt, creosote, oil or extractable plasticizers. Use a backup material of a closed cell polyethylene foam rod with a diameter 1/4-inch larger than the joint width.
- B. Prefomed Joint Seal: Provide a prefomed joint seal where shown or specified.
1. Provide joint material which is resilient, non-extrudable, impermeable, closed-cell, cross-linked, ethylene vinyl acetate, low density, polyethylene copolymer, nitrogen blown material which is ultraviolet light, weather and wear resistant, and which is concrete beige in color.

2. Conform material properties with the following:

	Property	Value	Test Method
a.	Density, pcf	2.8 to 3.4	ASTM D 3575 Suffix: W, Method A
b.	Water Absorption total immersion 3 months	0.02% by volume	ASTM D 3575 Suffix: L
c.	Tensile Strength	125 psi	ASTM D 3575 Suffix: T
d.	Elongation before breaking	255%	ASTM D 3575 Suffix: T
	Working Temperature	-94 to 160 F	---

- C. Wedge Inserts: Make wedge inserts for 5/8-inch and 3/4-inch bolts of ductile iron conforming to ASTM A 536.

## PART 3 - EXECUTION

### 3.01 INSTALLING OF JOINT SEALANT

- A. Preparation of 2-Component Sealants: Mix 2-component joint sealant using a slotted paddle and slow speed mixer for 5 to 8 minutes, continually working paddle from top to bottom until the sealant color is uniform. Scrape down the side of the container and paddle blade several times during the mixing operation to ensure uniform mixing.
1. Properly prepare joint surfaces by removing all foreign matter and concrete laitance so that concrete surfaces are structurally sound, clean, dry, and free of all oil, grease, wax, waterproofing compounds or form release materials prior to the application of primer and sealant.

2. Prime all concrete joint surfaces and all surfaces exposed to water prior to sealing, with no exceptions. Prime all other surfaces as recommended by the manufacturer of the sealant. Provide the prime as recommended by the manufacturer of the sealant, subject to approval. Apply the primer by either brushing or spraying on the joint surfaces. Apply and install the sealant within 2 to 24 hours after the application of primer.
  3. For horizontal joints, install the sealant by pouring directly from a suitable shaped can or by flowing from a bulk-loading gun.
  4. Fill vertical joints from a gun, starting from the bottom, to avoid bridging and the formation of air voids.
  5. Fill overhead joints from a gun, by laying a bead along each side of the joint and then filling the middle. Immediately after installation, tool in the sealant in order to establish firm contact with joint surfaces and to provide a smooth sealant surface. Tool in accordance with the manufacturer's instructions.
  6. Control joint depth with the use of joint fillers and backup materials. Make joint widths and sealant depths as shown. Do not exceed 1/2-inch for sealant depth.
- B. Preformed Joint Seal Surface Preparation: Properly prepare joint surfaces by removing all foreign matter and concrete laitance so that concrete surfaces are structurally sound, clean, dry, and free of all oil, grease, wax, water-proofing compounds or form release materials.
1. Blast clean or saw cut all existing concrete surfaces to expose a clean bare concrete surface. Allow new concrete to be well cured, and attain a minimum of 80 percent of the specified strength before installing sealant.
  2. Apply bonding adhesive, as recommended by the manufacturer to the concrete surfaces in strict compliance with the manufacturer's recommendations. Install the joint material under a compression of 25 percent and in one continuous operation, in accordance with manufacturer's recommendations. Do all splices and directional changes using heat welding method as recommended by the manufacturer.
- C. Unbonded Joints: Use unbonded horizontal joints as shown or required where slabs of beams must be prevented from bonding to footings, walls, columns or other rigid parts of the structure.
1. Prevent bonding by use of structural grade neoprene pads placed over the bearing surface of the footing, wall or other supporting part of the structure so as to isolate it from the new concrete being placed.

- D. Encasing Inserts: Encase wedge inserts, flashing reglets and dovetail anchor slots in the concrete as shown. Take special care to place and maintain them to the proper lines and grades and to compact concrete thoroughly around them to prevent the passage of water. Set these items before placing concrete and thoroughly brace them to prevent movement during the progress of the work. Provide dovetail anchor slots spaced not more than 16 inches apart for all concrete walls faced with masonry.

END OF SECTION



## SECTION 03311

### CONCRETE FOR NON-PLANT WORK

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION OF REQUIREMENTS

- A. The extent of concrete work is shown on the drawings.

##### 1.2 CODES AND STANDARDS

- A. ACI 347 "Recommended Practice for Concrete Formwork"; ACI 304 "Recommended Practice for measuring, Mixing, Transporting, and Placing Concrete"; comply with applicable provisions.
- B. Reference to standard specifications herein shall be construed as to be in reference to the latest revision or edition.

##### 1.3 STORAGE

- A. Immediately upon receipt at the site, cement that is to be site mixed shall be stored in a dry, weather tight building, properly ventilated and with provisions for prevention of moisture absorption.
- B. Reinforcing shall be protected from the weather.

#### PART 2 - PRODUCTS

##### 2.1 CONCRETE MATERIALS

- A. Cement: Cement shall conform to standard specifications for "Portland Cement", ASTM C150, Type II for concrete exposed to sewage.
- B. Aggregate: Concrete aggregate shall conform to the current specifications for "Concrete Aggregate", ASTM Designation C33.
- C. Water: Water used in mixing concrete shall be fresh, clean, and free from injurious amounts of oil, acid, alkali or organic matter.
- D. Ready-Mix Concrete: Ready-mixed concrete may be used at the option of the CONTRACTOR provided that such concrete meets the requirements of these specifications and of ASTM Designation C94 for "Ready-Mixed Concrete".
- E. High-Early-Strength Concrete: Concrete made with high-early-strength Portland cement shall be used only when specifically authorized by the

ENGINEER. The 7day compressive strength of concrete made with high-early-strength cement shall be at least equal to the minimum 28-day compressive strength specified. All provisions of these specifications shall be applicable to high-early-strength concrete except the cement shall conform to ASTM Designation C150, Type III.

## 2.2 RELATED MATERIALS

- A. Reinforcing: Deformed Reinforcing Bars, ASTM A615; Grade 60 unless otherwise indicated.
- B. Welded Wire Fabric: ASTM A185.
- C. Liquid Membrane-Forming Curing Compound: ASTM C309, Type I.
- D. Form Materials:
  - 1. Provide form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection.
  - 2. Exposed Concrete Surfaces: Suitable material to suit project conditions.

## 2.3 QUALITY

- A. Strength: The minimum 28-day compressive strength of reinforced concrete shall be 4,000 psi, unless shown otherwise on the drawings.
  - 1. Each cubic yard of 4,000 psi concrete shall contain no less than 517 lbs. of cement. The total water content per bag of cement shall not exceed 6.0 gallons.
- B. Strength: The minimum 28-day compressive strength of non-reinforced concrete shall be 3,000 psi, unless shown otherwise on the drawings.
  - 1. Each cubic yard of 3,000 psi concrete shall contain no less than 440 lbs. of cement. The total water content per bag shall not exceed 7.5 gallons.
- C. Mix Proportions: All concrete materials shall be proportioned so as to produce a workable mixture with a slump between 2 inches and 4 inches.
- D. Tests:
  - 1. The CONTRACTOR shall provide, for test purposes, one set of three cylinders taken from each day's pour or each 50 cubic yards placed, whichever is least or as directed by the ENGINEER. The CONTRACTOR at his expense shall supply test samples and an

independent testing laboratory at the CONTRACTOR's expense will make tests. Sampling and testing of concrete shall be made in accordance with ASTM C-143 and ASTM C-31. The standard age of test shall be at 7 days and 28 days; and, when approved by the ENGINEER, a 45 day test may be used. If the test strength of the cylinders falls below the minimum allowable compressive strength, the ENGINEER shall have the right to order the CONTRACTOR to remove and renew that day's pour of concrete or the CONTRACTOR shall accept such deductions in the final payment as the OWNER may deem reasonable.

2. Sampling and testing of concrete materials shall be made in accordance with ASTM Designations. The CONTRACTOR at his expense shall supply test samples, and an independent testing laboratory at the CONTRACTOR's expense shall make tests. The source from which concrete aggregates are to be obtained shall be selected by the CONTRACTOR well in advance of the time when they will be required in the work; and suitable samples, as they are to be used in the concrete, shall be furnished in advance of the time when the placing of the concrete is expected to begin.

## PART 3 EXECUTION

### 3.1 FORMING AND PLACING CONCRETE

- A. Formwork: Construct so that concrete members and structures are of correct size, shape, alignment, elevation and position, complying with ACI 347.

Clean and adjust forms prior to concrete placement. Apply form release agents for wet forms, as required. Retighten forms during and after concrete placement if required to eliminate mortar leaks.

### 3.2 REINFORCEMENT

- A. Position, support and secure reinforcement against displacement. Locate and support with metal chairs, runners, bolsters, spacers and hangers, as required. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- B. Install welded wire fabric in lengths as long as possible, lapping at least one mesh.
- C. Installation of Embedded Items: Set and build into the work anchorage devices and other embedded items required for other work that is attached to, or supported by cast-in-place concrete. Use setting diagrams, templates and instructions provided by others for locating and setting.

### 3.3 CONCRETE PLACEMENT

- A. Comply with ACI 304, placing concrete in a continuous operation within planned joints or sections. Do not begin placement until work of other trades affecting concrete is completed.
- B. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping, so that concrete is worked around reinforcement and other embedded items and into all parts of the forms.
- C. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placement and curing. Concrete shall not be placed when the surrounding air temperature is below 40°F and dropping.
  - 1. In cold weather comply with ACI 306.
  - 2. In hot weather comply with ACI 305.

### 3.4 CONCRETE FINISHES

- A. Nonslip Broom Finish: Apply nonslip broom finish to exterior concrete and sidewalks.
  - 1. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with the ENGINEER before application.

### 3.5 BONDING AND GROUTING

- A. Before depositing new concrete on or against concrete that has set, existing surfaces shall be thoroughly roughened and cleaned of glaze, foreign matter, and loose particles. An epoxy coating shall be applied for bonding the new concrete to the old.

### 3.6 CURING

- A. Concrete shall be kept continuously (not periodically) wet for a period of at least five consecutive days by covering with water or with an approved water saturated covering. Water for curing shall be clean and free from any elements, which might cause staining, or discoloration of the concrete surface.
- B. Sidewalks and floor slabs may be cured by spraying with a Membrane-Forming curing compound, applied as per manufacturer's recommendations. This material shall not be used on any interior slabs to which an applied finish is to be bonded.

### 3.7 PATCHING

- A. Any concrete which is not formed as shown on the drawings, or is out of alignment or level or shows a defective surface, shall be considered as not conforming to the intent of these specifications and shall be removed from the job by the CONTRACTOR at his expense, unless the ENGINEER grants permission to patch the defective area. This shall be done in accordance with the procedures above. Honeycomb consisting of ½-inch diameter holes or greater shall be considered a defective surface. Permission to patch any such area shall not be considered a waiver of the ENGINEER's right to require complete removal of the defective work if the patching does not, in his opinion, satisfactorily restore the quality of the concrete and appearance of the surface.
- B. As the forms are removed, fins, rough edges, and offsets shall be ground smooth. Holes to ½-inch, slight honeycomb, and minor defects shall be wet and filled with a 1:2 mix of cement mortar, matching color of surrounding concrete, and then troweled to a uniform plane. As soon as they have been troweled, the patched areas shall be sprayed with a curing compound, which will not destroy future bonding properties. Three days after application of curing compound, the entire surface shall be finished by wetting and applying a 1:2 mix of cement mortar with a cement brick. Using the brick, mortar shall be rubbed into pits or indentations and excess mortar rubbed off to provide a uniformly textured surface. When the surface has dried, all loose sand and dust shall be removed and the surface then hosed down with water.

### 3.8 TOLERANCES

- A. Tolerances for concrete work shall be in accordance with ACI 347.

END OF SECTION

## SECTION 03600

### GROUT

#### PART 1 - GENERAL

##### 1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install grout complete as shown on the Drawings and as specified herein.

##### 1.2 SUBMITTALS

- A. Submit to the ENGINEER, in accordance with Section 01340, shop drawings and product data showing materials of construction and details of installation for:

1. Commercially manufactured nonshrink cementitious grout. The submittal shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards and Material Safety Data Sheet.
2. Commercially manufactured nonshrink epoxy grout. The submittal shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards and Material Safety Data Sheet.
3. Cement grout. The submittal shall include the type and brand of the cement, the gradation of the fine aggregate, product data on any proposed admixtures and the proposed mix of the grout.

- B. Qualifications

1. Grout manufacturers shall submit documentation that they have at least 10 years experience in the production and use of the proposed grouts which they will supply.

##### 1.3 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)

1. ASTM C531 - Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical Resistant Mortars, Grouts and Monolithic Surfacing and Polymer Concretes

2. ASTM C579 - Standard Test Method for Compressive Strength of Chemical Resistant Mortars, Grouts and Monolithic Surfacing and Polymer Concretes
  3. ASTM C827 - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures
  4. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
- B. U.S. Army Corps of Engineers Standard (CRD)
1. CRD C-621 - Corps of Engineers Specification for Nonshrink Grout
- C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

#### 1.4 QUALITY ASSURANCE

- A. Qualifications
1. Grout manufacturer shall have a minimum of 10 years experience in the production and use of the type of grout proposed for the work.
- B. Pre-installation Conference
- C. Well in advance of grouting, hold a pre-installation meeting to review the requirements for surface preparation, mixing, placing and curing procedures for each product proposed for use. Parties concerned with grouting shall be notified of the meeting at least 10 days prior to its scheduled date.
1. A qualified field technician of the nonshrink grout manufacturer, specifically trained in the installation of the products, shall attend the pre-installation conference and shall be present for the initial installation of each type of nonshrink grout. Additional services shall also be provided, as required, to correct installation problems.
- D. Field Testing
1. All field testing and inspection services required shall be provided by the Owner. The Contractor shall assist in the sampling of materials and shall provide any ladders, platforms, etc, for access to the work. The methods of testing shall comply in detail with the applicable ASTM Standards.

## 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the jobsite in original, unopened packages, clearly labeled with the manufacturer's name, product identification, batch numbers and printed instructions.
- B. Store materials in full compliance with the manufacturer's recommendations. Total storage time from date of manufacture to date of installation shall be limited to 6 months or the manufacturer's recommended storage time, whichever is less.
- C. Material which becomes damp or otherwise unacceptable shall be immediately removed from the site and replaced with acceptable material at no additional expense to the Owner.
- D. Nonshrink cement-based grouts shall be delivered as preblended, prepackaged mixes requiring only the addition of water.
- E. Nonshrink epoxy grouts shall be delivered as premeasured, prepackaged, three component systems requiring only blending as directed by the manufacturer.

## 1.6 DEFINITIONS

- A. Nonshrink Grout: A commercially manufactured product that does not shrink in either the plastic or hardened state, is dimensionally stable in the hardened state and bonds to a clean base plate.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. The use of a manufacturer's name and product or catalog number is for the purpose of establishing the standard of quality desired.
- B. Like materials shall be the products of one manufacturer or supplier in order to provide standardization of appearance.

### 2.2 MATERIALS

- A. Nonshrink Cementitious Grout
  - 1. Nonshrink cementitious grouts shall meet or exceed the requirements of ASTM C1107, Grades B or C and CRD C-621. Grouts shall be Portland cement based, contain a pre-proportioned blend of selected aggregates and shrinkage compensating agents



and shall require only the addition of water. Nonshrink cementitious grouts shall not contain expansive cement or metallic particles. The grouts shall exhibit no shrinkage when tested in conformity with ASTM C827.

- a. General purpose nonshrink cementitious grout shall conform to the standards stated above and shall be SikaGrout 212 by Sika Corp.; Set Grout by Master Builders, Inc.; Gilco Construction Grout by Gifford Hill & Co.; Euco NS by The Euclid Chemical Co.; NBEC Grout by U. S. Grout Corp. or equal.
- b. Flowable (Precision) nonshrink cementitious grout shall conform to the standards stated above and shall be Masterflow 928 by Master Builders, Inc.; Hi-Flow Grout by the Euclid Chemical Co.; SikaGrout 212 by Sika Corp.; Supreme Grout by Gifford Hill & Co.; Five Star Grout by U. S. Grout Corp. or equal.

B. Nonshrink Epoxy Grout

1. Nonshrink epoxy-based grout shall be a pre-proportioned, three component, 100 percent solids system consisting of epoxy resin, hardener, and blended aggregate. It shall have a compressive strength of 14,000 psi in 7 days when tested in conformity with ASTM D695 and have a maximum thermal expansion of  $30 \times 10^{-6}$  when tested in conformity with ASTM C531. The grout shall be Ceilcote 648 CP by Master Builders Inc.; Five Star Epoxy Grout by U.S. Grout Corp.; Sikadur 42 Grout-Pak by Sika Corp.; High Strength Epoxy Grout by the Euclid Chemical Co. or equal.

C. Cement Grout

1. Cement grouts shall be a mixture of one part Portland cement conforming to ASTM C150, Types I, II, or III and 1 to 2 parts sand conforming to ASTM C33 with sufficient water to place the grout. The water content shall be sufficient to impart workability to the grout but not to the degree that it will allow the grout to flow.

D. Water

1. Potable water, free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Grout shall be placed over cured concrete which has attained its full design strength unless otherwise approved by the ENGINEER.
- B. Concrete surfaces to receive grout shall be clean and sound; free of ice, frost, dirt, grease, oil, curing compounds, laitance and paints and free of all loose material or foreign matter which may effect the bond or performance of the grout.
- C. Roughen concrete surfaces by chipping, sandblasting, or other mechanical means to ensure bond of the grout to the concrete. Remove loose or broken concrete. Irregular voids or projecting coarse aggregate need not be removed if they are sound, free of laitance and firmly embedded into the parent concrete.
  - 1. Air compressors used to clean surfaces in contact with grout shall be the oilless type or equipped with an oil trap in the air line to prevent oil from being blown onto the surface.
- D. Remove all loose rust, oil or other deleterious substances from metal embedments or bottom of baseplates prior to the installation of the grout.
- E. Concrete surfaces shall be washed clean and then kept moist for at least 24 hours prior to the placement of cementitious or cement grout. Saturation may be achieved by covering the concrete with saturated burlap bags, use of a soaker hose, flooding the surface, or other method acceptable to the ENGINEER. Upon completion of the 24 hour period, visible water shall be removed from the surface prior to grouting. The use of an adhesive bonding agent in lieu of surface saturation shall only be used when approved by the ENGINEER for each specific location of grout installation.
- F. Epoxy-based grouts do not require the saturation of the concrete substrate. Surfaces in contact with epoxy grout shall be completely dry before grouting.
- G. Construct grout forms or other leakproof containment as required. Forms shall be lined or coated with release agents recommended by the grout manufacturer. Forms shall be of adequate strength, securely anchored in place and shored to resist the forces imposed by the grout and its placement.
  - 1. Forms for epoxy grout shall be designed to allow the formation of a hydraulic head and shall have chamfer strips built into forms.

- H. Level and align the structural or equipment bearing plates in accordance with the structural requirements and the recommendations of the equipment manufacturer.
- I. Equipment shall be supported during alignment and installation of grout by shims, wedges, blocks or other approved means. The shims, wedges and blocking devices shall be prevented from bonding to the grout by appropriate bond breaking coatings and removed after grouting unless otherwise approved by the ENGINEER.

### 3.2 INSTALLATION – GENERAL

- A. Mix, apply and cure products in strict compliance with the manufacturer's recommendations and this Section.
- B. Have sufficient manpower and equipment available for rapid and continuous mixing and placing. Keep all necessary tools and materials ready and close at hand.
- C. Maintain temperatures of the foundation plate, supporting concrete, and grout between 40 and 90 degrees F during grouting and for at least 24 hours thereafter or as recommended by the grout manufacturer, whichever is longer. Take precautions to minimize differential heating or cooling of baseplates and grout during the curing period.
- D. Take special precautions for hot weather or cold weather grouting as recommended by the manufacturer when ambient temperatures and/or the temperature of the materials in contact with the grout are outside of the 60 and 90 degrees F range.
- E. Install grout in a manner which will preserve the isolation between the elements on either side of the joint where grout is placed in the vicinity of an expansion or control joint.
- F. Reflect all existing underlying expansion, control and construction joints through the grout.

### 3.3 INSTALLATION - CEMENT GROUTS AND NONSHRINK CEMENTITIOUS GROUTS

- A. Mix in accordance with manufacturer's recommendations. Do not add cement, sand, pea gravel or admixtures without prior approval by the ENGINEER.
- B. Avoid mixing by hand. Mixing in a mortar mixer (with moving blades) is recommended. Pre-wet the mixer and empty excess water. Add premeasured amount of water for mixing, followed by the grout. Begin with the minimum amount of water recommended by the manufacturer

and then add the minimum additional water required to obtain workability. Do not exceed the manufacturer's maximum recommended water content.

- C. Placements greater than 3-in in depth shall include the addition of clean, washed pea gravel to the grout mix when approved by the manufacturer. Comply with the manufacturer's recommendations for the size and amount of aggregate to be added.
- D. Place grout into the designated areas in a manner which will avoid segregation or entrapment of air. Do not vibrate grout to release air or to consolidate the material. Placement should proceed in a manner which will ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.
- E. Place grout rapidly and continuously to avoid cold joints. Do not place cement grouts in layers. Do not add additional water to the mix (retemper) after initial stiffening.
- F. Just before the grout reaches its final set, cut back the grout to the substrate at a 45 degree angle from the lower edge of bearing plate unless otherwise approved by the ENGINEER. Finish this surface with a wood float (brush) finish.
- G. Begin curing immediately after form removal, cutback, and finishing. Keep grout moist and within its recommended placement temperature range for at least 24 hours after placement or longer if recommended by the manufacturer. Saturate the grout surface by use of wet burlap, soaker hoses, ponding or other approved means. Provide sunshades as necessary. If drying winds inhibit the ability of a given curing method to keep grout moist, erect wind breaks until wind is no longer a problem or curing is finished.

### 3.4 INSTALLATION - NONSHRINK EPOXY GROUTS

- A. Mix in accordance with the procedures recommended by the manufacturer. Do not vary the ratio of components or add solvent to change the consistency of the grout mix. Do not overmix. Mix full batches only to maintain proper proportions of resin, hardener and aggregate.
- B. Monitor ambient weather conditions and contact the grout manufacturer for special placement procedures to be used for temperatures below 60 or above 90 degrees F.
- C. Place grout into the designated areas in a manner which will avoid trapping air. Placement methods shall ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.

- D. Minimize "shoulder" length (extension of grout horizontally beyond base plate). In no case shall the shoulder length of the grout be greater than the grout thickness.
- E. Finish grout by puddling to cover all aggregate and provide a smooth finish. Break bubbles and smooth the top surface of the grout in conformity with the manufacturer's recommendations.
- F. Epoxy grouts are self curing and do not require the application of water. Maintain the formed grout within its recommended placement temperature range for at least 24 hours after placing, or longer if recommended by the manufacturer.

### 3.5 SCHEDULE

- A. The following list indicates where the particular types of grout are to be used:
- B. General purpose nonshrink cementitious grout: Use at all locations where non shrink grout is called for on the plans except for base plates greater in area than 3-ft wide by 3-ft long and except for the setting of anchor rods, anchor bolts or reinforcing steel in concrete.
- C. Flowable nonshrink cementitious grout: Use under all base plates greater in area than 3-ft by 3-ft. Use at all locations indicated to receive flowable nonshrink grout by the Drawings. The Contractor, at his/her option and convenience, may also substitute flowable nonshrink grout for general purpose nonshrink cementitious grout.
- D. Nonshrink epoxy grout: Use for the setting of anchor rods, anchor bolts and reinforcing steel in concrete and for all locations specifically indicated to receive epoxy grout.
- E. Cement grout: Cement grout may be used for grouting of incidental base plates for structural and miscellaneous steel such as post base plates for platforms, base plates for beams, etc. It shall not be used when nonshrink grout is specifically called for on the Drawings or for grouting of primary structural steel members such as columns and girders.

END OF SECTION

**DIVISION 4**  
**(NOT USED)**

**DIVISION 5**  
**(NOT USED)**

**DIVISION 6**  
**(NOT USED)**



**DIVISION 7**  
**(NOT USED)**

**DIVISION 8**  
**(NOT USED)**

## SECTION 09900

### PAINTING AND COATING

#### PART 1 GENERAL

##### 1.1 INTENT

- A. The intent of this Specifications is to provide the material and workmanship necessary to produce complete protection of the surfaces to be coated for the Pine Island WWTP Effluent Pump Station. This includes all surface preparation, pre-treatment, coating application, touch-up of factory coated surfaces, protection of surfaces not to be coated, clean-up, and appurtenant work, all in accordance with the requirements of the Contract Documents. Throughout this specification "ENGINEER" refers to the County Project Manager or Contract Manager, and "OWNER" refers to the County.

##### 1.2 PURPOSE

- A. The purpose of this Specification is to generally outline the work contemplated for the painting and protective coating work performed for LCU, including Contract Operations, Capital Improvement Projects, and Developer Contributed Assets as defined under Scope below; together with the General Conditions, Special Provisions and all other Technical Specifications included herewith. All paints and materials used on interior tank or treatment unit surfaces shall conform to AWWA and/or Florida Department of Environmental Protection (FDEP) regulations as they may apply to potable water or wastewater service. The manufacturer furnishing the coating material may be required to furnish certification to the ENGINEER/OWNER that the materials meet these provisions.

##### 1.3 DESCRIPTION

- A. The extent of painting work is shown on the project drawings, contracts and schedules, and as specified herein.
- B. The work includes painting and finishing of interior and exterior exposed items and surfaces throughout the project, except as otherwise specified or shown on the drawings.
  - 1. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of the work.
- C. The work includes field painting of exposed bare and covered pipes and ducts including color coding, and of hangers, exposed steel and iron work, tanks,

vessels, and primed metal surfaces of equipment installed under the mechanical and electrical work, except as otherwise indicated.

- D. Paint all exposed surfaces normally painted in the execution of a pump station project whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, or are not specifically excluded from the painting work, paint these the same as adjacent similar materials or areas. If color or finish is not designated, the OWNER will select these from standard colors available for the materials systems specified.

#### 1.4 PAINTING NOT INCLUDED

- A. The following categories of work are not included as part of the field-applied finish work, unless otherwise noted on the Drawings or in the Contract Documents.
  - 1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under the various sections for structural steel, miscellaneous metal, metal fabrications, hollow metal work, and similar items. Also, for fabricated components such as shop-fabricated or factory-built mechanical and electrical equipment or accessories.
  - 2. Pre-Finished Items: Unless otherwise shown or specified, do not include painting when factory-finishing or installer finishing is specified for such items as, but not limited to, finished electrical equipment including light fixtures, switchgear and distribution cabinets.
  - 3. Concealed Surfaces: Unless otherwise shown or specified, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas. Painting of galvanized work that will be concealed in the completed work is not required. Do not paint structural steel to be encased in concrete, nor structural steel specified not to be painted under Division 5. Except for touch-up as specified in Part 3, painting of shop primed structural steel and ferrous metals that will be concealed in the completed work is not required.
  - 4. Finished Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plating, copper, bronze and similar finished materials will not require finish painting, unless otherwise specified.
  - 5. Operating and Machined Parts and Labels: Moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, machined surfaces, grease fittings, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting unless otherwise specified.

a. Do not paint over any code-requiring labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

6. Other Surfaces: Do not apply to glass, manhole frames and covers, aluminum platform gratings, stair treads, door thresholds, concrete wearing surfaces, or other walking surfaces unless otherwise specified.

## 1.5 CODES, STANDARDS AND REGULATIONS

A. The work herein specified shall be performed in a legally acceptable manner, and it shall be the responsibility of the CONTRACTOR to obtain any and all licenses, permits, and legal approvals required to perform the work specified.

B. All material and work covered by this specification shall comply with all currently approved or accepted provisions of applicable codes and standards published by the following organizations:

ANSI - American National Standards Institute  
11 West 42nd  
New York, NY 10036  
212-642-4900

API - American Petroleum Institute  
1220 L Street N.W.  
Washington, DC 20005  
202-682-8000

ASTM - American Society for Testing and Materials  
100 Barr Harbor Dr.  
West Conshohocken, PA. 19428  
610-832-9500

AWS - American Welding Society  
550 N.W. LeJeune Rd.  
Miami, FL 33126  
305-443-9353

AWWA - American Water Works Association  
6666 West Quincy Avenue Denver, CO 80235  
303-794-7711

FM - Factory Mutual Research  
1151 Boston-Providence Turnpike  
Norwood, MA 02062  
617-762-4300

- NACE - National Association of Corrosion ENGINEERs  
PO Box 218340 Houston, TX 77218  
1440 South Creek Dr.  
Houston, TX 77084-4906 713-492-0535
  
- NEMA - National Electrical Manufacturer's Association  
2101 L Street N.W. Ste. 300  
Washington, DC 20037  
202-457-8400
  
- NFPA - National Fire Protection Association  
1 Batterymarch Park  
Quincy, MA 02269-9101  
617-770-3000
  
- OSHA - Occupational Safety and Health Act  
U.S. Department of Labor  
Occupational Safety & Health Administration  
8040 Peters Rd. Bldg. H-100  
Fort Lauderdale, FL 33324  
954-424-0242
  
- SAE - Society of Automotive ENGINEERs  
400 Commonwealth Dr.  
Warrendale PA. 15096-0001  
412-776-4841
  
- SSPC - Steel Structures Painting Council  
40 24th Street  
Pittsburgh, PA 15222  
412-281-2331
  
- SSPWC - Standard Specifications for Public Works  
Construction  
Building News, Inc.  
3055 Overland Avenue  
Los Angeles, CA 90034  
310-202-7775
  
- UBC - Uniform Building Code Published by ICBO
  
- UL - Underwriters Laboratories Inc.  
333 Psingsten Rd.  
Northbrook, IL 67062  
312-273-4255

- C. The CONTRACTOR shall comply with all applicable Federal, state, and local laws and ordinances.

## 1.6 ACCEPTABLE COATING MANUFACTURERS

- A. Except as otherwise indicated herein, materials specified are from the catalog of the Kop-Coat, Inc. (Carboline Company) listed below. Materials by other manufacturers approved by the ENGINEER are acceptable provided that they are established to the satisfaction of the ENGINEER as being compatible with and of equal quality to the coatings of the company listed. The CONTRACTOR shall provide satisfactory documentation from the firm manufacturing the proposed material that the material meets the specified requirements and is equivalent or better than the listed materials in the following properties:
  - 1. Quality
  - 2. Durability
  - 3. Resistance to abrasion and physical damage
  - 4. Life expectancy
  - 5. Ability to recoat in future
  - 6. Solids content by volume
  - 7. Dry film thickness per coat
  - 8. Compatibility with other coatings
  - 9. Suitability for the intended service
  - 10. Resistance to chemical attack
  - 11. Temperature limitations in service and during application
  - 12. Type and quality of recommended undercoats and topcoats
  - 13. Ease of application
  - 14. Ease of repairing damaged areas
  - 15. Stability of colors
- B. The cost of all testing and analyzing of the proposed substitute materials that may be required by the ENGINEER, shall be paid by the CONTRACTOR. If the proposed substitution requires changes in the contract work, the

CONTRACTOR shall bear all such costs involved and the costs of allied trades affected by the substitution. These substitutions for other manufacturers must be made and approved prior to the bid date opening.

- C. Material Sources: Kop-Coat Inc. is the standard of quality for the industrial coating materials specified in this Section. Where paint numbers are listed, it is to show the type and quality of coatings that are required. For convenience of reference, this specification includes product designations for coatings and coating colors as manufactured by the Kop-Coat Inc., St. Louis, MO. 800-547-2468. Other acceptable manufacturers are, Keeler and Long, Watertown, CT (203-274-6701), Tnemec Co., Kansas City, MO (816-483-3400), and Porter International, Louisville, Ky (502-588-9769). Proposed substitute materials must be shown to satisfy the material descriptions and to equal or exceed the properties of the listed materials as required above in Paragraph 1-06 A.

## 1.7 SUBMITTALS

- A. Coating Materials List: The CONTRACTOR shall provide six (6) copies of a coating materials list which indicates the manufacturer and the coating number, keyed to the coating schedule herein, for approval of the ENGINEER. The submittals shall be made sufficiently in advance of the coating operations to allow ample time for checking, correcting, resubmitting and rechecking.
- B. Paint Manufacturer's Information: For each paint system to be used, the CONTRACTOR shall submit the following listed data prior to beginning painting operations.
  - 1. Paint manufacturer's data sheet for each product used.
  - 2. Paint manufacturer's instructions and recommendations on surface preparation and application.
  - 3. Colors available for each product (where applicable).
  - 4. Compatibility of shop and field applied coatings (where applicable).
  - 5. Material safety data sheet for each product used.
- C. Samples and Manufacturer's Certificate: Provide all submittals, including the following, as specified in Division 1.
  - 1. Submit manufacturer's standard color chart for color selection.
  - 2. Submit specimens, approximately 8 by 10 inches in size, for custom mixed colors for approval, not including color coding colors.



3. Where equipment is customarily shipped with a standard finish, submit samples of the proposed color and finish for approval prior to shipping.
4. Furnish affidavits from the manufacturer certifying that materials furnished conform to the requirements specified and that paint products have been checked for compatibility.
5. Submit a supplementary schedule of paint products with mil thickness, and solids by volume, including all paint applied in the shop and in the field. Provide a schedule that is in accordance with the recommendations of the paint manufacturer.
6. Furnish affidavits from the manufacturer certifying that coatings in immersion service contain no water soluble solvents or corrosion inhibitive (active) pigments with slight water solubility.

#### 1.8 DELIVERY AND STORAGE

- A. Deliver all coating materials to the job site in original, new and unbroken, sealed packages and containers bearing manufacturer's name and label, and the following information, all of which shall be plainly legible at the time of use:
  1. Name or title of material.
  2. Fed. Spec. number, if applicable.
  3. Manufacturer's stock number and date of manufacturer.
  4. Manufacturer's formula or specification number.
  5. Manufacturer's batch number.
  6. Manufacturer's name.
  7. Contents by volume, for major pigment and vehicle constituents.
  8. Thinning instructions.
  9. Application instructions.
  10. Color name and number.
  11. Expiration date.
- B. Store paint materials and painting tools and equipment, including solvents and cleaning materials, in a well ventilated, dry area and away from high heat. Do not store in building or structure being painted, nor leave overnight therein. Follow manufacturer's recommendations for the safe storage of paints and

solvents. CONTRACTOR shall store materials in compliance with all local, state, and federal regulations.

## 1.9 QUALITY ASSURANCE

- A. Inspection by the ENGINEER, or the waiver of inspection of any particular portion of the work, shall not relieve the CONTRACTOR of his responsibility to perform the work in accordance with these Specifications.
- B. Inspection Devices: The CONTRACTOR shall furnish, until final acceptance of the work, inspection devices in good working condition for the detection of holidays, measurement of surface profile, and measurement of dry film thicknesses of the protective coatings. Surface preparation comparison visual standards, profile and dry film thickness devices shall be made available for the ENGINEER's use at all times while coating is being done. The CONTRACTOR shall provide the services of a trained operator of the holiday detection devices until the final acceptance of such coatings. Holiday detection devices shall be operated only in the presence of the ENGINEER.
- C. Surface Cleanliness: Preparation of metallic surfaces shall be based upon comparison with SSPC-VIS 1 (ASTM D2200), and as described herein. The CONTRACTOR shall furnish the photographic standards. To facilitate inspection, the CONTRACTOR shall, on the first day of abrasive blasting operations, abrasive blast metal panels to the standards specified. Plates shall measure a minimum of 8.5 inches by 11 inches. Panels meeting the requirements of the Specifications shall be initialed by the CONTRACTOR and the OWNER's representative and coated with a clear non-yellowing finish. One of these panels shall be prepared for each type of abrasive blasting and shall be used as a comparison standard throughout the project. The CONTRACTOR shall provide SSPC-VIS 1 Surface Preparation Standards for use during the abrasive blasting operations.
- D. Surface Profile: The blast abrasive shall be suitable to achieve the blast profile as required for the coating system used. The CONTRACTOR shall furnish for the ENGINEER's use, a Keane-Tator Surface Comparator No. 372 or approved equal.
- E. Film Thickness Testing: On ferrous metals, the dry film coating thickness shall be measured in accordance with the SSPC "Paint Application Specification No. 2" (SSPC-PA2), using a magnetic-type dry film thickness gauge such as Mikrotest Model FM, Elcometer Model 111/1EZ, Positector 2000 or approved equal. Each coat shall be tested for the correct thickness. No measurements shall be made until at least eight (8) hours after application of the coating. On non-ferrous metals and other substrates, the coating thicknesses shall be measured at the time of application using a wet film gauge.

- F. Holiday Testing: The CONTRACTOR shall holiday test all coated ferrous surfaces inside a steel reservoir, or other surfaces which will be submerged in water or other liquids, or surfaces which are enclosed in a vapor space in such structures. Areas which contain holidays shall be marked and repaired, or recoated in accordance with the coating manufacturer's printed instructions and then retested.
1. Coatings With Thickness Exceeding 20 Mils: For surfaces having a total dry film coating thickness exceeding 20 mils: Pulse-type holiday detector such as Tinker & Razor Model AP-W, D.E. Stearns Co. Model 14/20, or approved equal shall be used. The unit shall be adjusted to operate at the voltage required to cause a spark jump across an air gap equal to twice the specified coating thickness.
  2. Coatings With Thickness of 20 Mils or Less: For surfaces having a total dry film coating thickness of 20 mils or less: Tinker & Razor Model M-1 non-destructive type holiday detector, K-D Bird Dog or approved equal shall be used. The unit shall operate at less than 75-volts. For thicknesses between 10 and 20 mils, a non-sudsing type wetting agent, such as Kodak Photo-Flo, or equal shall be added to the water prior to wetting the detector sponge.

#### 1.10 MANUFACTURER'S REPRESENTATIVE

- A. The CONTRACTOR shall require the protective coating manufacturer to furnish a qualified technical representative to visit the project site for technical support and as may be necessary to resolve field problems attributable or associated with the manufacturer's products furnished under this contract or the application thereof.

#### 1.11 SAFETY AND HEALTH REQUIREMENTS

- A. General: The CONTRACTOR shall provide and require use of personal protective and safety equipment for persons working in or about the project site, in accordance with requirements of OSHA Safety and Health Standards for Construction (29CFR 1910, 1915, and 1926) its revisions, and all other applicable regulations. The CONTRACTOR shall also comply with the coating manufacturer's printed instructions, appropriate technical bulletins, manuals, and material safety data sheets in the handling of potentially hazardous or harmful materials.
- B. Head and Face Protection and Respiratory Devices: The CONTRACTOR shall require all persons to wear protective helmets while in the vicinity of the work. In additions, workers engaged in or near the work during sandblasting shall wear eye and face protection devices and air purifying, half-mask or

mouthpiece respirators with appropriate filters. Barrier creams shall be used on any exposed areas of skin.

- C. Ventilation: Where ventilation is used to control hazardous exposure, all equipment shall be explosion proof. Forced air ventilation shall be provided to reduce the concentration of air contaminants to the degree such that a hazard does not exist and to assist in the proper curing of coatings applied in a confined area. Air circulation and exhausting of solvent vapors shall be continued until coatings have fully cured.
- D. Sound Levels: Whenever the occupational noise exposure exceeds maximum allowable sound levels permitted under OSHA regulations, the CONTRACTOR shall provide and require the use of approved hearing protection devices.
- E. Illumination: Adequate illumination shall be provided while work is in progress, including explosion-proof lights and electrical equipment. Whenever required by the ENGINEER, the CONTRACTOR shall provide additional illumination to cover all areas to be inspected. The level of illumination for inspection purposes shall be determined by the ENGINEER.
- F. Temporary Access: All temporary ladders and scaffolding shall conform to applicable safety requirements. Scaffolding shall be erected where requested by the ENGINEER to facilitate inspection and shall be moved by the CONTRACTOR to locations as requested by the ENGINEER.
- G. Cloths and cotton waste that might constitute a fire hazard shall be placed in fire resistant closed metal containers until removed from the project site or destroyed at the end of each work day.

#### 1.12 WARRANTY

- A. All work covered under the Contract shall be guaranteed against defective workmanship and materials for a period of one (1) year after completion and acceptance of the work. A first anniversary inspection will be scheduled by the CONTRACTOR during the eleventh (11th) month following acceptance of the work. A report shall be furnished to the OWNER describing the condition of the paint system and other work covered under the Contract. Tank draining shall be coordinated with the OWNER. Any latent defects found during this inspection shall be promptly repaired by the CONTRACTOR at no additional cost to the OWNER. Any location where coats of paint have peeled off, bubbled or cracked, and any location where rusting is evident, shall be considered a failure of the paint system. The CONTRACTOR shall make repairs at all points where failures are observed by removing the deteriorated coating, cleaning the surfaces and recoating with the same paint system. Any

such repair work shall be completed by the CONTRACTOR within thirty (30) days after written notice of such defects unless otherwise negotiated.

- B. Failure on the part of the CONTRACTOR to schedule this warranty inspection will not relieve him of warranty responsibility and any defects found by the OWNER after the normal warranty period will be assumed to have occurred during the one (1) year while the warranty was in effect.

## PART 2 - PRODUCTS AND COATING SYSTEMS

### 2.1 GENERAL

- A. Definitions: The term "paint", "coatings", or "finishes" as used herein, shall include surface treatments, emulsions, enamels, paints, epoxy resins, and all other protective coatings, excepting galvanizing or anodizing, whether used as a pre-treatment, primer, intermediate coat, or finish coat. The term "DFT" means minimum dry film thickness.
- B. Compatibility: In any coating system, only compatible materials from a single manufacturer shall be used in the work. Particular attention shall be directed to compatibility of primers and finish coats. If necessary, subject to the approval of the ENGINEER, a barrier coat shall be applied between all existing prime coats and subsequent field coats to insure compatibility.

### 2.2 COLORS AND FINISHES

- A. All colors and shades of colors for all coats of paint shall be as selected or specified. Paint colors, surface treatment, gloss, and finishes, are indicated or specified in the "schedules" of the contract documents. Color and gloss not indicated or specified will be selected by the OWNER.
- B. Each coat shall be of a slightly different shade, as directed by the ENGINEER, to facilitate inspection of surface coverage of each coat. Finish colors shall be as selected from the manufacturer's standard color samples or shall be customer mixed to match color samples furnished by the ENGINEER. Final acceptance of colors will be from samples applied on the job.
- C. Color Pigments: Pure, non-fading, applicable types to suit the substrates and service indicated.
- D. Paint Coordination: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Furnish information to manufacturers, fabricators, suppliers and others where necessary on the characteristics of the finish

materials to be used, to ensure compatible prime coats of use. Provide barrier coats over incompatible primers or remove and re-prime as required.

- E. Color Coding: All exposed piping in structures, aboveground or in pipe trenches, shall be color code painted in strict accordance with the color code chart presented in Paragraph 3-15 of this section. All colors shall be as specified or as selected by the OWNER.

## 2.3 UNDERCOATS AND THINNERS

- A. Undercoats: Provide undercoat paint produced by the same manufacturer as the finish coats.
- B. Thinners: Use only thinners approved by the paint manufacturer and use only within recommended limits.

## 2.4 INDUSTRIAL COATING SYSTEMS

- A. The CONTRACTOR shall use coating materials suitable for the intended use and recommended by their manufacturer for the intended service.
- B. Protective Coating Materials: Products shall be standard coatings produced by recognized manufacturers regularly engaged in production of such materials for application on essentially identical facilities to those proposed in this project. Where requested, the CONTRACTOR shall provide the ENGINEER with the names of not less than ten (10) successful applications of the proposed manufacturer's products, which have been proven over a three (3) year period of time, demonstrating compliance with this specification requirement.
- C. System 1 - Alkyd Enamel: High quality gloss or semi-gloss, long oil alkyd finish with a minimum solids content of 57-percent by volume. Primer as recommended by manufacturer.

### 1. Painting New Construction

- a. Prime coat except wood surfaces (DFT = 3.0 mils) Kop-Coat 622-LCF Primer.
- b. Prime coat for wood surfaces (DFT = 1.5 mils) Kop-Coat Rustarmor 500 enamel thinned 15-percent with Kop-Coat 4000 Thinner.
- c. Finish coats, two (Total DFT = 3.0 mils) Kop-Coat Rustarmor 500 Enamel.

- d. Total system DFT except wood surfaces = 6.0 mils. Total system DFT for wood surfaces = 4.5 mils.

## 2. Repainting Existing Surfaces

- a. The cleaned steel is to be hand brushed twice with (DFT = 4.0 mils) KopCoat 622-LCF Primer. Completely work the primer into all the irregular surface faces of the steel.
- b. Finish coats, two (2) (total DFT = 3.0 mils) Kop-Coat Rustarmor 500 Enamel.
- c. Total millage shall be at least 7.0 mils.

- D. System 2 - Silicone Alkyd Enamel: High quality gloss alkyd, medium long oil alkyd finish. Minimum solids content of 48-percent by volume. Prime coat to be as recommended by manufacturer.

## 1. Painting New Construction

- a. Prime coat (DFT = 3.0 mils) Kop-Coat 622-LCF Primer.
- b. Finish coats, two (Total DFT = 3.0 mils) Kop-Coat Sub-Sil B.
- c. Total system DFT = 6.0 mils.

## 2. Repainting Existing Surfaces

- a. The cleaned steel is to be hand brushed twice with (DFT = 4.0 mils) KopCoat 622-LCF Primer.
- b. Finish coats, two (Total DFT = 3.0 mils) Kop-Coat 1515 Silicone Alkyd.
- c. Total system DFT shall be at least 7.0 mils.

- E. System 3 - High Build Epoxy: High build polyamide epoxy coating, resistant to splash, spillage and fumes of dilute acids, bases and salts, and with high resistance to weathering. Coating material shall have a minimum solids content of 56-percent by volume. Prime coat to be a rust inhibitive epoxy primer as recommended by manufacturer.

- 1. Prime coat (DFT = 1.5 mils) Kop-Coat 294 Epoxy Primer.
- 2. Finish coats, two (Total DFT = 10.0 mils) Kop-Coat Hi-Gard Epoxy Coating.

3. Total system DFT = 11.5 mils.
- F. System 4 Acrylic Latex (High Sheen): Single component, water based acrylic latex with a fungicide additive and minimum solids content of 35-percent by volume. Prime coat to be as recommended by manufacturer.
1. Prime coat (DFT = 2.0 mils) as recommended by manufacturer, if needed.
  2. Finish coats, two (Total DFT = 3.0 mils) Kop-Coat 620 Acrylic Emulsion.
  3. Total system DFT = 5.0 mils (with prime coat). 3.0 mils (without prime coat).
- G. System 5 - Acrylic, Concrete and Masonry (Flat): High molecular weight acrylic coating material with a minimum solids content of 41-percent by volume. Prime coat shall be an acrylic filler and sealer for concrete surfaces.
1. Painting New Construction
    - a. Prime coat (filler/sealer) Kop-Coat Concrete and Masonry Filler.
    - b. Finish coats, two (2) (Total DFT = 3.0 mils) Kop-Coat 600 Interior-Exterior Acrylic Emulsion.
    - c. Total system DFT = 3.0 mils.
  2. Repainting Existing Surfaces
    - a. Spot prime if needed with Kop-Coat Concrete and Masonry Filler to insure a consistent total finish appearance.
    - b. Finish coats, two (Total DFT = 3.0 mils) Kop-Coat 600 Interior-Exterior Acrylic Emulsion.
    - c. Total millage shall be at least 3.0 mils.
- H. System 6 - Coal Tar Epoxy, Steel: High build, 2-component amine or polyamide cured coal tar epoxy, solids content of at least 74-percent by volume, suitable for long term immersion in wastewater and for coating of buried surfaces, and conforming to or exceeding Corps of ENGINEERS Specification C-200, or SSPC Paint 16. Prime coats are for use as a shop primer only. Prime coat shall be omitted when both surface preparation and coating are to be performed in the field.
1. Prime coat (DFT = 1.5 mils) Kop-Coat 654 Epoxy Primer.



2. Finish coats, two (2) (Total DFT = 20.0 mils) Kop-Coat Bitumastic No. 300-M.

Note: Time between coats is critical and maximum times as stated by the manufacturer must not be exceeded.

3. Total system DFT = 21.5 mils (with prime coat), 20.0 mils (without prime coat).

Notes:

- a. Spot sandblast to SSPC-SP10 all areas damaged during erection, or areas not precoated before application of coating.
  - b. All edges, nuts, bolts, lap joints, weld seams and the roof rim angle shall receive one brush-applied coat prior to the application of the complete spray coat.
- I. System 7 - Coal Tar Epoxy, Concrete: High build, 2-component amine or polyamide cured coal tar epoxy, solids content of at least 74-percent by volume, suitable for long term immersion in wastewater and for coating of buried surfaces and conforming to or exceeding Corps. of ENGINEERS Specification C-200, or SSPC Paint 16. Filler compound shall be a 2-component epoxy material used to fill voids and provide a suitable surface for the application of the coal tar epoxy. Filler is worked into the concrete surface with a wide blade putty knife or a squeegee.
1. First coat - Kop-Coat Bitumastic No. 300-M, thinned 33 percent with Thinner 2000 and apply at the rate of 200-300 sq. ft. per gallon. Allow not more than 24 hours before applying additional coats at the normal, unthinned rate.
  2. Finish coats, two (Total DFT = 20.0 mils) Kop-Coat Bitumastic No. 300-M.
- Note: Time between coats is critical and maximum times as stated by the manufacturer must not be exceeded.
3. Total system DFT = 20.0 mils.
- J. System 9 - Polyurethane: High gloss, 2 - component aliphatic polyurethane for use on steel, fiberglass and PVC. Coating material shall have a minimum solids content of 56-percent by volume. Prep surface as recommended by manufacture. Product is not recommended for interior building surfaces or continuous immersion.
1. Prime coat (DFT = 3.0 mils) Hi-GARD Epoxy.

2. Finish coats, two (2) (total DFT = 3.0 mils) Kop-Coat 1122 BRS Linear Polyurethane.
3. Total system DFT = 6.0 mils minimum.

## PART 3 - EXECUTION

### 3.1 STORAGE, MIXING AND THINNING OF MATERIALS

- A. Manufacturer's Recommendations: Unless otherwise specified herein, the coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protecting its coating materials, for preparation of surfaces for coating, and for all other procedures relative to coating shall be strictly observed. No substitutes or other deviations will be permitted without written permission of the ENGINEER. The CONTRACTOR shall supply the ENGINEER with copies of each manufacturer's instructions in accordance with the requirements of Paragraph 1.7, "SUBMITTALS".
- B. All protective coating materials shall be used within the manufacturer's recommended shelf life.
- C. Storage and mixing of paint or other coating materials shall be performed only in those areas designated by the ENGINEER.

### 3.2 PREPARATION FOR COATING

- A. General: All surfaces to receive protective coatings shall be cleaned as specified herein prior to application of said coatings. The CONTRACTOR shall examine all surfaces to be coated, and shall correct all surface defects before application of any coating material. All marred or abraded spots on shop-primed and on factory-finished surfaces shall receive touch-up restoration prior to any coating application. Do not paint over dirt, rust, scale, oil, grease, moisture, scuffed surfaces or other foreign material or in conditions otherwise detrimental to the formation of a durable paint bond and film.
- B. Protection of Surfaces Not to be Coated: Surfaces which are not to receive protective coatings shall be protected during surface preparation, cleaning, and coating operations. All hardware, lighting fixtures, switch plates, machined surfaces, couplings, shafts, bearings, nameplates on machinery and other surfaces not to be painted shall be removed, masked or otherwise protected. Drop cloths shall be provided to prevent coating materials from falling on or marring adjacent surfaces. The working parts of all mechanical and electrical equipment shall be protected from damage during surface preparation and

coating operations. Openings in motors shall be masked to prevent entry of coating or other materials.

- C. Protection of Adjacent Work and Areas: Care shall be exercised not to damage adjacent work during blast cleaning operations. Spray painting shall be conducted under carefully controlled conditions. The CONTRACTOR shall be fully responsible for and shall promptly repair to the satisfaction of the OWNER any and all damage to adjacent work or adjoining property occurring from blast cleaning or coating operations.
- D. Protection of Painted Surfaces: Cleaning and coating shall be so programmed that dust and other contaminants from the cleaning process will not fall on wet, newly-coated surfaces.

### 3.3 SURFACE PREPARATION STANDARDS

- A. The following referenced surface preparation specifications of the Steel Structures Painting Council shall form a part of this Specification:
  - 1. Solvent Cleaning (SSPC-SP1): The method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants from steel surfaces through the use of solvent, vapor, emulsion, alkaline, and/or steam.
  - 2. Hand Tool Cleaning (SSPC-SP2): The method for removing all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter through the use of non-power hand tools.
  - 3. Power Tool Cleaning (SSPC-SP3): The method for removing all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter through the use of power assisted hand tools.
  - 4. White Metal Blast Cleaning (SSPC-SP5): The method of preparing steel surfaces which, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, and paint.
  - 5. Commercial Blast Cleaning (SSPC-SP6): The method of preparing steel surfaces which, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, and paint. Evenly dispersed very light shadows, streaks, and discolorations caused by stains of rust, mill scale, and previously applied paint may remain on no more than 33-percent of the surface.
  - 6. Brush-off Blast Cleaning (SSPC-SP7): The method of preparing steel surfaces which, when viewed without magnification, shall be free of all

visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface.

7. Near-White Blast Cleaning (SSPC-SP10): The method of preparing steel surfaces which, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, and paint. Evenly dispersed very light shadows, streaks, and discolorations caused by stains of rust, mill scale, and previously applied paint may remain on no more than 5-percent of the surface.

### 3.4 SURFACE PREPARATION

- A. General: Perform preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.
  1. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for the complete painting of the items and adjacent surfaces. Following completion of painting of each space or area, reinstall the removed items by workmen skilled in the trades involved.
  2. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program the cleaning and painting so that contaminants from the cleaning process will not fall onto wet, newly painted surfaces. Remove mildew in accordance with the paint manufacturer's recommendations.

### 3.5 NEW FERROUS METAL SURFACE PREPARATION (UNGALVANIZED)

- A. The minimum abrasive blasting surface preparation shall be as specified in the coating system schedules included at the end of this section. Where there is a conflict between these Specifications and the coating manufacturer's printed recommendations for the intended service, the higher degree of cleaning shall apply.
- B. Workmanship for metal surface preparation shall be in conformance with the current SSPC Standards and this section. Blast cleaned surfaces shall match the standard samples available from the National Association of Corrosion ENGINEERs (NACE) Standard TM-01-70.
- C. All oil, grease, welding fluxes and other surface contaminants shall be removed by alkaline cleaning per SSPC-SP1 prior to blast cleaning.

- D. All sharp edges shall be rounded or chamfered and all burrs, surface defects and weld splatter shall be ground smooth prior to blast cleaning.
- E. The type and size of abrasive shall be selected to produce a surface profile that meets the coating manufacturer's recommendation for the particular coating and service conditions. CONTRACTOR shall submit data and samples for approval on abrasives to be used on the Project. Abrasives that are used shall be designed for the specific purpose of blast cleaning. Abrasives shall be free of contaminants and chlorides. Ordinary builder's sand shall not be considered to be approved abrasive material. ENGINEER will periodically sample abrasives used at the job site for comparison with approved submitted materials.
- F. The abrasive shall not be reused unless otherwise approved by the ENGINEER. For automated shop blasting systems, clean oil and moisture-free abrasives shall be maintained.
- G. The CONTRACTOR shall comply with the applicable federal, state, and local air pollution control regulations for blast cleaning.
- H. Compressed air for air blast cleaning shall be supplied at adequate pressure from well-maintained compressors equipped with oil/moisture separators which remove all contaminants.
- I. Surfaces shall be cleaned of all dust and residual particles of the cleaning operation by dry air blast cleaning, vacuuming or other approved method prior to painting.
- J. Enclosed areas and other areas where dust settling is a problem shall be vacuum cleaned and wiped with a tack cloth.
- K. Damaged or defective coating shall be removed by the specified blast cleaning to meet the clean surface requirements before recoating.
- L. If the specified abrasive blast cleaning will damage adjacent work, the area to be cleaned is less than 100 square feet, and the coated surface will not be submerged in service, the SSPC-SP2, Hand Tool Cleaning, or SSPC-SP3, Power Tool Cleaning, will be permitted.
- M. Shop applied coatings of unknown composition shall be completely removed before the specified coatings are applied. Valves, castings, ductile iron pipe, and fabricated pipe or equipment shall be examined for the presence of shop-applied temporary coatings. Temporary coatings shall be completely removed by Solvent Cleaning per SSPC-SP1 before the abrasive blast cleaning work has been started.

- N. Shop primed equipment shall be alkaline cleaned in the field before finish coats are applied.

### 3.6 FERROUS METAL SURFACE PREPARATION (GALVANIZED)

- A. All installation and erection caused blemishes to galvanized surfaces shall be touched up in accordance with ASTM A780 prior to coating.
- B. Galvanized ferrous metal shall be alkaline cleaned per SSPC-SP1 to remove oil, grease, and other contaminants detrimental to adhesion of the protective coating system to be used.
- C. Surfaces shall be pretreated with Kop-Coat 40 Passivator, one (1) coat 0.4 mil DFT, prior to finish coating, in accordance with the printed recommendations of the coating manufacturer.

### 3.7 SURFACE PREPARATION OF FERROUS SURFACES WITH EXISTING COATINGS, EXCLUDING STEEL TANK OR TREATMENT UNIT INTERIORS (IN ADDITION TO REQUIREMENTS IN PARAGRAPHS 3-05 AND 3-06).

- A. General: All grease, oil, heavy chalk, dirt, or other contaminants shall be removed by solvent or detergent cleaning prior to abrasive blast cleaning. The CONTRACTOR shall determine the generic type of the existing coatings by laboratory testing, at no additional cost to the OWNER.
- B. Abrasive Blast Cleaning: The CONTRACTOR shall provide the degree of cleaning specified in the coating system schedule for the entire surface to be coated. If the degree of cleaning is not specified in the schedule, deteriorated coatings shall be removed by abrasive blast cleaning to SSPC-SP6, Commercial Blast Cleaning. Areas of tightly adhering coatings shall be cleaned to SSPC-SP7, Brush-Off Blast Cleaning, with the remaining thickness of existing coating not to exceed 3 mils.
- C. Incompatible Coatings: If coatings to be applied are not compatible with existing coatings, the CONTRACTOR shall apply intermediate coatings per the paint manufacturer's recommendation for the specified abrasive blast cleaning. A small trial application shall be conducted for compatibility prior to painting large areas.
- D. Unknown Coatings: Coatings of unknown composition shall be completely removed prior to application of new coatings.

### 3.8 SURFACE PREPARATION FOR REPAINTING EXISTING STEEL

- A. The entire structure is to be completely pressure washed at 3,000 to 5,000 psi with potable water.

- B. All areas shall be cleaned/sandblasted to the surface preparation standards as specified herein, or superceded by the bid form.
- C. All cleaned areas are to be primed the same work day that they are cleaned and blasted.

### 3.9 PRESSURE WASH CLEANING FOR REPAINTING EXISTING CONCRETE

- A. The entire structure is to be pressure washed at 3,000 to 5,000 psi with a solution of 50-percent water and bleach to yield a mixture with a minimum concentration of 2-1/2-percent sodium hypochlorite.
- B. The entire structure is to be completely rinsed by pressure washing at 3,000 to 5,000 psi with potable water.

### 3.10 CONCRETE AND CONCRETE BLOCK MASONRY SURFACE PREPARATION

- A. Surface preparation shall not begin until at least 30 days after the concrete has been placed.
- B. All efflorescence, chalk, dust, dirt, oil and grease shall be removed by Detergent Cleaning per SSPC-SP1 before abrasive blast cleaning.
- C. Concrete, concrete block masonry surfaces, previously painted concrete and masonry and deteriorated concrete and masonry surfaces to be coated shall be abrasive blast cleaned to remove laitance, paint, deteriorated concrete, and roughen the entire surface equivalent to the surface of the No. 80 grit flint sandpaper. Concrete shall have a consistent, even texture (void free) and shall be patched where needed.
- D. Determine the alkalinity and moisture content of the surfaces to be painted by performing appropriate tests. If the surfaces are found to be sufficiently alkaline to cause blistering and burning of the finish paint, correct this condition before application of paint. Do not paint over surfaces where the moisture content exceeds that permitted in the manufacturer's printed directions.
- E. If acid etching is required by the coating application instructions, the treatment shall be made after sandblasting. After acid etching, rinse surfaces with clean water to neutralize the acid and test the pH. The pH shall be between 7.0 and 8.0.
- F. Surfaces shall be clean and dry and as recommended by the coating manufacturer before coating is started.

- G. Unless required for proper adhesion, surfaces shall be dry prior to coating. The presence of moisture shall be determined with a moisture detection device such as Delmhors Model DB, or engineer-approved equal.

### 3.11 PLASTIC, FIBERGLASS AND NONFERROUS METALS SURFACE PREPARATION

- A. Plastic and Fiberglass surfaces shall be sanded or Brush Off Blast Cleaned, SSPC-SP7, prior to solvent cleaning with a chemical compatible with the coating system primer. If blast cleaned, use 60-80 mesh abrasive.
- B. Non-ferrous metal surfaces shall be Solvent Cleaned, SSPC-SP1, followed by sanding or Brush Off Blast Cleaning, SSPC-SP7.
- C. All surfaces shall be clean and dry prior to coating application.

### 3.12 WORKMANSHIP

- A. Skilled craftsmen and experienced supervision shall be used on all work.
- B. Clean drop cloths shall be used. All damage to surfaces resulting from the work hereunder shall be leaned, repaired, and refinished to the complete satisfaction of the ENGINEER, at no cost to the OWNER.
- C. All coatings shall be applied under dry and dust-free conditions. Coating shall be done in a workmanlike manner so as to produce an even film of uniform thickness. Edges, corners, crevices, and joints shall receive special attention to insure that they have been thoroughly cleaned and that they receive an adequate thickness of coating material. The finished surfaces shall be free from runs, drops, ridges, waves, laps, alligating, brush marks, and variations in color, texture, and finish. The hiding shall be so complete that the addition of another coat would not increase the hiding. Special attention shall be given to insure that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas, and installations shall be protected by the use of drop cloths or other approved precautionary measures.

### 3.13 SHOP COATING REQUIREMENTS

- A. All items of equipment, or parts of equipment which are not submerged in service, shall be shop primed and then finish coated in the field after installation with the specified or approved color. The methods, materials, application, equipment and all other details of shop painting shall comply with these Specifications. If the shop primer requires top- coating within a specified period of time, the equipment shall be finish coated in the shop and then touch-up painted after installation.



- B. All items of equipment, or parts and surfaces of equipment which are submerged when in service, with the exception of pumps and valves shall have all surface preparation and coating work performed in the field.
- C. The interior surfaces of steel water reservoirs shall have all surface preparation and coating work performed in the field.
- D. For certain pieces of equipment it may be undesirable or impractical to apply finish coatings in the field. Such equipment may include engine generator sets, equipment such as electrical control panels, switch-gear or main control boards, submerged parts of the pumps, ferrous metal passages in valves, or other items where it is not possible to obtain the specified quality in the field. Such equipment shall be shop primed and finish coated in the field with the identical material after installation. The CONTRACTOR shall require the manufacturer of each such piece of equipment to certify as part of its shop drawings that the surface preparation is in accordance with these Specifications. The coating material data sheet shall be submitted with the shop drawings for the equipment.
- E. For certain small pieces of equipment the manufacturer may have a standard coating system which is suitable for the intended service conditions. In such cases, the final determination of suitability will be made during review of the shop drawing submittals. Equipment of this type generally includes only indoor equipment such as instruments, small compressors, and chemical metering pumps.
- F. Shop painted surfaces shall be protected during shipment and handling by suitable provisions including padding, blocking, and the use of canvas or nylon slings. Primed surfaces shall not be exposed to the weather for more than 6 months before finish coating, or less time if recommended by the coating manufacturer.
- G. Damage to shop-applied coatings shall be repaired in accordance with this section and the coating manufacturer's printed instructions prior to finish painting.
- H. The CONTRACTOR shall make certain that the shop primers and field topcoats are compatible and meet the requirements of this section. Copies of applicable coating manufacturer's data sheets shall be submitted with equipment shop drawings.

### 3.14 APPLICATION OF COATINGS

- A. The application of protective coatings to steel substrates shall be in accordance with "Paint Application Specification No. 1", (SSPC-A-1), Steel Structures Painting Council.

- B. Cleaned surfaces and all coats shall be inspected prior to each succeeding coat. The CONTRACTOR shall schedule such inspection with the ENGINEER in advance.
- C. Blast cleaned ferrous metal surfaces shall be painted before any rusting or other deterioration of the surface occurs. Blast cleaning shall be limited to only those surfaces that can be painted in the same working day.
- D. Coatings shall be prepared, mixed and applied in accordance with the manufacturer's instructions and recommendations, and these Specifications. If directions differ, the most stringent requirements shall be followed.
- E. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.
- F. Stir materials before application to produce a mixture of uniform density, and stir as required during the application of the materials. Do not stir surface film into the coating materials. Remove the film, and if necessary, strain the material before using.
- G. Special attention shall be given to edges, angles, weld seams, flanges, nuts and bolts, and other places where insufficient film thicknesses are likely to be present. Use stripe (brushed or gloved) painting for these areas.
- H. Finish coats, including touch-up and damage repair coats shall be applied in a manner which will present a uniform texture and color matched appearance.
- I. Job Conditions: The following job conditions will be strictly enforced during the application of coatings for the project.
  - 1. Apply water-base coatings only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 degrees F and 90 degrees F unless otherwise permitted by the paint manufacturer's printed instructions.
  - 2. Apply solvent-thinned coatings only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45 degrees F and 95 degrees F unless otherwise permitted by the paint manufacturer's printed instructions.
  - 3. Do not apply paint in dust or smoke laden atmosphere, high winds, rain, fog or mist; or when the relative humidity exceeds 85%; or to damp or wet

surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.

4. Do not apply coatings when the temperature is less than 5 degrees F above the dewpoint. Dewpoint shall be determined by use of a sling psychrometer in conjunction with U.S. Weather Bureau psychometric tables.
  5. Do not apply coatings when the outside air temperature is expected to drop below 45 degrees F or less than 5 degrees F above the dewpoint, within 8 hours after application of the coating.
  6. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.
- J. The finish coat on all work shall be applied after all concrete, masonry, and equipment installation is complete and the work areas are clean and dust-free.
- K. General Considerations:
1. Apply paint as specified and in accordance with the manufacturer's directions. Use brushes for applying first coat on wood and on metals other than steel and sheetmetal and items fabricated from steel and sheetmetal. For other coats on wood, metal and other substrates, use applicators and techniques best suited for the type of material being applied.
  2. Apply additional coats when undercoats, stains or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. Insure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
  3. Paint surfaces behind movable equipment the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment with prime coat only before final installation of equipment.
  4. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
  5. Paint the back sides of removable or hinged covers to match the exposed surfaces.
  6. Finish exterior doors on tops, bottoms and side edges the same as the exterior faces, unless otherwise indicated or specified.

7. Sand lightly between each succeeding enamel coat.
  8. Omit the field prime coat on shop-primed surfaces and touch up painted metal surfaces which are not to be finished painted and which will not be exposed to view in the completed work. Do not omit primer on metal surfaces specified to be finish coated or on metal surfaces that will be exposed to view in the completed work.
- A. Scheduled Painting:
1. Apply the first coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
  2. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
- B. Minimum Coating Thickness: Apply each material at not less than the manufacturer's recommended spreading rate, to establish a total dry film thickness as specified or, if not specified, as recommended by coating manufacturer.
- C. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to those items exposed in mechanical equipment rooms and in occupied spaces, and on the outside or exterior of buildings or structures:
1. Mechanical items to be painted include, but are not limited to, the following:
    - a. Piping, valves, pipe hangers, and supports.
    - b. Pumps
    - c. Tanks
    - d. Duct work, insulation
    - e. Motors, mechanical equipment, and supports
    - f. Accessory items
  2. Electrical items to be painted include, but are not limited to, the following:
    - a. Conduit and fittings
    - b. Switchgear

- D. Prime Coats: Apply a prime coat to material, equipment and surfaces which are required to be painted or finished, and which have not been prime coated by others.

Clean and prime unprimed ferrous metals as soon as possible after delivery of the metals to the job site. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

- E. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks, or other surfaces imperfections.
- F. Pigmented, Opaque Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.
- G. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

### 3.15 CURING OF COATINGS

- A. The CONTRACTOR shall provide curing conditions in accordance with the conditions recommended by the coating material manufacturer or by these Specifications, whichever is the more stringent requirement, prior to placing the completed coating system into service.
- B. Forced Air Ventilation of Steel Reservoirs and Enclosed Hydraulic Structures: Forced air ventilation is required for the application and curing of coatings on the interior surfaces of steel reservoirs and enclosed hydraulic structures. During curing periods, continuously exhaust air from a manhole in the lowest shell ring or in the case of an enclosed hydraulic structure, from the lowest level of the structure using portable ducting. After all interior coating operations have been completed, provide a final curing period for a minimum of 10 days, during which time the forced air ventilation system shall operate continuously. For additional requirements, refer to the specific written instructions of the manufacturer for the coating system being applied.

### 3.16 COLOR CODING

- A. All exposed piping shall be color coded. After the finish coat has been applied, label each line with stenciled legends identifying the nature of the pipe contents and the direction of flow. This stenciled identification shall appear in one or more places in the line as deemed necessary by the ENGINEER. Stencil legends shall be white for all pipe except white color coded pipe, which shall have black

legends. Labels shall occur a minimum of every 15 feet of straight piping and at all bends. Minimum stencil size shall be two-inch letters for 4-inch and larger diameter piping and one-inch letters for 2-inch to 3-1/2-inch diameter piping. Piping 1-1/2-inch diameter and smaller shall be identified using plastic wrap-around pipe markers.

- B. Items to be coded but not specifically mentioned shall be coated in a color selected by the ENGINEER or OWNER.
- C. All paints/coatings used in potable water contact areas must have AWWA and EPA classification and approvals.
- D. All requirements of the Occupational Safety and Health Act (OSHA) concerning color coding and safety markings shall be considered part of these Specifications unless specifically excluded.
- E. Any paint/coating requirements/specifications not specifically addressed in the foregoing shall be decided upon as required by the ENGINEER.
- F. Every valve or connection, where it may be possible for a worker to be exposed to a hazardous substance, shall be labeled per General Industry Safety Orders, Article 112, OSHA Occupational Safety and Health Standards 29CFR1910.
- G. Color Code Chart

APPLICATION	COLOR
Dangerous machine parts, equipment and guards	Orange - Kop-Coat OSHA Safety Orange #J498
<u>Water Lines/Piping</u>	
Finished or Potable Reuse Water	Dark Blue - Kop-Coat OSHA Safety Blue A#183 Pantone Purple 522C - Kop-Coat OSHA Safety
<u>Chemical Lines/Piping</u>	
Chlorine (Solution)	Red w/Yellow Band - Kop-Coat OSHA Safety Red #0508 with 6-inch bands of Kop-Coat OSHA Safety Yellow #S625
<u>Other Lines/Piping</u>	
Pumps, Equipment and Motors	Grey – Kop-Coat Light Grey #0746

3.17 COATING SYSTEM SCHEDULES

A. COATING SYSTEM SCHEDULE, FERROUS METAL - NOT GALVANIZED (FM):

<u>Schedule No.</u>	<u>Item</u>	<u>Surface Prep.</u>	<u>System No.</u>
FM-1	All exposed surfaces outdoors, exposed to normal industrial exposure	Commercial Blast Cleaning, SSPC-SP6	Urethane #9
FM-2	All exposed surfaces indoors and outdoors, exposed to moderate and severe industrial exposure	Commercial Blast Cleaning, SSPC-SP6	(2b) Urethane #9
FM-3	Surfaces submerged or intermittently submerged in wastewater, including all surfaces lower than 2' above high water level and all surfaces inside enclosed hydraulic structures, tanks and treatment units and all surfaces of valves, couplings and pumps	Near White Metal Blast Cleaning, SSPCSP10	(6) Coal Tar Epoxy or (3) High Build Epoxy (if color desired)
FM-4	Buried surfaces that are not specified to be coated elsewhere	Near White Metal Blast Cleaning, SSPCSP10	(6) Coal Tar Epoxy
FM-5	Indoor architectural sheet metal, flashings, door frames, and exposed ducts	Commercial Blast Cleaning, SSPC-SP6	(1) Alkyd Enamel

B. COATING SYSTEM SCHEDULE - CONCRETE AND CONCRETE BLOCK MASONRY (C):

<u>Schedule No.</u>	<u>Item</u>	<u>Surface Prep.</u>	<u>System No.</u>
C-1	Exposed, indoors and outdoors	Per Paragraph 3-09	(5b) Acrylic-Concrete Repainting
C-2	Submerged in wastewater	Per Paragraph 3-10	(7) Coal Tar Epoxy Concrete
C-3	Interior surfaces of sewer manholes, including sidewalls, bottom, and metal appurtenances	Per Paragraph 3-10	See Specification 09950
C-4	Exterior walls, exposed to chemical splash, washdown etc.	Per Paragraph 3-10	(8) High Build Epoxy

### 3.18 CLEAN-UP AND PROTECTION

- A. Clean Up: During the progress of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day. Upon completion of painting work, clean window glass and other paint-spattered surfaces located on site and off site. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- B. Protection: Protect work of other trades located on site and off site, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting.
  - 1. Provide "Wet Paint" signs, as required, to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.
  - 2. At the completion of work of other trades, touch up and restore all damaged or defaced painted surfaces.

### 3.19 APPEARANCE AND INSPECTION

- A. All painting shall be accomplished in a workmanlike manner and shall be free of unsightly sags, runs, bubbles, drips, waves, laps, alligatoring, unnecessary brush marks and overspray or other physical defects and shall be uniform in color.
- B. The CONTRACTOR shall provide all rigging, scaffolding and other equipment necessary for a satisfactory inspection of a complete paint system and acceptance by the ENGINEER/OWNER.
- C. Inspection shall be conducted by an inspector selected by the ENGINEER/OWNER in the presence of the OWNER's representative and the CONTRACTOR or his representative. Provisions for calibrated and functional test equipment is the responsibility of the CONTRACTOR.
- D. The paint film shall be free of pinholes and holidays as determined by the use of an approved holiday detector as defined in Paragraph 1-09 of this Section.
- E. The paint film shall be randomly checked for dry film thickness as stipulated in the "Coating System" sections of these specifications. Thicknesses shall be checked with a properly calibrated and approved magnetic gauge as defined in Paragraph 1-09 of this Section.



### 3.20 REPAIR OF DEFECTS IN PAINT

- A. Any defects discovered during inspection, such as low film millage, holidays or pinholes, shall be repaired with the same materials as used for the original finish coat(s). Excessive low millage could require extra full coat(s) of paint.
- B. A final inspection will be conducted by the ENGINEER/OWNER or his representative after any necessary repairs and prior to final acceptance of the job.

END OF SECTION

## SECTION 09905

### PIPING, VALVE, AND EQUIPMENT IDENTIFICATION SYSTEM

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Scope of Work: The work included under this Section consists of providing an identification system for piping systems and related equipment.
- B. Related Work Described Elsewhere:
  - 1. Shop Drawings, Working Drawings, and Samples: Section 01340.
  - 2. Painting: Section 09900
  - 3. Equipment: Division 11
  - 4. Mechanical: Division 15.

##### 1.2 QUALITY ASSURANCE

- A. Standards: ANSI Standard A13.1, Scheme for the Identification of Piping Systems.

##### 1.3 SUBMITTALS

- A. Submit manufacturer's descriptive literature, illustrations, specifications, and other pertinent data in accordance with Section 01340.
- B. Schedules:
  - 1. Provide a typewritten list of all tagged valves giving tag color, shape, letter code and number, the valve size, type, use, and general location.
  - 2. Provide a complete list of materials to be furnished and surfaces on which they will be used.
- C. Samples:
  - 1. Provide a sample of each type valve tag supplied.
  - 2. Provide a sample of each type of identification tape supplied.
  - 3. Provide manufacturer's color charts for color selection by ENGINEER.

#### 1.4 PRODUCTS DELIVERY, STORAGE, AND HANDLING

- A. Delivery Of Materials: Except for locally mixed custom colors, deliver sealed containers with labels legible and intact.
- B. Storage Of Materials:
  - 1. Store only acceptable project materials on project site.
  - 2. Store in suitable location.
  - 3. Restrict storage to paint materials and related equipment.
  - 4. Comply with health and fire regulations.

#### 1.5 JOB CONDITIONS

- A. Environmental Requirements:
  - 1. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied.
  - 2. Do not apply finish in areas where dust is being generated.
- B. Protection: Cover or otherwise protect finished work of other trades and surfaces not to be painted.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Materials for painting shall conform to requirements of Section 09900: Painting and Coating.
- B. Materials selected for coating systems for each type surface shall be the product of a single manufacturer.
- C. Aboveground piping shall be identified by self-adhesive pipe markers equal to those manufactured by W. H. Brady Company.
  - 1. Markers shall be of wording and color as shown in Table 09905.
  - 2. Lettering shall be:
    - a) 2 1/4-inches high for pipes 3 inches diameter and larger.
    - b) 1 1/8-inches high for pipes less than 3 inches diameter.

3. Flow arrows shall be:
  - a) 2 1/4-inches by 6 inches for pipes 3 inches diameter and larger.
  - b) 1 1/8-inches by 3 inches for pipes less than 3 inches diameter.

## 2.2 IDENTIFICATION SYSTEMS FOR BURIED PIPE

### A. DESCRIPTION

1. Furnish and install identification systems for reclaimed water mains as shown on the Drawings and specified herein.

### B. IDENTIFICATION TAPE FOR BURIED PIPE

1. Identification tape shall be manufactured of inert polyethylene and be resistant to alkalis, acids and other destructive agents found in soil. Minimum thickness of tape shall be 4 mils. Tape width shall be minimum 6 inches and shall be imprinted with black letters. Imprint shall be repeated a minimum of once every 2 feet for the entire length of tape.
2. Tape background colors and imprints shall be as follows:

SERVICE TYPE	IMPRINT	BACKGROUND COLOR
Potable Water	"Caution - Potable Water Line Buried Below"	Blue
Wastewater/Drain	"Caution – Wastewater Line Buried Below"	Green
Reclaimed Water	"Caution – Reclaimed Water Line Buried Below"	Purple
Sanitary Sewer	"Caution – Sanitary Sewer Water Line Buried Below"	Green

3. Identification tape shall be "Terra Tape" as manufactured by Reef Industries, Inc., Houston, Texas, (800) 231-6074, Allen Systems Inc., Wheaton, IL (800) 323-1749, or approved equal.

### C. DETECTING WIRE AND MARKER POSTS

1. Shall be as detailed on the Contract Drawings.
2. Where feasible, combine detecting wire termination point with marker post such as the rigid "Tri View Test Station", manufactured by Repnet of Bloomington, MN, (800) 522-4343, or approved equal.

3. Color for marker posts identification decals shall be blue for potable water and made of Schedule 80 PVC.
- D. Aboveground Valve Identifications: A coded and numbered tag attached with brass chain and/or brass "S" hooks shall be provided on all valves.
1. Tag Types: Tags for valves on pipe shall be brass or anodized aluminum. Colors for aluminum tags shall, where possible, match the color code of the pipe line on which it is installed. Square tags shall be used to indicate normally closed valves and round tags shall indicate normally open valves.
  2. Coding: In addition to the color coding, each tag shall be stamped or engraved with wording or abbreviations to indicate the valve service and number. All color and letter coding shall be approved by the ENGINEER. Valve service shall either be as listed in Table 09905, or by equipment abbreviation if associated with a particular piece of equipment. Valve numbering, if required, shall be as approved by the ENGINEER and/or Owner.

## PART 3 - EXECUTION

### 3.1 COLOR CODING FOR PIPES AND EQUIPMENT

- A. Piping color codes, and code labels for pipe identification shall conform to Table 09905.
- B. General Notes and Guidelines:
1. Pipelines, equipment, or other items which are not listed here shall be assigned a color by the Owner and shall be treated as an integral part of the Contract.
  2. Color coding shall consist of color code painting and identification of all exposed conduits, through lines and pipelines for the transport of gases, liquids, or semi-liquids including all accessories such as valves, insulated pipe coverings, fittings, junction boxes, bus bars, connectors and any operating accessories which are integral to a whole functional mechanical pipe and electrical conduit system.
  3. All moving parts, drive assemblies, and covers for moving parts which are potential hazards shall be Safety Orange.
  4. All safety equipment shall be painted in accordance with OSHA Standards.

5. All inline equipment and appurtenances not assigned another color shall be painted the same base color as the piping. The pipe system shall be painted with the pipe color up to, but not including, the flanges attached to pumps and mechanical equipment assigned another color.
  6. All pipe hangers and pipe supports shall be painted, unless specified otherwise due to material of construction.
- C. All pipe hangers, pipe supports, and accessories shall be painted to match their piping. The system shall be painted up to, but not including, the face of flanges or the flexible conduit connected to electrical equipment. Structural members used solely for pipe hangers or supports shall be painted to match their piping. Where the contact of dissimilar metals may cause electrolysis and where aluminum will contact concrete, mortar or plaster, the contact surface of the metals shall be coated in accordance with Section 09900.
- D. All systems which are an integral part of the equipment, that is originating from the equipment and returning to the same piece of equipment, shall be painted between and up to, but not including, the face of flanges or connections on the equipment.
- E. All insulated surfaces, unless otherwise specified, shall be given one (1) coat of sizing, one (1) prime coat, and one (1) finish coat.
- F. System code lettering and arrows shall conform to the requirements of ANSI A 13.1 marked on piping as follows:

1. Legends shall be of the following color for the respective pipe color:

<u>Key to Classification of Predominant Colors For Piping</u>	<u>Color of Letters, if not Otherwise Specified</u>
---	---

(F) Fire Protection: Red	White
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(D) Dangerous: Yellow	Black
Orange	Black

<u>Key to Classification of Predominant Colors For Piping</u>	<u>Color of Letters, if not Otherwise Specified</u>
---	---

(S) Safe: Green	Black
White	Black
Black	White
Light Grey	Black
Dark Grey	White
Aluminum	Black

(P) Protective: Blue	White
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2. All piping containing or transporting corrosive or hazardous chemicals shall be identified with labels every 10 feet and with at least two (2) labels in each room. Otherwise, markers shall be placed no more than 20 feet apart with at least one (1) marker on every straight run and additional markers at turns and where pipes pass through walls.
3. An arrow indicating direction of flow shall be placed adjacent to each marker.

### 3.2 FABRICATED EQUIPMENT

- A. Unless otherwise indicated or specifically approved, all fabricated equipment shall be shop primed and finished. See Section 09900 – Painting and Coating.
- B. The Contractor shall be responsible for and take whatever steps are necessary to properly protect the shop prime and finish coats against damage.
- C. Where specified in other Sections of these Specifications for mechanical equipment, the Contractor shall apply field coats of paint in accordance with Section 09900. If the shop finish coating is unsatisfactory due to poor adhesion or other problems with primer or finish coats, coatings shall be removed and replaced by sandblasting, priming and finishing in accordance with Section 09900 and this Section.
- D. Wherever fabricated equipment is required to be sandblasted, the Contractor shall protect all motors, drives, bearings, gears, etc., from the entry of grit. Any equipment found to contain grit shall be promptly and thoroughly cleaned. Equipment contaminated by grit in critical areas, such as bearings, gears, seals, etc., shall be replaced at no cost to the Owner.

### 3.3 INSTALLATION OF IDENTIFICATION TAPE

- A. Identification tape shall be installed for all buried pipelines and conduits in accordance with the manufacturer's installation instructions and as specified herein.
- B. Identification tape for piping shall be installed at two (2) locations:
  1. One (1) foot below finished grade along centerline of pipe, and;
  2. Directly on top of the pipe.

### 3.04 INSTALLATION OF DETECTING WIRE

- A. Attach to the pipe at the 12 o'clock position.

- B. The detecting wire shall be held in place with nylon cable ties at each end and at the midpoint of the pipe. The cable ties shall be Ty-Rap as manufactured by T and B Electrical Company or approved equal.
- C. The wire shall be capable of being extended 12 inches above the surface at air release valves and valve boxes so that a current can be induced through the wire to detect the location of the pipe.
- D. The wires shall be brought to the surface at each valve box using the Test Station Box for buried valves to protect the wire.

TABLE 09905  
PAINT COLOR CODE SCHEDULE  
(COLOR SHALL MATCH EXISTING, WHERE APPLICABLE)

Equipment and Materials	Paint Color	Code Label
Reclaimed Water Main	Purple	RW
Electrical Conduit (above 220 volts)	Black w/Yellow Bands	EC
Pipe Supports	Match Piping	N/A
Key to Classification of Predominant Colors for Piping	Color	Color of Letters for Stenciling
(F) Fire Protection	Red	White
(D) Dangers	Yellow Orange	Black Black
(S) Safe	Green White Black Light Gray Dark Gray Aluminum	Black Black White Black White Black
(P) Protective	Blue	White

Width of color bands and letter size shall conform to the following schedule:

Outside Diameter of Pipe or Covering (Inches)	Size of Legend Letters (Inches)	Width of Color Band (Inches)
3/4 to 1 1/4	1/2	8
1 1/2 to 2	3/4	8
3 1/2 to 6	1 1/4	12
8 to 10	2 1/2	24
Over 10	3 1/2	32

END OF SECTION



**DIVISION 10**

**(Not Used)**

**DIVISION 11**

**EQUIPMENT**

## SECTION 11208

### SUBMERSIBLE RECLAIMED WATER PUMPS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes: Requirements for furnishing and installing all labor, material, equipment and incidentals required and install, place in operation, and field test submersible pumps and related equipment as generally described below:
  - 1. Install three (3) submersible pumps at Pine Island's WWTP Effluent Pump Station.
- B. Related Work Specified in Other Sections Includes:
  - 2. Section 09900 - Painting

##### 1.2 REFERENCES

- A. Codes and standards referred to in this section are:
  - 1. ASTM A 48 - Specification for Grey Iron Castings
  - 2. Hydraulic Institute Standards
  - 3. IEEE 82 - Test Procedure for Impulse Voltage Tests on Insulated Conductors
  - 4. NEC - National Electric Code
  - 5. AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings
  - 6. AFBMA 10 - Specifications for Metal Balls

##### 1.3 SYSTEM DESCRIPTION

- A. General: Provide pumps of the total submersible non-clog, centrifugal type, each driven by submersible closed coupled motors mounted as an integral part of the pump. Design the pumping units to pump treated wastewater effluent. Arrange the pumping equipment guide rails and base elbow for installation in the spaces shown without appreciable revision of the piping or structure. Design the pumping units for continuous and intermittent duty with ten starts per hour per pump.
- B. Operating Conditions: Provide pumps to operate at the capacities and heads and over the range of operating conditions specified without overloading,

cavitation, and vibration. Furnish the pumps in accordance with the following requirements:

<u>Items</u>	<u>Requirements</u>		
	<u>Pump 1</u>	<u>Pump 2</u>	<u>Pump 3</u>
Impeller diameter (inches)	<u>4-15/16</u>	<u>4-15/16</u>	<u>4-15/16</u>
Voltage (V)	<u>460</u>	<u>460</u>	<u>460</u>
Phase	<u>3</u>	<u>3</u>	<u>3</u>
Design capacity (gpm)	<u>260</u>	<u>260</u>	<u>260</u>
Design head (feet)	<u>33</u>	<u>33</u>	<u>33</u>
Pump discharge diameter, minimum (inches)	<u>4</u>	<u>4</u>	<u>4</u>
Pump speed, maximum (rpm)	<u>3490</u>	<u>3490</u>	<u>3490</u>
Wet well floor elevation (feet)	<u>-6.34</u>	<u>-6.34</u>	<u>-6.34</u>
Horsepower (HP)	<u>6.5</u>	<u>6.5</u>	<u>6.5</u>

- C. Pump Curve: Design each pump to have a continuously rising characteristic curve from the rating point to shutoff which passes through the rating point, and which meets or exceeds the specified heads and capacities, all within the Hydraulic Institute tolerances.
- D. Provide submersible units capable of sustaining full reverse runaway speed without damage.

#### 1.4 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Shop Drawings: Submit working drawings, including arrangement and erection drawings of the equipment and equipment operating characteristics. Include the following:
  - 1. Pump performance curves. Draw the curves for the specified conditions including those at reduced speed. Plot head, input kilowatts, and overall efficiency, as a function of capacity from zero to maximum capacity.

2. General arrangement drawing of pumping unit, base elbow and guide rail system. Include equipment weight and anchor methods and materials.
  3. Cross section drawing of pumping unit.
  4. Parts list with materials of construction identified.
  5. Motor performance characteristics.
  6. Spare parts list.
  7. Painting procedure.
- C. Quality Control Submittals: Submit 6 certified copies of the Shop Test results.
- D. Operation and Maintenance: Submit the Operation and Maintenance manuals for the pumping equipment.

#### 1.5 PUMP WARRANTY

- A. The pump manufacturer shall warrant the pumps being supplied against defects in workmanship and materials for a period of five (5) years under normal use, operation and service. In addition, the manufacturer shall replace certain parts which shall become defective through normal use and wear on a progressive schedule of cost for a period of five (5) years; parts included are the seal, impeller, pump housing, wear ring, and bearings. The warranty shall be in published form and apply to all similar units.

#### 1.6 QUALITY ASSURANCE

- A. Qualifications: Provide pumping equipment produced by a manufacturer who regularly engages in the design, manufacture, assembly and production of submersible sewage pumping equipment of the size and type as specified for not less than five years.
- B. Regulatory Requirements: Rate the motor unit, and wet well wiring for service in hazardous Class 1, Division 1 locations.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all products and materials as specified in Division 1.

#### 1.8 PARTS

- A. Special Tools: Furnish a complete set of special wrenches, spanners, eyebolts and other special tools sufficient to completely dismantle and reassemble each kind and size of pumping unit. Provide tools of forged steel, case hardened, and full finished. Furnish the sets with a metal tool case with a handle and provision for padlocking.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below.

1. Flygt Corporation
2. ABS Pumps, Inc.

### 2.2 GENERAL CONSTRUCTION

- A. Materials: Provide stainless steel fasteners, bolts, nuts and washers where exposed to the pumped liquid.
- B. Component Joints: Provide machined metal-to-metal joints on component parts that are assembled together. Fit with an "O"ring seal where watertight joints are required. Arrange the "O"ring seal for automatic compression and sealing without adjustment or bolt torquing procedures. Do not use flat gaskets or sealing compounds to obtain watertight joints. Furnish machined rabbet fits on component joints as required to provide automatic alignment of rotating parts.

### 2.3 CASING

- A. General: Provide pump casing of the centrifugal single volute, centerline discharge type. Do not use diffusion vanes.
- B. Materials: Construct pump casing of ASTM A48, Class 30B or 35B cast iron.
- C. Wear Ring: Construct renewable wear rings of stainless steel.

### 2.4 IMPELLER

- A. General: Design impeller of the enclosed non-clog type. Provide pump-out vanes or a back ring, arranged with minimum clearances so as to preclude solids and stringy material from damaging the mechanical seal, on the back of the impeller.
- B. Materials: Construct the impeller of cast iron ASTM A48, Class 30B or 35B.

- C. Balance: Dynamically balance the impellers.
- D. Wear Ring: Construct renewable impeller wear ring of brass.
- E. Assembly: Secure the impeller to the shaft with a stainless steel key and lock nut in such a way that it cannot unscrew or become loosened due to rotation in either direction.

## 2.5 OIL CHAMBER

- A. General: Provide an oil chamber to function as a buffer between the pumped liquid in the casing and the motor. Arrange the oil chamber to accommodate thermal expansion of the oil. Furnish an oil chamber drain plug that is accessible from outside the pump unit and permits changing oil without dismantling pump components.
- B. Materials: Construct the oil chamber of ASTM A48 cast iron, Class 30B or 35B.

## 2.6 MECHANICAL SEAL

- A. Design: Provide each pump with double tandem mechanical seals. Design the upper seal unit, between the oil chamber and motor housing, with one stationary tungstencarbide ring and one positively driven rotating carbon ring. Design the lower seal unit, between the pump casing and oil chamber, with one stationary ring and one positively driven rotating ring. Furnish these rings made of tungsten-carbide. Use type 316 stainless steel for metal parts. Protect the spring element of the lower seal from solids contained in the pumped liquid. Do not rely upon the pumped liquid for lubrication. No seal damage is to result from operating the pumping unit out of its liquid environment. Conventional double mechanical seals with a single or double constant differential pressure to effect sealing and subject to opening and penetration by pumping forces will not be acceptable.

## 2.7 MOTOR

- A. General: Provide submersible pump motor of 460-volt, 3-phase, 60-hertz as specified in Section 16155.
- B. Ratings: Design the motor to have suitable output torque and speed characteristic to start and operate the pump over the range of specified conditions. For constant speed pumping units do not exceed the nameplate horsepower rating under maximum load conditions. Base the nameplate horsepower rating on an 80 degrees C temperature rise above an ambient

temperature of 40 degrees C. Design the motor for continuous load operation and continuous on-off cycling of ten starts per hour minimum without exceeding the 80 degree C temperature rise.

- C. Insulation: Provide the motor with a minimum of NEMA Class F (155 degrees C) moisture resistant insulation. Construct stator coils with NEMA Class F insulated winding wire. Apply impregnation resin to stator assembly in three dip and bake steps.
- D. Stator Housing: Provide the motor with an ASTM A48, Class 30B or 35B cast iron stator housing. For motors that employ cooling water jackets, design the water jacket passages to preclude clogging by solids contained in the pumped liquid.
- E. Cables: Provide the motor cable entry with a mechanical locking ring or compression type cord grip to protect the cable jacket from being pulled out of the motor. Do not use epoxy for this purpose. Arrange the cable entry so as to provide a watertight seal with a terminal board and terminations next to the motor. Isolate the cable entry leads from the internal motor leads to prevent entry of water into the motor chamber by leakage or wicking. Provide cables suitable for submersible pump application and conforming to NEC specifications for cable sizing. Provide permanent label on cables.
- F. Shaft
  - 1. Design: Provide a one piece, fully machined pump and motor shaft. Design the shaft to limit shaft deflection under maximum pumping load to .002 inches at the lower mechanical seal face and to obtain a rotating assembly first critical speed of not less than 150 percent of the rated speed.
  - 2. Material: Provide shafts of either carbon steel or stainless steel. Protect carbon steel shafts from exposure to the pumped liquid by employing a stainless steel sleeve or chrome plating.
- G. Bearings
  - 1. Design: Provide two anti-friction bearing assemblies. Design one assembly to carry only radial loads and to be free to float axially within the frame. Design the other assembly to carry both radial and axial loads and to be restrained from axial movement.
  - 2. Bearing Life: Select bearings in accordance with AFBMA 9 and AFBMA 10, Load Ratings and Fatigue Life for Ball and Roller Bearings, to have



a 20,000 hours minimum  $L_{10}$  bearing life at maximum pumping load that occurs under the specified operating conditions.

## 2.8 PROTECTION MONITORING SYSTEM

- A. General: Provide each pumping unit with a monitoring system to protect critical machine functions during operation.
- B. Motor Winding Temperature: Provide three thermostats, one per phase, to protect against overheating. Initiate an alarm and motor shutdown on high temperature.
- C. Sensor Monitoring Device: Provide a monitoring device or devices designed to be compatible with the sensors and motor controls. Locate monitoring devices in control panel.

## 2.9 GUIDE RAIL SYSTEM AND BASE ELBOW

- A. Design: Provide each pump with a base elbow and guide rail system. Design the guide rail system to permit installation and removal of the pump from its base elbow discharge connection without requiring personnel to enter the wet well.
- B. Guide Rail System: Provide a guide bracket which is an integral part of the pump casing and permits sliding the pumping unit, along two unthreaded 316 stainless steel guide rails. Provide the guide rails of 316 stainless steel pipe connected to the base elbow at the bottom. Support the guide rails at intermediate locations and at the top with stainless steel brackets bolted to the wall of the wet well or concrete slab. Fit each pump with a 316 stainless steel cable of adequate length and strength to permit the raising and lowering of the pump for inspection and removal.
- C. Base Elbow: Provide a ductile iron base elbow arranged for automatic pump connection. Provide the pump casing with a machined discharge flange which, when the pump is lowered into the pumping position, will automatically align and mate with the plain-end of the base elbow. Design the discharge connection such that no motion other than vertical is required to seat the mating flange of the casing to the base elbow. Accomplish sealing of the pump connection by metal to metal contact or by a positive resilient seal of Buna-N attached to the pump casing discharge flange. Design the base elbow to support the weight of the pumping unit and prevent it from bearing directly on the wet well floor.
- D. Mounting Accessories: Provide anchor bolts, nuts, washers, and accessories and other adapter equipment necessary for mounting the pumping equipment and appurtenances. Construct anchor bolts, nuts, washers, accessories and adaptor equipment of 316 stainless steel. Provide 3/8-inch minimum 316

stainless steel chain a minimum of 20 inches long attached to a minimum ¼-inch minimum 316 stainless steel wire rope which is to be hung on a 316 stainless steel rack at the top of the wet well.

## 2.10 OPERATION AND CONTROL

- A. Each pumping station control system shall include a liquid level controller which shall sense the water level in the wet well and provide appropriate signals to the logic circuits to produce the required mode of operation for the pumping facilities. The standard level controls shall be five (5) non-mercury Rotofloats as manufactured by Anchor Scientific Inc. Long Lake, MN, or approved equal.
- B. Any alternative levels sensing and control system must be approved by LCU. The bubbler type liquid level control system and any alternative levels sensing and control system shall include a high and a low level floats as a back-up system. Capability shall be provided for manual start-stop control for all pumping units as well as the normal automatic control from the liquid level sensing and logic circuits. An automatic alternator shall change the starting sequence on each pump cycle. A high water level, non-loathing alarm system shall be provided. Each water pump shall be provided with an elapsed time meter to indicate pump running time. The submersible station controls shall be housed within an exterior panel, pole-mounted or free-standing enclosure. The panel will be of NEMA 4X, stainless steel, weather-tight construction with double dead front outer doors fitted with hoop and padlock master keyed to County standard. Each panel shall be equipped with a service lock out switch to lock out alarm signals to the Telemetry System.
- C. The requirement for variable speed pump controls shall receive prior review with the County. Should such system be directed, the facility shall be equal to existing LCU variable speed control units, or as approved by LCU.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install all equipment in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1. Complete all wiring and piping and make all necessary adjustments to equipment to provide a complete operational pumping installation.

### 3.2 FIELD QUALITY CONTROL

- A. **Manufacturer's Field Services:** Furnish the services of a qualified representative of the manufacturer to provide instruction on proper installation of the equipment, inspect the completed installation, make any necessary adjustments, participate in the startup of the equipment, participate in the field testing of the equipment and place the equipment in trouble-free operation, as specified in Division 1.
  
- B. **Tests:** After installation of the pumping units, control equipment and all appurtenances, subject each unit to a field running test as specified in Division 1, under actual operating conditions. Perform the field tests in the presence of and as directed by the ENGINEER. Demonstrate that under all conditions of operation each unit:
  - 1. Has not been damaged by transportation or installation.
  - 2. Has been properly installed.
  - 3. Has no mechanical defects.
  - 4. Has been properly connected.
  - 5. Is free of overheating of any parts.
  - 6. Is free of overloading of any parts.

Test the pumps to demonstrate that the pumps and control system operate as specified. Promptly correct any defects in the equipment or failure to meet the requirements of the Specifications.

Conduct 24 hours of continuous operation test prior to acceptance.

### 3.3 CLEANING AND PAINTING

- A. Paint as specified in Section 09900.

END OF SECTION

## SECTION 11209

### CORROSION RESISTANT AIR BLOWER

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes: Requirements for furnishing and installing all labor, material, equipment and incidentals required and install, place in operation, and field test air blower and related equipment as generally described below:
  - 1. Install one (1) corrosion resistant air blower at Pine Island's WWTP Effluent Pump Station.
- B. Related Work Specified in Other Sections Includes:
  - 1. Section 09900 - Painting

##### 1.2 REFERENCES

- A. Codes and standards referred to in this section are:
  - 1. Hydraulic Institute Standards
  - 2. IEEE 82 - Test Procedure for Impulse Voltage Tests on Insulated Conductors
  - 3. NEC - National Electric Code
  - 4. AFBMA 10 - Specifications for Metal Balls

##### 1.3 SYSTEM DESCRIPTION

- A. General: Provide one (1) corrosion resistant, fiberglass reinforced plastic (FRP) air blower, driven by a direct drive totally enclosed fan-cooled (TEFC) motor as an integral part of the blower. The air blower shall be for the treatment of corrosive vapors from the wet well. Arrange the air blower in the space shown without appreciable revision of the piping or structure. The Contractor shall be responsible for the duct from the lift station to the blower suction, connections, power connections and all other items for a complete unit.
- B. Operating Conditions: Provide air blower to treat the volume of the effluent pump station to be ventilated in one (1) minute. The air blower shall also meet static pressure requirements of the effluent pump station wet well, which is determined by the total resistance to incoming air flow from ducts, fittings, elbows, dampers and other factors. Furnish the air blower in accordance with the following requirements:

<u>Item</u>	<u>Requirements</u>
Drive	Direct
Motor Type	TEFC
Wheel Material	Polypropylene
Housing Material	FRP
Speed, RPM	1,725
Horsepower, HP	1/3
Power Voltage (Phase)	115/208-230
Frequency (Hz)	60
Volume Treated (cfm)	710 to 1,025
Static Pressure Treated (in. of water)	1-1/4 to 1/4

- C. Blower Performance Curve: the air blower manufacturer shall provide a performance curve displaying static pressure drop relative to volume being treated in relation to the motor speed. The curve shall also indicate the area of most efficient blower operation.
- D. The air blower unit shall have round inlets and outlets.

#### 1.4 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Shop Drawings: Submit working drawings, including arrangement and erection drawings of the equipment and equipment operating characteristics. Include the following:
  1. Blower performance curve. Draw the curves for the specified conditions including those at reduced speed. Plot volume and static pressure drop as a function of capacity from zero to maximum capacity of the selected blower capacity range.
  2. General arrangement drawing of blower. Include equipment weight and anchor methods and materials.
  3. Cross section drawing of blower unit.
  4. Parts list with materials of construction identified.
  5. Motor performance characteristics.
  6. Spare parts list.
  7. Painting procedure.

- C. Quality Control Submittals: Submit six (6) certified copies of the Shop Test results.
- D. Operation and Maintenance: Submit the Operation and Maintenance manuals for the blower equipment.

#### 1.5 BLOWER WARRANTY

- A. The blower manufacturer shall warrant the blower being supplied against defects in workmanship and materials for a period of one (1) year under normal use, operation and service. In addition, the manufacturer shall replace certain parts which shall become defective through normal use and wear on a progressive schedule of cost for a period of five (5) years; parts included are the wheel, drives, housing, and motor. The warranty shall be in published form and apply to all similar units.

#### 1.6 QUALITY ASSURANCE

- A. Qualifications: Provide blower equipment produced by a manufacturer who regularly engages in the design, manufacture, assembly and production of corrosion-resistant air blower equipment of the size and type as specified for not less than five (5) years.
- B. Regulatory Requirements: Rate the motor unit, and wet well wiring for service in hazardous Class 1, Division 1 locations.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all products and materials as specified in Division 1.

#### 1.8 PARTS

- A. Special Tools: Furnish a complete set of special wrenches, spanners, eyebolts and other special tools sufficient to completely dismantle and reassemble the blower unit. Provide tools of forged steel, case hardened, and full finished. Furnish the sets with a metal tool case with a handle and provision for padlocking.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below.
  - 1. Norton Lab and Industrial Blowers

## 2.2 GENERAL CONSTRUCTION

- A. Materials: Provide a stainless steel stand, bolts, fasteners, nuts and washers where exposed to the pumped liquid. Stainless steel equipment shall be coated with a corrosion-resistant polyurethane paint.
- B. Component Joints: The blower supplied shall be fully assembled in the counterclockwise up blast position.

## 2.3 MOTOR

- A. General: Provide a direct-drive, corrosive duty TEFC enclosure, single-phase, 115/208-230V, 60-hz motor as specified in Section 16155.

## 2.4 OPERATION AND CONTROL

- A. An operation and control manual shall be provided by the blower manufacturer.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install all equipment in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1. Make all necessary adjustments to equipment to provide a complete operational blower unit installation.

### 3.2 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Furnish the services of a qualified representative of the manufacturer to provide instruction on proper installation of the equipment, inspect the completed installation, make any necessary adjustments, participate in the startup of the equipment, participate in the field testing of the equipment and place the equipment in trouble-free operation, as specified in Division 1.
- B. Tests: After installation of the blower unit, control equipment and all appurtenances, subject each unit to a field running test as specified in Division 1, under actual operating conditions. Perform the field tests in the presence of and as directed by the ENGINEER. Demonstrate that under all conditions of operation each unit:

1. Has not been damaged by transportation or installation.



2. Has been properly installed.
3. Has no mechanical defects.
4. Has been properly connected.
5. Is free of overheating of any parts.
6. Is free of overloading of any parts.

Test the blower unit to demonstrate that the unit and control system operate as specified. Promptly correct any defects in the equipment or failure to meet the requirements of the Specifications.

Conduct 24 hours of continuous operation test prior to acceptance.

### 3.3 CLEANING AND PAINTING

- A. Paint as specified in Section 09900.

END OF SECTION

## SECTION 11312

### COLLECTION SYSTEM BYPASS

#### PART 1 - GENERAL

##### 1.1 SCOPE OF WORK

- A. The work covered by this Section consists of providing all temporary bypassing to perform all operations in connection with the flow of wastewater effluent around pipe segment(s) or lift stations. The purpose of bypassing is to prevent overflows and allow the WWTP to provide continuous service. The Contractor shall maintain effluent flow in the construction area in order to prevent backup and/or overflow. Multiple bypass operations and locations may be required to complete the project.

#### PART 2 - PRODUCTS

##### 2.1 GENERAL

- A. The Contractor shall provide and maintain adequate equipment, piping, tankers and other necessary appurtenances in order to maintain continuous service in all effluent lines as required for construction. The Contractor shall have tankers, backup pumps, backup generators, piping and appurtenances ready to deploy immediately.
- B. Bypass pumps shall be skid mounted pumps as manufactured by Godwin Pumps, Thompson, Rain for Rent, or an approved equal. Each Pump and bypass line shall have its own discharge check valve. The Pumps should be variable speed to accommodate changes in flow.
- C. Bypass equipment shall include discharge flow meter and multiple pressure transmitters and possible connection to SCADA system.

#### PART 3 - EXECUTION

##### 3.1 GENERAL

- A. The Contractor shall have scheduled delivery of all materials, equipment and labor necessary to complete the repair, replacement or rehabilitation to the job site prior to isolating the pump station. The Contractor shall demonstrate that the pumping system is in good working order and is sufficiently sized to successfully handle flows by performing a test run for a period of 48 hours prior to beginning the work. The bypass pumping system shall be sized to pump a minimum firm capacity of 520 GPM at a total dynamic head (TDH) of 37 feet using 6-inch temporary piping, and the

system shall include redundant backup pumps in case of failure to primary pumps. This shall be completed for each bypass operation required to complete the project. The bypass flow shall be set up and have sensors in order to send the flow to either the reclaimed water storage pond, reclaimed water storage tank and/or the reject pond.

### 3.2 BYPASS PLAN

- A. The Contractor shall submit a comprehensive written plan according to Specification 01340: Shop Drawings, Working Drawings, and Samples, that describes the intended bypass for the maintenance of flows during construction. The Contractor shall also provide a sketch showing the location of bypass pumping equipment for each pump station or line segments around which flows are being bypassed. The plan shall include any proposed tankers, pumps, bypass piping, backup plan and equipment, work schedule, monitoring log for bypass pumping, monitoring plan of the bypass pumping operation and maintenance of traffic plan. The Contractor shall cease bypass operations and return flows to the new and/or existing sewer when directed by the County. All piping shall be designed to withstand at least twice the maximum system pressure or a minimum of 50 psi, whichever is greater. During bypassing, no wastewater effluent shall be leaked, dumped, or spilled in or onto, any area outside of the existing reclaimed water system. When bypass operations are complete, all bypass piping shall be drained into the wastewater system prior to disassembly.

### 3.3 BYPASS OPERATION

- A. The County shall review and provide written comments to the bypass plan prior to implementation of the bypass. The Contractor shall plug off and pump down the line segment in the immediate work area and shall maintain the wastewater system so that surcharging does not occur.
- B. Where work requires the line to be blocked beyond NORMAL WORKING HOURS and bypass pumping is being utilized, the Contractor shall be responsible for on-site monitoring the bypass operation 24 hours per day, 7 days per week, by on-site personnel. If accepted in the bypass plan by the County, any electronic monitoring in lieu of on-site monitoring must be detailed in the comprehensive written plan and approved by the County.
- C. The Contractor shall insure that no damage will be caused to private property as a result of bypass pumping operations. The Contractor shall complete the work as quickly as possible and satisfactorily pass all tests, inspections and repair all deficiencies prior to discontinuing bypassing operations and returning flow to the line segment or pump station.
- D. The Contractor shall immediately notify the County (within 1 hour) should an effluent overflow occur and the Contractor shall take the necessary action to clean up the spillage to the satisfaction of the County and/or other

governmental agency. If effluent is spilled onto public or private property, the Contractor shall wash down and clean up the spillage to the satisfaction of the County and/or other governmental agency. When bypassing a pump station, one back-up pump equal to the primary unit shall be required. Bypass pumps and motors shall have a maximum rating of 55 decibels at 20 feet for sound attenuation.

### 3.4 CONTRACTOR LIABILITY

- A. The Contractor shall be responsible for all required pumping, equipment, piping and appurtenances to accomplish the bypass and for any and all damage that results directly or indirectly from the bypass pumping equipment, piping and/or appurtenances. The Contractor shall also be liable for all County personnel and equipment costs, penalties and fines resulting from overflows. In addition to the aforementioned costs to be paid by the Contractor, a fine of \$5,000 per overflow occurrence shall be assessed. For each 24-hour period following overflow that the effluent wastewater overflow/damage is not completely cleaned and returned to full operational capacity, an additional \$5,000 fine will be assessed daily. It is the intent of these specifications to require the Contractor to establish adequate bypass pumping as required regardless of the flow condition.

END OF SECTION

**DIVISION 12**  
**(NOT USED)**

**DIVISION 13**

**(NOT USED)**

**DIVISION 14**

**(NOT USED)**

**DIVISION 15**  
**MECHANICAL**



## SECTION 15000

### MECHANICAL - GENERAL REQUIREMENTS

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

###### A. Scope of Work:

1. All equipment furnished and installed under this contract shall conform to the general stipulations set forth in this Section except as otherwise specified in other Sections.
2. Contractor shall coordinate all details of equipment with other related parts of the Work, including verification that all structures, piping, wiring, and equipment components are compatible. Contractor shall be responsible for all structural and other alternations in the Work required to accommodate equipment differing in dimensions or other characteristics from that contemplated in the Contract Drawings or Specifications.

###### B. Related Work Described Elsewhere: Other Sections directly referenced in this section include the following:

1. General Requirements: Division 1.
2. Equipment: Division 11.

###### C. Contract Drawings and Specifications: The Contract Drawings and Specifications shall be considered as complementary, one to the other, so that materials and work indicated, called for, or implied by the one and not by the other shall be supplied and installed as though specifically called for by both. The Contract Drawings are to be considered diagrammatic, not necessarily showing in detail or to scale all of the equipment or minor items. In the event of discrepancies between the Contract Drawings and Specifications, or between either of these and any regulations or ordinances governing work of these Specifications, the bidder shall notify the ENGINEER in ample time to permit revisions.

##### 1.2 QUALITY ASSURANCE

###### A. Materials and Equipment: Unless otherwise specified, all materials and equipment furnished for permanent installation in the Work shall conform to applicable standards and specifications and shall be new, unused, and undamaged when installed or otherwise incorporated in the Work. No such material or equipment shall be used by the Contractor for any purpose other

than that intended or specified, unless such use is specifically authorized in writing by the Owner. No material shall be delivered to the site without prior acceptance of drawings and data by the ENGINEER.

B. Equivalent Materials and Equipment:

1. Whenever a material or article is specified or described by using the name of a proprietary product or the name of a particular manufacturer or vendor, the specific item mentioned shall be understood as establishing the type, function, and quality desired. Other manufacturers' products will be accepted provided sufficient information is submitted to allow the ENGINEER to determine that the products proposed are equivalent to those named. Such items shall be submitted for review in accordance with Section 01340: Drawings and Submittals.
2. Requests for review of equivalency will not be accepted from anyone except the Contractor and such requests will not be considered until after the contract has been awarded.

C. Governing Standards: Equipment and appurtenances shall be designed in conformity with ANSI, ASME, ASTM, IEEE, NEMA, OSHA, AGMA, and other generally accepted applicable standards. They shall be of rugged construction and of sufficient strength to withstand all stresses which may occur during fabrication, testing, transportation, installation, and all conditions of operations. All bearings and moving parts shall be adequately protected against wear by bushings or other acceptable means. Provisions shall be made for adequate lubrication with readily accessible means.

D. Tolerances: Machinery parts shall conform to the dimensions indicated on the Drawings within allowable tolerances. Protruding members such as joints, corners, and gear covers shall be finished in appearance. All exposed welds shall be ground smooth and the corners of structural shapes shall be rounded or chamfered.

E. Clearances: Ample clearances shall be provided for inspection and adjustment. All equipment shall fit the allotted space and shall leave reasonable access room for servicing and repairs. Greater space and room required by substituted equipment shall be provided by the Contractor and at his expense.

F. Testing:

1. When the equipment is specified to be factory tested, the results of the tests shall be submitted to the ENGINEER and approval of the test results shall be obtained before shipment of the equipment.

2. When an item of equipment, including controls and instrumentation, has been completely erected, the Contractor shall notify the ENGINEER, who will designate a time to make such tests as required, and operate the item to the satisfaction of the ENGINEER. All testing shall be done in the presence of the ENGINEER. "Completely erected" shall mean that the installation is erected, all necessary adjustments have been made, all required utility connections have been made, required lubricants and hydraulic fluid have been added and the unit has been cleaned and painted.

G. Pressure Test:

1. After installation, all piping shall be pressure tested. Piping shall be tested in accordance with Section 15044: Pressure Testing of Force Main Piping.
2. All tests shall be made in the presence of and to the satisfaction of the ENGINEER and also, to the satisfaction of any local or State inspector having jurisdiction.
  - a. Provide not less than three (3) days notice to the ENGINEER and the authority having jurisdiction when it is proposed to make the tests.
  - b. Any piping or equipment that has been left unprotected and subject to mechanical or other injury in the opinion of the ENGINEER shall be retested in part or in whole as directed by the ENGINEER.
  - c. The piping systems may be tested in sections as the Work progresses but no joint or portion of the system shall be left untested.
3. All elements within the system that may be damaged by the testing operation shall be removed or otherwise protected during the operation.
4. All defects and leaks observed during the tests shall be corrected and made tight in an approved manner and the tests repeated until the system is proven tight.
5. Repair all damage done to existing or adjacent work or materials due to or on account of the tests.
6. Provide test pumps, gauges, or other instruments and equipment required for the performance of all tests. Provide all temporary bracing, test plugs, additional restraint, and thrust blocking which may be required for test pressures above normal working pressures.

7. All tests shall be maintained for as long a time as required to detect all defects and leaks but not less than the duration specified for each type of pipe or piping system in this Division.

H. Failure of Test:

1. Defects: Any defects in the equipment, or deviations from the guarantees or requirements of the Specifications, shall be promptly corrected by the Contractor by replacements or otherwise. The decision of the ENGINEER as to whether or not the Contractor has fulfilled his obligations under the Contract shall be final and conclusive. If the Contractor fails to correct any defects or deviations, or if the replaced equipment when tested shall fail again to meet the guarantees or specified requirements, the Owner, notwithstanding his having made partial payment for work and materials, may reject that equipment and order the Contractor to remove it from the premises at the Contractor's expense.
2. Rejection of Equipment: In case the Owner rejects a particular item of equipment, then the Contractor hereby agrees to repay to the Owner all sums of money paid to him to deliver to the Contractor a bill of sale of all his rights, title, and interest in and to the rejected equipment provided, however that the equipment shall not be removed from the premises until the Owner obtains from other sources other equipment to take the place of that rejected. The bill of sale shall not abrogate the Owner's right to recover damages for delays, losses or other conditions arising out of the basic Contract. The Owner hereby agrees to obtain the alternate equipment within a reasonable time and the Contractor agrees that the Owner may use the original equipment furnished by him without rental or other charge until the other equipment is obtained.

- I. Responsibility During Tests: The Contractor shall be fully responsible for the proper operation of equipment during tests and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the Owner formally takes over the operation thereof.

J. Acceptance of Materials:

1. 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 acceptance of the Owner. No material shall be delivered to the work without prior submittal approval of the ENGINEER.
2. The Contractor shall submit to the ENGINEER data relating to materials and equipment he proposes to furnish for the work. Such

data shall have in sufficient detail to enable the ENGINEER to identify particular product and to form an opinion as to its conformity to the Specifications.

3. 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 the 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 sample 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 tests.
4. The Contractor shall submit data and samples sufficiently early to permit consideration and acceptance before materials are necessary for incorporation in the work.

K. Safety Requirements:

1. In addition to the components shown and specified, all machinery and equipment shall be safeguarded in accordance with the safety features required by the current codes and regulations of ANSI, OSHA, and local industrial codes.
2. The Contractor shall provide for each V-belt drive or rotating shaft a protective guard which shall be securely bolted to the floor or apparatus. The guard shall completely enclose drives and pulleys and be constructed to comply with all safety requirements.

1.3 SUBMITTALS (SEE SECTION 01340: SHOP DRAWINGS, WORKING DRAWINGS, AND SAMPLES)

1.4 MAINTENANCE MATERIALS

- 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 equipment supplied.
- 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.

## PART 2 - PRODUCTS

### 2.1 FABRICATION AND MANUFACTURE

#### A. Workmanship and Materials:

1. Contractor shall guarantee all equipment against faulty or inadequate design, improper assembly or erection, defective workmanship or materials, and leakage, breakage or other failure. Materials shall be suitable for service conditions.
2. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practice. Individual parts shall be manufactured to standard sizes and gages so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall not have been in service at any time prior to delivery, except as required by tests.
3. Except where otherwise specified, structural and miscellaneous fabricated steel used in equipment shall conform to AISC standards. All structural members shall be designed for shock or vibratory loads. Unless otherwise specified, all steel which will be submerged, all or in part, during normal operation of the equipment shall be at least 1/4 inch thick.

#### B. Lubrication:

1. Equipment shall be adequately lubricated by systems which require attention no more frequently than weekly during continuous operation. Lubrication systems shall not require attention during startup or shutdown and shall not waste lubricants.
2. Lubricants of the type recommended by the equipment manufacturer shall be furnished by the Contractor in sufficient quantity to fill all lubricant reservoirs and to replace all consumption during testing, startup, and operation for the entire warranty period prior to acceptance of equipment by Owner. Unless otherwise specified or permitted, the use of synthetic lubricants will not be acceptable.
3. Lubrication facilities shall be convenient and accessible. Lubrication fittings shall be the zerk type for each piece of equipment. Oil drains and fill openings shall be easily accessible from the normal operating area or platform. Drains shall allow for convenient collection of waste oil in containers from the normal operating area or platform without removing the unit from its normal installed position.

- C. Safety Guards: All belt or chain drives, fan blades, couplings, and other moving or rotating parts shall be covered on all sides by a safety guard. Safety guards shall be fabricated from 16 USS gage or heavier galvanized or aluminum-clad sheet steel or 1/2 inch mesh galvanized expanded metal. Each guard shall be designed for easy installation and removal. All necessary supports and accessories shall be provided for each guard. Supports and accessories, including bolts, shall be galvanized. All safety guards in outdoor locations shall be designed to prevent the entrance of rain and dripping water.
- D. Equipment Foundation Supports:
1. All foundations, platforms and hangers required for the proper installation of equipment shall be furnished and installed by the Contractor.
  2. Unless otherwise indicated or specified, all equipment shall be installed on reinforced concrete bases at least 6 inches high. Cast iron or welded steel baseplates shall be provided for pumps, compressors, and other equipment. Each unit and its drive assembly shall be supported on a single baseplate of neat design. Baseplates shall have pads for anchoring all components and adequate grout holes. Baseplates for pumps shall have a means for collecting leakage and a threaded drain connection. Baseplates shall be anchored to the concrete base with suitable anchor bolts and the space beneath filled with 1 inch minimum grout. All open equipment bases shall be filled with nonshrinking grout sloped to drain to the perimeter of the base.
  3. The Contractor shall furnish, install and protect all necessary guides, bearing plates, anchor and attachment bolts, and all other appurtenances required for the installation of equipment. These shall be of ample size and strength for the purpose intended.
  4. All anchor bolts, anchor bolt templates, and location drawings required for the installation of the equipment, support columns, and for all other equipment or machinery included under this Contract shall be furnished by the Contractor. All mechanical equipment shall be anchored using hook anchor bolts, cast-in-place, unless specifically called for otherwise on the Drawings. Anchor bolts, sleeves, and inserts shall be set in place in forms and cast in the concrete by the Contractor. It shall be the responsibility of the Contractor to obtain such anchor bolts, templates, and approved location drawings in proper time to avoid delay, and it shall be his further responsibility to check and approve the location and setting of the anchor bolts, sleeves, and inserts prior to the casting of the concrete. Parts of anchors or metal work that are not built into masonry and concrete shall be coated with approved paint. Anchor bolts for column base

plates and other structural elements shall be of galvanized steel unless indicated otherwise; anchor bolts for drives, motors, fans, blowers, and other mechanical equipment shall be of Type 316 stainless steel. Anchor bolts shall be of ample size and shall be provided with hexagonal nuts of the same quality of metal as the bolts. All threads shall be clean cut and of U.S. Standard sizes.

5. Unless specified otherwise, 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. All threads shall be clean cut and shall conform to ANSI B1.1-latest for "Unified and American Screw Threads for Screws, Bolts, Nuts, and Other Threaded Parts."
6. Anchor bolts and expansion bolts shall be set accurately. Anchor bolts which are set before the concrete has been placed shall be carefully held in suitable templates of approved design provided under this Contract. Where indicated on the Drawings, specified, or required, anchor bolts shall be provided with square plates or shall have square heads and washers and be set in the concrete forms with suitable pipe sleeves, or both.
7. Structural steel supports and miscellaneous steel required for supporting and/or hanging equipment and piping furnished under this Division shall be provided and installed by Contractor.
8. All foundations, anchor pads, piers, thrust blocks, inertia blocks and structural steel supports shall be built to template and reinforced as required for loads imposed on them.
9. The Contractor shall assume all responsibility for sizes, locations and design of all foundations, anchor pads, pier, thrust blocks, inertia blocks, curbs and structural steel supports.

E. Shop Painting:

1. All steel and iron surfaces shall be protected by suitable paint or coatings applied in the shop. Surfaces which will be inaccessible after assembly shall be protected for the life of the equipment. Exposed surfaces shall be finished smooth, thoroughly cleaned, and filled as necessary to provide a smooth uniform base for painting. Electric motors, speed reducers, starters, and other self-contained or enclosed components shall be shop primed or finished with a high-grade oil-resistant enamel suitable for coating in the field with an alkyd enamel. Coatings shall be suitable for the environment where the equipment is installed.
2. Surfaces to be painted after installation shall be prepared for painting as recommended by the paint manufacturer for the intended service,



and then shop painted with one or more coats of the specified primer. Unless otherwise specified, the shop primer for steel and iron surfaces shall be Koppers "No. 10 Inhibitive Primer", or equal.

3. Machined, polished, and nonferrous surfaces which are not to be painted shall be coated with rust-preventive compound, Houghton "Rust Veto 344", Rust-Oleum "R-9", or equal.
- F. Nameplates: Contractor shall provide equipment identification nameplates for each item of equipment. Nameplates shall be 1/8 inch Type 304 stainless steel and shall be permanently fastened. Plates shall be fastened using round head metallic drive screws, or where metallic drive screws are impractical, with stainless steel pop rivets. Metallic drive screws shall be brass or stainless steel, Type V and No. 8 by 3/8 inch long. Names and/or equipment designations shall be engraved on the plates and the engraving painted with a primer and black paint system compatible with stainless steel. Contractor shall submit a list of proposed names and designations for review prior to fabrication of nameplates. At a minimum, each nameplate shall include equipment manufacturer's name, year of manufacture, serial number and principal rating data.
- G. Pipe Identification:
1. All pipe (except underground) shall have code letters and flow arrows painted as per Division 9. The Contractor shall ensure that the pipes are properly marked.
  2. Underground pipe and tube: Pipe and tube shall be located by laying 2 inch wide plastic tape continuously along the run of pipe or tube per Division 9.
- H. Noise Attenuation and Control:
1. Unless otherwise specified, the maximum permissible noise level for a complete installed piece of equipment located within or outside a structure shall not exceed 85 dB at 3 feet. A complete piece of equipment includes the driver and driven equipment, plus any intermediate couplings, gears, and auxiliaries. All equipment provided herein that is specified to be factory and field tested shall be tested as specified herein for noise generation at the equipment manufacturer's expense.
  2. Maximum permissible noise (sound pressure) levels shall be in decibels as read on the "A" weighting scale of a standard sound level meter (dB); all measurements shall be made in relation to a reference pressure of 0.0002 microbar. Measurements of emitted noise levels shall be made on a sound level meter meeting at least the Type 2 requirements set forth in ANSI S1.4, Specification for Sound Level

Meters. The sound level meter shall be set on the "A" scale and to slow response. Unless otherwise specified for a particular piece of equipment, the point of measurement of sound level shall be made at the specified distance from any major surface along the entire perimeter and at midheight of the piece of equipment, or at the specified distance from an outer major surface encompassing the sound source including inlets or outlets.

I. Fire Hazard Rating:

1. All piping, duct work, and equipment insulation, fastener, and jacketing materials shall have a fire hazard rating not to exceed 25 for flame spread, 50 for fuel contributed, and 50 for smoke developed. Rating shall be determined by ASTM Designation E84, "Surface Burning Characteristics of Building Materials". Corresponding ratings determined by Underwriters' Laboratories, Inc., UL-723, "Test Method for Fire Hazard Classification of Building Materials", will also be acceptable.
2. Flameproofing treatments will not be acceptable.

2.2 ACCESSORIES

- A. Special Tools and Accessories: Equipment requiring periodic repair and adjustment shall be furnished complete with all special tools, instruments, and accessories required for proper maintenance. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices.
- B. Fasteners: All nuts, bolts, anchors and other fastening devices shall be a minimum of Type 316 stainless steel.

PART 3 - EXECUTION

3.1 INSTALLATION AND OPERATION

- A. Installation: Equipment shall not be installed or operated except by, or with the guidance of, qualified personnel having the knowledge and experience necessary for proper results. When so specified, or when employees of Contractor or his subcontractors are not qualified, such personnel shall be field representatives of the manufacturer of the equipment or materials being installed.
  1. The Contractor shall have on site sufficient proper construction equipment and machinery of ample capacity to facilitate the work and to handle all emergencies normally encountered in work of this character. To minimize field erection problems, mechanical units shall be factory assembled when practical.

2. Equipment shall be erected in a neat and workmanlike manner on the foundations and supports at the locations and elevations shown on the Drawings, unless otherwise directed by the ENGINEER during installation.
  3. All equipment shall be installed in such a manner as to provide access for routine maintenance including lubrication.
  4. For equipment such as pumping units, which require field alignment and connections, the Contractor shall provide the services of the equipment manufacturer's qualified mechanic, millwright, machinist, or authorized representative, to align the pump and motor prior to making piping connections or anchoring the pump base.
  5. Equipment of a portable nature which requires no installation shall be delivered to a location designated by the Owner.
- B. Tolerances: Precision gauges and levels shall be used in setting all equipment. All piping and equipment shall be perfectly aligned, horizontally and vertically. Tolerances for piping and equipment installation shall be 1/2 inch to 30 ft. horizontal and vertically. All valves and operators shall be installed in the position shown on the Drawings or as directed by the ENGINEER, if not shown.
- C. Alignment and Level: The equipment shall be brought to proper level by shims (1/4 inch maximum). After the machine has been leveled and aligned, the nuts on the anchor bolts shall be tightened to bind the machine firmly into place against the wedges or shims. Grouting shall be as specified in Division 3.
- D. Contact of Dissimilar Metals: Where the contact of dissimilar metal may cause electrolysis and where aluminum will contact concrete, mortar, or plaster, the contact surface of the metals shall be separated using not less than one coat of zinc chromate primer and one heavy coat of aluminum pigmented asphalt paint on each surface.
- E. Cutting and Patching: All cutting and patching necessary for the work shall be performed by the Contractor.
- F. Operation: All equipment installed under this Contract, including that furnished by Owner or others under separate contract, shall be placed into successful operation according to the written instructions of the manufacturer or the instructions of the manufacturer's field representative. All required adjustments, tests, operation checks, and other startup activity shall be provided.

### 3.2 OBSERVATION OF PERFORMANCE TESTS

- A. Where the specifications require observation of performance tests by the ENGINEER, such tests shall comply with the quality assurance paragraph in this section.

END OF SECTION

## SECTION 15044

### PRESSURE TESTING OF PIPING

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Scope of Work: This Section specifies the hydrostatic testing requirements for force main piping. Hydrostatic pressure and leakage testing shall be completed in accordance with AWWA C600 and C605, latest revision, however, no leakage is allowed.
- B. Testing Records:
  - 1. Provide a record of each piping installation during the testing. These records shall include:
    - a) Date of test.
    - b) Identification of pipeline tested or retested.
    - c) Identification of pipeline material.
    - d) Identification of pipe specification.
    - e) Test fluid.
    - f) Test pressure.
    - g) Remarks: Leaks identified (type and location), types of repairs, or corrections made.
    - h) Certification by Contractor that the leakage rate measured conforms to the Specifications.
    - i) Signature of Owner's representative witnessing pipe test.
  - 2. Submit five (5) copies of the test records to the ENGINEER's representative upon completion of the testing.

#### PART 2 - PRODUCTS

##### 2.1 GENERAL

- A. Testing fluid shall be water for all hydrostatic tests.
- B. Provide pressure gauges, pipes, bulkheads, pumps, and meters to perform the hydrostatic testing.

## PART 3 - EXECUTION

### 3.1 TESTING PREPARATION

- A. Pipes shall be in place and anchored before commencing pressure testing.
- B. Conduct hydrostatic tests on exposed and above ground piping after the piping has been installed and attached to the pipe supports, hangers, anchors, expansion joints, valves, and meters.
- C. Before conducting hydrostatic tests, flush pipes with water to remove dirt and debris.
- D. Test new pipelines which are to be connected to existing pipelines by isolating the new line from the existing line by means of pipe caps, plugs, special flanges, or blind flanges. After the new line has been successfully tested, remove caps, plugs, or flanges and connect to the existing piping.
- E. Conduct hydrostatic tests on buried pipe after the trench has been completely backfilled. The pipe may be partially backfilled and the joints left exposed for inspection for an initial leakage test. Perform the final test, however, after completely backfilling and compacting the trench.
- F. Pressure Test:
  - 1. All tests shall be made in the presence of and to the satisfaction of the Owner, ENGINEER, and any local or State inspector having jurisdiction.
    - a. Provide not less than three (3) days notice to the Owner, ENGINEER, and the authority having jurisdiction when it is proposed to make the tests.
    - b. Any piping or equipment that has been left unprotected and subject to mechanical or other injury shall be retested as directed by the ENGINEER.
    - c. The piping systems may be tested in sections as the work progresses, but no joint or portion of the system shall be left untested.
  - 2. All elements within the system that may be damaged by the testing operation shall be removed or otherwise protected during the operation.
  - 3. Repair all damage done to existing or adjacent work or materials due to performance of the tests.

### 3.2 HYDROSTATIC TESTING

- A. Hydrostatic Testing of Aboveground or Exposed Piping: Open vents at high points of the piping system to purge air while the pipe is being filled. Subject the piping system to the test pressure indicated. Maintain the test pressure for a minimum of four (4) hours. Examine joints, fittings, valves, and connections for leaks. The piping system shall show no leakage or weeping. Correct leaks and retest until no leakage is obtained.
- B. Hydrostatic Testing of Buried Piping:
1. Where any section of the piping contains concrete thrust blocks or encasement, do not start the pressure test until at least 10 days after the concrete has been poured. When testing mortar-lined piping, fill the pipe to be tested with water and allow it to soak for at least 48 hours to absorb water before conducting the pressure test.
  2. Apply and maintain the test pressure by means of a hydraulic force pump. Maintain the test pressure for a minimum duration of four (4) hours. No leakage is allowed.
  3. Repair and retest any pipes showing leakage.
- C. Test pressures for various pipe applications are set forth below.

Service	Mark	Test Pressure (psig)
Reclaimed Water Main	RW	150

#### NOTES:

1. Piping not listed and sections of piping in gross discrepancy with listed pressure, with the approval of the ENGINEER, shall be tested at a minimum of 1.5 times working pressure.

END OF SECTION

## SECTION 15050

### UTILITY PIPING, FITTINGS, VALVES, AND ACCESSORIES

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

###### A. Scope of Work:

1. The Work included in this Section consists of furnishing all labor, equipment, and materials and in performing all operations necessary for the construction, installation or restoration of all utility piping, valves, and appurtenances complete and ready for operation as shown on the Drawings and specified herein.
2. All products in contact with potable water shall be in accordance with ANSI/NSF Standard 61 for potable water contact.
3. Owner will furnish materials and equipment as indicated in the Drawings and specified herein. The Contractor shall coordinate project requirements and Owner furnished materials and equipment and provide all materials not specifically identified as Owner furnished required for a complete system. Piping, fittings, valves, and accessories not provided by the Owner shall be as specified herein.

###### B. Related Work Described Elsewhere:

1. Shop Drawings, Working Drawings, and Samples: Section 01340.
2. Warranties and Bonds: Section 01740.
3. Excavation, Backfilling and Compaction: Section 02220.
4. Painting: Division 9.
5. Equipment: Division 11.
6. Pressure Testing of Piping: Section 15044.

##### 1.2 QUALITY ASSURANCE

###### A. Construction Requirements:

1. All the lines shall be installed with at least 36-inches of cover within utility easements and 42-inches of cover within County Right-of-Way.



2. For underground utilities, changes in horizontal alignment of less than 11-1/4 degrees may be achieved through the use of allowable pipe deflection in lieu of fittings shown on the Drawings at the CONTRACTOR's option, but subject to approval of the ENGINEER as to layout. Said deflection shall not exceed 75 percent of the maximum allowable deflection as stated in the pipe manufacturer's installation instructions.
  3. Install proposed pipe so as not to scratch, dent, or damage any existing pipes. Pipe shall be installed in a way that prevents damaging existing pipe. If existing pipes are damaged due to construction, the CONTRACTOR shall be required to repair the pipe according to the OWNER's requirements.
- B. Pipe Inspection: The CONTRACTOR shall obtain from the pipe manufacturers a certificate of inspection to the effect that the pipe and fittings supplied for this Contract have been inspected at the plant and that they meet the requirements of these Specifications. All pipe and fittings shall be subject to visual inspection at time of delivery by rail or truck and also just before they are lowered into the trench to be laid. Joints or fittings that do not conform to these Specifications will be rejected and must be removed immediately by the CONTRACTOR.

The entire product of any plant may be rejected when, in the opinion of the ENGINEER, the methods of manufacture fail to secure uniform results, or where the materials used are such as to produce inferior pipe or fittings.

### 1.3 SUBMITTALS

- A. Shop Drawings:
1. In general, the following Shop Drawings shall be submitted to the ENGINEER for approval prior to construction:
    - a) Mill test certificates or certified test reports on pipe and fittings.
    - b) Details of restrained and flexible joints.
    - c) Valve boxes.
    - d) All valves, plug and check.
    - e) Couplings.
    - f) Wet taps.
    - g) Service saddles.
    - h) Pressure gauges.

- i) Flexible expansion joints, tie rods, and flanged coupling adapters.
  - j) Joint lubricant.
  - k) Temporary plug and anchorage system for hydrostatic pressure test.
  - l) Detailed piping layout drawings and pipe laying schedule (see below).
2. Tabulated layout schedule for each pipe system including:
- a) Pipe invert station and elevation at each change of grade and alignment.
  - b) The limits of each reach of pipe thickness class and of restrained joints.
  - c) The limits of each reach of concrete encasement.
  - d) Locations of valves and other mechanical equipment.
  - e) Methods and locations of supports.
  - f) Details of special elbows and fittings.
  - g) Identify the limits of Owner furnished materials and equipment.
3. A separate Shop Drawing submittal will be required for each major item listed above and for each different type of an item within a major item. For example, separate submittals will be required for each valve type. All submittals shall be in accordance with the General and Special Conditions and Section 01340: Shop Drawings and Submittals.

**B. Acceptance of Material:**

- 1. The CONTRACTOR shall furnish an Affidavit of Compliance certified by the pipe manufacturer that the pipe, fittings, and specials furnished under this Contract comply with all applicable provisions of current AWWA and ASTM standards and these Specifications. No pipe or fittings will be accepted for use in the Work on this project until the Affidavit has been submitted and approved by the ENGINEER.
- 2. The OWNER reserves the right to sample and test any pipe or fitting after delivery and to reject all pipe and fittings represented by any sample which fails to comply with the specified requirements.

- C. Operation and Maintenance Manuals: Submit operation and maintenance manuals for applicable components requiring periodic maintenance and/or explanation of operation. Manuals shall be prepared in accordance with Section 01730: Operating and Maintenance Data. Information shall include:
  - 1. Detailed assembly drawings, clear and concise instructions for operating, adjusting, overhauling, troubleshooting and, other maintenance. Include shop drawings previously submitted and approved with all corrections made.
  - 2. A complete lubrication schedule including lubricant types, grades, and recommended frequency of lubrication.
  - 3. A list of parts for all products with catalog numbers and all data necessary for ordering replacement parts. Such instructions and parts lists shall be prepared for the specific product furnished and shall not refer to other types or models.

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Pipe, fittings, valves, and accessories shall be handled in such manner as to ensure a sound undamaged condition during shipping, delivering, and installing.
- B. Particular care shall be taken not to injure the pipe coating and linings.
- C. Insides of valves and piping shall be kept free of dirt and debris.

#### 1.5 JOB CONDITIONS

- A. Water in Excavation: Water shall not be allowed in the trenches while underground pipes are being laid and/or tested. The CONTRACTOR shall not open more trench than the available pumping facilities are able to dewater to the satisfaction of the ENGINEER. The CONTRACTOR shall assume responsibility for disposing of all water so as not to injure or interfere with the normal drainage of the territory in which he is working. In no case shall the pipelines being installed be used as drains for such water, and the ends of the pipe shall be kept properly and adequately plugged during construction by the use of approved stoppers and not by improvised equipment. All necessary precautions shall be taken to prevent the entrance of mud, sand, or other obstructing matter into the pipelines. If on completion of the work any such materials has entered the pipelines, it must be cleaned as directed by the ENGINEER so that the entire system will be left clean and unobstructed.

#### 1.6 PIPE MATERIAL SCHEDULE

- A. Drawings present a pipe material schedule that designates the types of pipe that are to be used in various applications.

## PART 2 - PRODUCTS

### 2.1 DUCTILE IRON PIPE AND FITTINGS

- A. Ductile Iron Pipe: Ductile iron pipe shall conform to the requirements of ANSI, A21.51 and AWWA C151, latest revision. The minimum pressure class for underground pipes shall be Class 150. Pipe shall be furnished in laying lengths of 20 feet or less, unless specifically shown otherwise on the Drawings. Flanged pipe shall have a minimum thickness class of Class 53. All pipe and fittings shall be new and unused, no refurbished piping or fittings will be accepted.
- B. Coating and Lining
1. Corrosion Resistant Interior Lining: All ductile iron pipe, fittings, and specials for pressurized mains shall be lined with Protecto 401 Ceramic Epoxy Pipe Coating with a minimum dry film thickness of 40 mils applied by the pipe manufacturer. Storage, surface preparation, application, and safety precautions shall strictly follow manufacturer's instructions.
  2. Standard Lining: All ductile iron pipe, fittings, and specials for reuse mains shall have an interior protective lining of cement-mortar with a seal coat of asphaltic material in accordance with ANSI/AWWA A21.4/C104. For process air service, the standard lining shall be omitted and the pipe shall be unlined.
  3. Exterior Coatings for Buried Pipe: Ductile iron pipe, fittings, and specials to be installed underground shall be coated on the exterior at the factory with an asphaltic coating approximately 1 mil thick as specified in AWWA C151.
  4. Exterior Coating for Exposed Pipe: Ductile iron pipe, fittings, and specials to be installed aboveground shall be furnished with a shop applied primer on the exterior as specified in Drawings. Field paint per Section 09900.
- C. Fittings: Fittings for ductile iron pipe shall be either mechanical joint, restrained joint, or flanged joint as indicated on the Drawings and shall have a minimum working pressure of 250 psi. Fittings shall be ductile iron and shall conform to ANSI/AWWA C110/A21.10, ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53, latest revisions for flanged and mechanical joint pipe. Fittings shall be coated and lined in the manner specified above for ductile iron pipe. The rubber gaskets for flanged, mechanical, and push-on joints shall be as described below.

- D. Push-On Joints: Pipe using push-on joints shall be in strict accordance with ANSI/AWWA C111/A21.11, latest revision and shall be as manufactured by an Approved Manufacturer. Jointing materials shall be provided by the pipe manufacturer and installation shall be in strict accordance with the manufacturer's recommended practice. For process air service, joint materials shall be rated for an operating temperature of at least 300 degrees F.
- E. Mechanical Joints: Jointing materials for mechanical joints shall be provided by the pipe and fitting manufacturer. For process air service, joint materials shall be rated for an operating temperature of at least 300 degrees F. Materials assembly and bolting shall be in strict accordance with ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53, latest revisions. Tee head bolts and nuts for mechanical joints shall be manufactured of high strength, low alloy steel in accordance with ANSI/AWWA C111/A21.11.
- F. Flanged Joints: Flanges shall be Class 125 per ANSI B16.1 with any special drilling and tapping as required to insure correct alignment and bolting.
1. Gaskets:
    - a. Liquid Service: Fullface, 1/8-inch thick, cloth-inserted rubber: Johns-Manville No. 109, John Crane Co., Style 777, or equal. Gaskets shall be suitable for a water pressure of 350 psi at a temperature of 180 degrees F.
    - b. Air Service: 1/8-inch thick resilient material rated for an operating temperature of at least 300 degrees F.
  2. Bolts, nuts, and washers for flanges shall be of carbon steel conforming to ASTM A307, Grade B. The bolts and all items associated with the bolt assemblies shall be hot dip galvanized.
  3. Flanges shall be long-hub type screwed tightly on pipe by machine at the foundry prior to facing and drilling. Flange machine surfaces shall be coated with rust inhibitor immediately after facing and drilling. Field assembled screwed on flanges are prohibited.
- G. Restrained Joints and Fittings: Pipe joints and fittings shall be restrained in accordance with the Drawings and the requirements of this Specification. In cases where the calculated required length of restrained pipe is not evenly divisible by nominal laying lengths of pipe, the total required length of restrained pipe shall be rounded up to the next closest nominal length that is evenly divisible by the standard laying length.
1. Manufactured Restrained Joints: Manufactured restrained joints shall be 1100 Series manufactured by an Approved Manufacturer.

2. Restrained joint pipe and fittings shall be ductile iron only and shall comply with applicable portions of this Specification. Manufactured restrained joints shall be capable of deflection during assembly. Deflection shall not exceed 80 percent of the manufacturer's recommendations.
  3. Tee head bolts and nuts for restrained joints shall be manufactured of high strength, low alloy steel in accordance with ANSI/AWWA C111/A21.11.
- H. Alternate Restrained Joints: Ductile iron pipe and fittings with mechanical joints may be restrained using a follower gland which includes a restraining mechanism. When actuated during installation, the restraining device shall impart multiple wedging action against the pipe wall which increases resistance as internal pressure in the pipeline increases.
1. The joint shall maintain flexibility after installation. Glands shall be manufactured of ductile iron conforming to ASTM A536 and restraining devices shall be of heat treated ductile iron with a minimum hardness of 370 BHN. The gland shall have standard dimensions and bolting patterns for mechanical joints conforming to ANSI/AWWA C111 and C153, latest revisions.
  2. Tee head bolts and nuts shall be manufactured of corrosion-resistant, high strength, low alloy steel in accordance with ANSI/AWWA C111/A21.11.
  3. The restraining wedges shall have twist-off nuts to insure proper torqueing. The mechanical joint restraint device shall have a minimum working pressure rating of 250 psi with a minimum safety factor of 2 to 1 and shall be MEGALUG<sup>®</sup> as manufactured by EBBA Iron, Inc.
- I. All fittings, joints, restraints, and pipe shall be manufactured by County-approved manufacturer.

## 2.2 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

- A. Small PVC Pressure Piping: Unless otherwise specified, PVC pressure pipe smaller than 4 inches nominal diameter shall be Schedule 80 PVC in accordance with ASTM D1785. Schedule 80 pipe shall have either solvent welded or threaded joints. PVC pressure pipe shall bear the approved seal of the National Sanitation Foundation (NSF). PVC pressure pipe shall be FDOT approved for all installations within County and FDOT right-of-ways. PVC pipe that is exposed to sunlight shall be manufactured with additives to provide resistance to ultraviolet deterioration.

1. Fittings: Socket type, solvent welded fittings for Schedule 80 PVC pipe shall be in conformance with ASTM D2467. Threaded type fittings for Schedule 80 PVC pipe shall be in conformance with ASTM D2464. All solvent welded or threaded joints shall be watertight.
  2. Flanges: Flanges for Schedule 80 PVC pipe shall be rated for a 150 psi working pressure with ANSI B 16.1 dimensions and bolting pattern. Flanges shall be connected to PVC piping with either solvent welded or threaded joints in accordance with ASTM D2467 or ASTM 2464, respectively. Gaskets shall be neoprene, full faced type with a minimum thickness of 1/8-inch. Nuts and bolts shall be hexagonal with machine threads, manufactured of Type 316 stainless steel in accordance with ASTM A320, Class 2. Type 316 stainless steel flat washers w/lock washers shall be used against PVC flanges. The nuts shall have a hardness that is lower than that of the bolts and washers by a difference of 50 Brinnell hardness to prevent galling during installation.
  3. Solvent Cement: PVC solvent cement shall be in compliance with ASTM D2564 and in accordance with the pipe manufacturer's recommendations.
  4. Thread Lubricant: Lubricant for Schedule 80 threaded joints shall be Teflon tape only.
- B. Large PVC Pressure Piping: Unless otherwise noted, PVC pressure pipe for nominal diameters 4 inches and larger in size shall conform to the requirements of AWWA C900 DR18 up to 12 inches and AWWA C905 DR18 larger than 12 inches with gasketed integral bell ends. Pipe shall be designed for maximum working pressure of not less than 150 psi and with not less than a 4 to 1 sustained hydrostatic pressure safety factor. PVC pressure pipe shall be FDOT Approved for all installations within County and FDOT right-of-ways. Fittings shall be ductile iron fittings with restrained mechanical joint ends as specified hereinbefore. Pipe shall be made to ductile iron pipe O.D.'s instead of IPS.
- C. Gravity Sewer Piping: Unless otherwise noted, large gravity drainage piping for nominal diameters 4 inches and larger in size shall conform to the requirements of ASTM D3034 SDR26 up to 15 inches with gasketed integral bell ends. Each integral bell joint shall consist of a formed bell with a rubber gasket. Gaskets shall be EPDM.
- D. Bell and Spigot:
1. Pipe joints shall be made with integral bell and spigot pipe ends. The bell shall consist of an integral thickened wall section designed to be at least as strong as the pipe wall. The bell shall be supplied with factory glued rubber ring gasket which conforms to the manufacturer's

standard dimensions and tolerances. The gasket shall meet the requirements of ASTM F477 "Elastomeric Seals (Gaskets) for Joining Plastic Pipe". PVC joints manufacturer shall be a County approved manufacturer.

E. Restrained Joints:

1. In accordance with the Drawings, to prevent pipe joints and fittings from separating under pressure, pipe joints and fittings shall be restrained as follows:
  - a) PVC pipe bell and spigot joints shall be restrained with a County approved manufacturer. The restraining device and Tee head bolts shall be manufactured of high strength ductile iron meeting ASTM A536, Grade 6542-10. Clamping bolts and nuts shall be manufactured of corrosion resistant high strength, low alloy CORTEN steel meeting the requirements of ASTM A242.
  - b) Mechanical joint fittings used with PVC pipe shall be restrained with the EBBA Iron MEGALUG® Series 2000 PV Restrainer or an equal approved by the ENGINEER. The restraining device and Tee head bolts shall be manufactured of high strength ductile iron meeting ASTM A536, Grade 65-42-10. Clamping bolts and nuts shall be manufactured of corrosion resistant high strength, low alloy CORTEN steel meeting the requirements of ASTM A242.

F. Fittings

1. All fittings for use with PVC pipe three (3) inches and larger in size shall be gray cast iron or ductile iron with a minimum working pressure of 250 psi and shall conform to ANSI/AWWA A21.10/C110, latest revision. Fittings shall have mechanical joint bell ends manufactured in accordance with ANSI/AWWA A21.11/C111, and Florida Administrative Code (FAC) Chapter 62-555.322, latest revision. Jointing materials for mechanical joints shall be provided by the fitting manufacturer. Materials, assembly and bolting shall be in accordance with ANSI/AWWA A21.11/C111, latest revision. Tee head nuts and bolts for mechanical joints shall be manufactured of corrosion resistant high strength, low alloy COR-TEN steel meeting the requirements of ASTM A 242.
2. All cast iron and ductile iron fittings for use with PVC pipe shall be coated and lined as specified below:
  - a. Exterior of Fitting:



- 1) Ground buried pipe and fittings shall have factory applied bituminous coating or coal tar varnish or asphalt base paint, 1.0 mil thick.
  - 2) Exposed pipe and fittings shall have factory applied coating of a universal rust-inhibitive primer 2.0 mils dry thickness.
- b. Interior of Fitting:
- 1) Epoxy Lining: Two component, self priming, chemically cured, hi-build coal tar epoxy protective coating with a minimum DFT of 30 mils. To be used in wastewater applications only.
  - 2) Cement-Mortar lining: In accordance with ANSI 21.4 for cement mortar linings. To be used where indicated on pipe schedule for water applications.
- G. All fittings, joints, restraints, and pipe shall be manufactured by City-approved manufacturer included in Appendix A.

## 2.3 PIPE COUPLINGS

- A. Couplings: Pipe couplings used to join two pieces of plain end pipe shall be sized to suit the outside diameter of the pipe ends to be jointed. Transition couplings shall be used to join pipes of different outside diameters. Pipe couplings shall be bolted type with steel middle ring and end followers.
- B. Coating: All carbon steel parts of the coupling shall be coated on the interior and exterior with a fusion bonded thermosetting epoxy coating with a 12-mil nominal coating thickness. The coating manufacturer shall be a County approved manufacturer.
- C. Gaskets: Gaskets for the coupling shall be wedge type manufactured of Buna-N resilient rubber.
- D. Bolts: Bolts shall be manufactured of high strength Type 316 stainless steel with Type 316 stainless steel hexagonal nuts. Bolts and nuts shall conform dimensionally to ANSI/AWWA C111, latest revision.
- E. Manufacturer: Couplings shall be Style 38 and manufacturer shall be a County approved manufacturer.

## 2.4 FLANGED ADAPTER COUPLINGS

- A. Adapters shall be suitable for joining plain-end pipe to flanged pipes and fittings. Adapters shall conform in size and bolt hole placement to ANSI

standards for steel and/or cast iron flanges, 125 or 150 pound standard, unless otherwise required for connections (ANSI B16.1 125 lb./ANSI B16.5 150 lb.).

- B. Adapters shall be constructed of Type 316 stainless steel. Bolts and nuts shall be Type 316 stainless steel conforming to ASTM A193, Grade B8 for bolts, and ASTM A194, Grade 8 for nuts and washers. Bolts and nuts greater than 1 1/8 inches in diameter shall be carbon steel ASTM A307, Grade B, with cadmium plating, ASTM A165, Type NS. Gasket material shall be suitable for exposure to the liquids to be contained within the pipes. All adapters shall be restrained with set screws to prevent axial movement. The restraint system shall be rated for a working pressure of at least 150 psi.
- C. Adapters shall be Dresser Style 128 or equal.

## 2.5 FLEXIBLE EXPANSION JOINTS

- A. Flexible expansion joints shall be of the molded wide double arch design manufactured of neoprene rubber with polyester and steel reinforcement. Neoprene body shall be supplied with a Hypalon coating. All expansion joints shall have filled arches. Joints shall be flanged, suitable for 150 psi water working pressure, and in accordance with ANSI B16.1 dimensions and bolting patterns. Flanged ends shall be furnished with split 316 stainless steel retaining rings.
- B. Provide 316 stainless steel limit restraint rods on all lines as follows:

### Tie Bolts or Stud Requirements for Flexible Pipe Couplings

Nominal Pipe Size (Inches)	150 psi		300 psi	
	No. Bolts Or Studs	Size (Inches)	No Bolts Or Studs	Size (Inches)
2	2	5/8	2	5/8
3	2	5/8	2	5/8
4	2	5/8	2	5/8
6	2	5/8	2	5/8
8	2	5/8	2	5/8
10	2	5/8	2	3/4
12	2	3/4	2	7/8
14	2	3/4	2	1
16	2	7/8	2	1-1/4
18	2	1	2	1-3/8
20	2	1	2	1-1/2
24	4	1	4	1-1/4

C. Minimum performance for flexible expansion joints shall be as follows:

Size <u>(In.)</u>	Axial Compression <u>(Inches)</u>	Axial Elongation <u>(Inches)</u>	Lateral Deflection <u>(Inches)</u>	Angular Deflection <u>Degrees</u>
2	7/8	1/2	1	30
4	7/8	1/2	1	30
6	7/8	1/2	1	25
8	1-3/8	3/4	1	25
10	1-3/8	3/4	1	20
12	1-3/8	3/4	1	20
24	1-5/8	7/8	1	20

D. Flexible expansion joints shall be as manufactured by Mercer, Red Valve, General Rubber Corporation, Metraflex Company, or an equal approved by the ENGINEER.

## 2.6 PLUG VALVES

A. Plug valves shall be non-lubricated 100% full port eccentric type with flanged or mechanical joint ends as specified below. Valves shall open by turning to the left (counter-clockwise), when viewed from the stem. Port area of valves shall be a minimum of 100 percent of full pipe area. Valve pressure ratings, body flanges, and wall thicknesses shall be in full conformance with ANSI B16.1, latest revision. Valves shall seal leak-tight against full rated pressure in both directions. Prior to shipment from the factory, each valve shall be hydrostatically tested as follows. Valve seats shall be tested to provide leak tight shut off to 175 psi for valves through 12-inch and 150 psi for valves 14 inches and larger, with pressure in either direction. In addition, a hydrostatic shell test shall be performed with the plug open to a pressure twice that of rating specified above to demonstrate overall pressure integrity of the valve body. Plug valves shall be eccentric plug valves manufactured by an approved manufacturer.

B. Valve bodies shall be constructed of high strength cast iron conforming to ASTM A126, Class B and AWWA C504, latest revisions. Valve seats shall be formed by cast bodies with raised eccentric seats which have a corrosion-resistant welded-in overlay of not less than 90 percent pure nickel on all surfaces contacting the plug face. Valve seats shall be in accordance with AWWA C504 and AWWA C507, latest revisions. Valves shall be furnished with resilient faced plugs with neoprene facing, suitable for use with sludge. Valves shall be furnished with replaceable, permanently lubricated, stainless steel or fiberglass backed woven teflon fiber, sleeve-type bearings in the upper and lower plug stem journals. Plug stem bearings shall comply with AWWA C504 and C507, latest revisions. Valves shall be bolted bonnet design. Valves shaft seals shall be designed so that they can be repackaged without removing the bonnet and the packing shall be adjustable. Packing material shall be Buna type packing. Valve shaft seals shall be in accordance

with AWWA C504 and AWWA C507, latest revisions. All exposed valve nuts, bolts, springs, washers, and the like shall be Type 316 stainless steel.

- C. All interior ferrous surfaces of the valve, except the valve seating surfaces, shall be coated with a factory applied, fusion bonded or thermosetting epoxy coating in accordance with AWWA C550, latest revision. Coating shall be holiday-free with a minimum thickness of 12 mils. Surfaces shall be clean, dry, and free from rust, oil, and grease before coating.
- D. All exterior surfaces of plug valves shall be clean, dry, and free from rust and grease before coating. For buried service, the exterior ferrous parts of all valves shall be coated at the factory. For valves installed above ground, the exterior ferrous parts of all valves shall be shop primed at the factory with one coat, minimum dry film thickness 2 - 3.5 mils, of a lead and chromate-free primer with rust-inhibitive pigments and synthetic resins. Primer shall be suitable for finish paint specified. Following installation, above-ground valves shall be finish painted in accordance with the Drawings.
- E. All plug valves installed above ground, in valve vaults, or on flanged piping shall have flanged ends as specified for ductile iron pipe, unless otherwise shown on Drawings. Flanges shall comply with facing, drilling, and thickness of ANSI Standards for Class 125 dimension. All buried plug valves shall have mechanical joint ends as specified for ductile iron pipe.
- F. Mechanical Valve Actuators
  - 1. Each plug valve installed underground shall have a gear actuator with a 2-inch square nut designed for buried and submerged service. Gear actuator shall be sized for the maximum pressure differential across the valve, equal to the pressure rating of the valve. Valve shall have seals on all shafts and gaskets on valve and actuator covers to prevent entry of water and dirt. Actuator mounting brackets for buried or submerged service shall be totally enclosed and shall have gasket seals. All exposed valve nuts, bolts, springs, washers, and the like shall be Type 316 stainless steel.
  - 2. Each above ground plug valve and all plug valves installed in concrete vaults shall be furnished with a mechanical gear actuator furnished with a handwheel. Gear actuator shall be sized for the maximum pressure differential across the valve, equal to the pressure rating of the valve. All gearing shall be enclosed in a high-strength cast iron housing, suitable for running in a lubricant. Housing shall be provided with seals on all shafts to prevent the entry of dirt and water into the actuator. Actuator shaft and quadrant shall be supported on permanently lubricated bronze bearings. Actuator shall clearly indicate valve position and an adjustable stop shall be provided to set closing torque.

## 2.7 SWING CHECK VALVES

- A. Swing check valves 2-inch through 24-inch in size shall conform to AWWA C508, latest revision, and shall be designed for a minimum water working pressure of 150 psi. Check valves shall have cast iron body, swing type design, and ends shall be flanged, Class 125 in accordance with ANSI B16.1. When open, the valve shall have a straight way passage with a minimum flow area equal to the full pipe area. Swing check valves shall be completely bronze fitted with renewable bronze seat ring and a rubber faced disc. Valve hinge pin shall be stainless steel. Check valves shall be supplied with an outside lever and weight. The check valve bonnet shall be provided with a tapped boss with plug for future installation of a pressure gauge.
- B. Each check valve for the pumps shall be oil cushioned such that it opens smoothly on pump start-up and closes at a controlled rate of speed for the final predetermined portion of its stroke following pump shut-down. A single cushioning device mounted on the external side of the valve shall control the valve closure by way of the interchange of oil to and from an oil reservoir. The use of an air or gas pressurized oil reservoir shall not be permitted. On start-up of the pump, the check valve disc shall open in response to the flow and then afford the minimum resistance to the flow. Upon pump shut-down, the valve's counterweight shall initiate the valve closure at an unrestricted rate until the valve disc reaches the preselected point of closure. The point at which the adjustable closing speed occurs shall be field-adjustable. The closing speed shall also be adjustable in the field by way of a micrometer type needle valve. Each check valve shall include a limit/proximity switch to remotely monitor position of check valve.
- C. Swing check valves shall absolutely prevent the return of water back through the valve when the inlet pressure decreases below the downstream pressure. The check valve shall be constructed such that the disc and body seat ring may be easily removed and replaced without removing the valve from the line. Each valve shall be hydrostatically tested at the factory, at a test pressure of 300 psi.
- D. Prior to shipment from the factory, the interior ferrous surfaces of the valve, except for finished, non-ferrous, or bearing surfaces, shall be coated with a fusion bonded or thermosetting epoxy coating in accordance with AWWA C550, latest revision. Coating shall be holiday-free, NSF approved, with a minimum thickness of 16 mils. Surfaces shall be clean, dry, and free from rust and grease before coating.
- E. All exterior surfaces of swing check valves shall be clean, dry, and free from rust and grease before coating. Exterior ferrous parts of all valves shall be shop primed at the factory with one (1) coat, minimum dry film thickness of 4 mils, of a rust inhibitive, universal primer. Primer shall suitable for finish paint specified. Following installation, valves shall be finish painted in accordance with the Drawings.

- F. Valve Manufacturer: Swing check valves shall be manufactured by a County approved manufacturer.

2.8 VALVE BOXES

- A. Assemble and place a valve box over the operating nut for each buried valve.
- B. Valve extensions shall be provided for all buried valves when operating nut is deeper than three (3) feet below final grade.

2.9 PIPE AND VALVE IDENTIFICATION SYSTEMS

- A. Materials selected for identification systems for each type surface shall be the product of a single manufacturer.
- B. Buried piping shall be identified by identification tape installed over the centerline of the pipelines.

1. Identification Tape for Steel or Iron Pipe: Identification tape shall be manufactured of inert polyethylene film so as to be highly resistant to alkalies, acids, or other destructive agents found in soil, and shall have a minimum thickness of 4 mils. Tape width shall be 6-inches and shall have background color specified below, imprinted with black letters. Imprint shall be as specified below and shall repeat itself a minimum of once every 2 feet for entire length of tape. Tape shall be Terra Tape Standard 250, or approved equal.
2. Identification Tape for Plastic or Non-Magnetic Pipe: Identification tape shall be manufactured of reinforced polyethylene film with a minimum overall thickness of 4 mils and shall have a 0.35 mil thick magnetic metallic foil core. The tape shall be highly resistant to alkalies, acids, and other destructive agents found in soil. Tape width shall be 3 inches and shall have background color specified below, imprinted with black letters. Imprint shall be as specified below and shall repeat itself a minimum of once every 2 feet for entire length of tape. Tape shall be TerraTape Sentry Line 1350, or approved equal.
3. Warning tape shall be placed 12 inches to 18 inches above all pipe.
4. Tape background colors and imprints shall be as follows:

<u>Imprint</u>	<u>Background Color</u>
"Caution Reclaimed Force Main Buried Below"	Purple

5. Identification tape shall be "Terra Tape" as manufactured by Reef Industries, Inc., Houston, TX; Allen Systems, Inc., Wheaton, IL; or approved equal.
- C. Buried piping shall be identified by a continuous longitudinal painted "purple" stripe of oil-based enamel paint located within the top 90 degrees of the pipe. Said stripe shall be a minimum 2-inches in width for pipe sizes less than 24-inches in diameter and three (3) stripes 2-inches in width within the top 90 degrees for pipe sizes 24-inches and larger. All PVC shall be a single homogenous color as indicated by the identification color above.
- D. Buried piping shall be installed with a continuous, insulated 14-gauge solid copper wire installed along the top of the pipe for location purposes.
- E. General Notes and Guidelines:
  1. Pipelines, equipment, or other items which are not listed here shall be assigned a color by the Owner and shall be treated as an integral part of the Contract.
  2. All inline equipment and appurtenances not assigned another color shall be painted the same base color as the piping. The pipe system shall be painted with the pipe color up to, but not including, the flanges attached to pumps and mechanical equipment assigned another color.
- F. All insulated surfaces, unless otherwise specified, shall be given one (1) coat of sizing, one (1) prime coat, and one (1) finish coat.

## 2.10 MISCELLANEOUS ITEMS

- A. Other items necessary for the complete installation and not specified herein shall conform to the details and notes shown on the Drawings. All minor items implied, usually included, or required for the construction of a complete operating system shall be installed whether shown on the Drawings or not.

## PART 3 - EXECUTION

### 3.1 INSPECTION

- A. All pipe, fittings, valves, and other material shall be subject to inspection and approval by the ENGINEER after delivery, and no broken, cracked, imperfectly coated, or otherwise damaged or unsatisfactory material shall be used. When a defect or crack is discovered, the injured portion shall not be installed. Cracked pipe shall have the defect cut off at least 12-inches from the break in the sound section of the barrel.

### 3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Excavation, backfill, and compaction shall conform to the provisions of Section 02220. Upon satisfactory installation of the pipe bedding material as specified in Section 02220, a continuous trough for the pipe barrel and recesses for the pipe bells or couplings shall be excavated by hand digging. When the pipe is laid in the prepared trench, true to line and grade, the pipe barrel shall receive continuous, uniform support and no pressure will be exerted on the pipe joints from the trench bottom.
- B. Cover for underground piping shall not be less than that indicated on the Drawings. The minimum cover for pipe shall be 36 inches. In areas where other piping conflicts preclude the maximum cover desired, the piping shall be laid to provide the maximum cover obtainable.
- C. Pipe, fittings, valves, and accessories shall be installed as shown or indicated on the Drawings.
- D. All connections to existing piping systems shall be made as shown or indicated on the Drawings after consultation and cooperation with authorities of the Owner. Some such connections may have to be made during off-peak hours (late night or early morning).
- E. Pipe Joint Deflection: Whenever it is desirable to deflect pipe joints to avoid obstructions or to maintain required alignment, the amount of the joint deflection shall not exceed 80-percent of the maximum limits allowed by the pipe manufacturer.
- F. In preparation for pipe installation, placement (stringing) of pipe should be as close to the trench as practical on the opposite side of the trench from the excavated material. The bell ends of the pipe should point in the direction of the work progress.
- G. Pipe and fittings shall be laid accurately to the lines and grades indicated on Drawings or required. Where grades for the pipeline are not indicated on the Drawings, maintain a uniform depth of cover with respect to finish grade. Care shall be taken to insure a good alignment both horizontally and vertically and to give the pipe a firm bearing along its entire length. Any pipe which has its grade or joint disturbed after laying shall be taken up and relayed.
- H. All pipe and fittings shall be cleared of sand, dirt, and debris before laying. All precautions shall be taken to prevent sand, dirt, or other foreign material from entering the pipe during installation. If necessary, a heavy, tightly woven canvas bag of suitable size shall be placed over each end of the pipe before lowering into the trench and left there until the connection is made to the adjacent pipe. Any sand, dirt, or other foreign material that enters the pipe shall be removed from the pipe immediately. Interior of all pipe and fittings shall be kept clean after installation until accepted in the complete Work.



- I. Any time that pipe installation is not in progress, the open ends of pipe shall be closed by a watertight plug or other method approved by the ENGINEER. Plugs shall remain in pipe ends until all water is removed from the trench. No pipe shall be installed when trench conditions are unsuitable for such work, including standing water, excess mud, or rain.
- J. After pipe has been laid, inspected, and found satisfactory, sufficient backfill shall be placed along the pipe barrel to hold the pipe securely in place while conducting the preliminary hydrostatic test. No backfill shall be placed over the joints until the preliminary test is satisfactorily completed, leaving them exposed to view for the detection of visible leaks.
- K. Upon satisfactory completion of the hydrostatic test, backfilling of the trench shall be completed.
- L. Above ground and Exposed Piping: Piping shall be cut accurately to measurements established at the job site and shall be worked into place without springing or forcing, properly clearing all equipment access areas and openings. Changes in sizes shall be made with appropriate reducing fittings. Pipe connections shall be made in accordance with the details shown and manufacturer's recommendations. Open ends of pipe lines shall be properly capped or plugged during installation to keep dirt and other foreign material out of the system. Pipe supports and hangers shall be provided where indicated or as required to insure adequate support of the piping.

### 3.3 INSTALLATION OF DUCTILE IRON PIPE

- A. All ductile iron pipe and fittings shall be laid in accordance with American Water Works Association Standard ANSI/AWWA C600, latest revision, entitled "Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances".
- B. Restrained Joints: Restrained joints shall be provided where indicated on the Drawings. Joint assembly shall be made in strict accordance with the manufacturer's instructions, which shall be submitted to the ENGINEER for review and approval before commencing work.
- C. Flanged Joints: Flanged joints shall be made up by inserting the gasket between the flanges. The threads of the bolts and the faces of the gaskets shall be coated with suitable lubricant immediately before installation.
  - 1. Bolt holes of flanges shall straddle the horizontal and vertical centerlines of the pipe. Clean flanges by wire brushing before installing flanged fittings. Clean flange bolts and nuts by wire brushing and lubricate bolts with oil and graphite.

2. Insert the nuts and bolts (or studs), finger tighten, and progressively tighten diametrically opposite bolts uniformly around the flange to the proper tension.
3. Exercise care when tightening joints to prevent undue strain upon valves, pumps, and other equipment.
4. If flanges leak under pressure testing, loosen or remove the nuts and bolts, reset or replace the gasket, reinstall or retighten the bolts and nuts, and retest the joints. Joints shall be watertight.

### 3.4 INSTALLATION OF PVC PIPE

- A. All push-on joint PVC pipe shall be installed in accordance with the pipe manufacturer's published installation guide, the AWWA Manual of Practice No. M23 "PVC Pipe - Design and Installation" and the Uni-Bell Plastic Pipe Association installation recommendations.
- B. PVC Pipe Joint Assembly for Threaded and Solvent Welded Pipe:
  1. All threaded and solvent welded joints shall be made watertight in accordance with ASTM D2855, ASTM D2564, and AWWA Manual M23. All pipe cutting, threading, and jointing procedures for threaded and solvent welded PVC pipe joints shall be in strict accordance with the pipe and fitting manufacturer's printed installation instructions. Thread lubricant for threaded joints shall be Teflon tape only.
  2. At threaded joints between PVC and metal pipes, the metal side shall contain the socket end and the PVC side the spigot. A metal spigot shall not, under any circumstances, be screwed into a PVC socket.

### 3.5 INSTALLATION OF PIPE SLEEVES, WALL CASTINGS, AND COUPLINGS

- A. Pipe sleeves and wall castings shall be provided at the locations called for on the Drawings. These units shall be as detailed and of the material as noted on the Drawings. They shall be accurately set in the concrete or masonry to the elevations shown. All wall sleeves and castings required in the walls shall be in place when the walls are poured. Ends of all wall castings and wall sleeves shall be of a type consistent with the piping to be connected to them.
- B. Link seals for wall sleeves shall be installed in strict accordance with the manufacturer's printed installation instructions. For watertight applications in tanks, the link seal installation shall be tested hydrostatically for leaks at the same time as the tank. Any leaks that occur during the test period shall be repaired by checking the link seals for proper installation and replacing of units found to be defective at no additional cost to the Owner.

- C. Pipe couplings shall be installed in strict accordance with the manufacturer's published instructions and recommendations.

### 3.6 INSTALLATION OF VALVES

- A. Valves of the size and type shown on the Drawings shall be set plumb and installed at the locations indicated on the Drawings. Valves shall be installed in accordance with manufacturer's installation instructions and with the details shown on the Drawings.
- B. Valves shall be installed such that they are supported properly in their respective positions, free from distortion and strain. Valves shall be installed such that their weight is not borne by pumps and equipment that are not designed to support the weight of the valve.
- C. Valves shall be carefully inspected during installation; they shall be opened wide and then tightly closed and the various nuts and bolts shall be tested for tightness. Special care shall be taken to prevent any foreign matter from becoming lodged in the valve seat. Check and adjust all valves for smooth operation.
- D. Install valves with the operating stem in either horizontal or vertical position.
- E. Allow sufficient clearance around the valve operator for proper operation.
- F. Clean iron flanges by wire brushing before installing flanged valves. Clean carbon steel flange bolts and nuts by wire brushing, lubricate flange bolt threads with oil or graphite, and tighten nuts uniformly and progressively. Clean threaded joints by wirebrushing or swabbing. Apply Teflon joint compound or Teflon tape to pipe threads before installing threaded valves. Joints shall be watertight.
- G. For buried valves, a valve box shall be centered accurately over the operating nut and the entire assembly shall be plumb. The tops of valve boxes shall be adjusted to the proper elevation as specified below and as shown on the Drawings.
- H. Valves shall be tested hydrostatically, concurrently with the pipeline in which they are installed. Protect or isolate any parts of valves, operators, or control and instrumentation systems whose pressure rating is less than the pressure used for the pressure tests. If valve joints leak during pressure testing, loosen or remove the nuts and bolts, reseal or replace the gasket, reinstall or retighten the bolts and nuts, and hydrostatically retest the joints.
- I. Following installation, all above-ground valves shall be painted in accordance with Section 09905.

### 3.7 PRESSURE TEST

- A. Pressure Testing of Piping- See Section 15044.

### 3.8 OBTAINING POTABLE WATER FOR TESTING AND FLUSHING

- A. The potable water supply shall be protected with an air gap or a reduced pressure principle backflow preventer approved by the Owner, if potable water is used for testing and flushing.
- B. To obtain potable water service during construction, the Contractor shall be required to install a temporary water meter, if public supply is available. The piping, fittings, backflow preventer, and appurtenances required for the temporary construction water service shall be supplied by the Contractor.
- C. The Contractor shall coordinate with the Owner for temporary construction water service connection, usage, and flushing.

### 3.9 MAIN CLEANING AND FLUSHING

- A. Following the hydrostatic and leakage tests, all the mains constructed under this contract shall be cleaned and flushed to remove sand, loose dirt, and other debris. Flushing velocity shall be a minimum of 2.5 feet per second. Flushing shall continue until clean water flows from the main. However, the Contractor shall endeavor to use the minimum amount of flushing water required to complete the work.
- B. Temporary blowoffs may be required for the purpose of flushing mains. Temporary blowoffs shall be installed as close as possible to the ends of the main being flushed. Blowoffs installed on the main shall be the same diameter as the main. Temporary blowoffs shall be removed and plugged after the main is flushed. Installing and removing temporary blowoffs shall be at no additional cost to the Owner.
- C. The Owner shall be notified at least 72 hours prior to flushing mains.
- D. Blowoffs and temporary drainage piping used for flushing shall not be discharged into any gravity sewer or pumping station wet well. The Contractor shall obtain prior approvals from the ENGINEER and the Owner as to the methods and locations of flushing water discharge.

END OF SECTION

## SECTION 15110

### WASTEWATER VALVES AND APPURTENANCES

#### PART 1 - GENERAL

##### 1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install complete and ready for operation all valves and appurtenances as shown on the Drawings and as specified herein.
- B. The equipment shall include, but not be limited to, the following:
  - 1. Eccentric Plug Valves
  - 2. Check Valves
  - 3. Pinch Check Valves
  - 4. Vacuum Breakers
  - 5. Air Release Valves
  - 6. Corporation Stops
  - 7. Flange Adapter Couplings
  - 8. Flexible Couplings
  - 9. Diaphragm Seals
  - 10. Unions
  - 11. Mechanical Type Seals
  - 12. Hose End Faucets
  - 13. Pressure Gauges
  - 14. Reduced Pressure Backflow Preventer
  - 15. Flow Meters

##### 1.2 DESCRIPTION OF SYSTEMS

- A. All of the equipment and materials specified herein are intended to be standard for use in controlling the flow of wastewater.

##### 1.3 QUALIFICATIONS

- A. All of the types of valves and appurtenances shall be products of well-established reputable firms who are fully experienced, reputable and qualified in the manufacture of the particular equipment 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 as applicable.

#### 1.4 SUBMITTALS

- A. Submit within 15 days after execution of the contract a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site, in accordance with Section 01600.
- B. Complete shop drawings of all valves and appurtenances shall be submitted to the ENGINEER for approval in accordance with the requirements of Section 01340 and the General Conditions.

#### 1.5 TOOLS

- A. Special tools, if required for normal operation and maintenance shall be supplied with the equipment.

### PART 2 - PRODUCTS

#### A. General:

- 1. All valves and appurtenances shall be of the size shown on the Drawings and as far as possible all equipment of the same type shall be from one manufacturer.
- 2. All valves and appurtenances shall have the name of the maker and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.

#### B. Eccentric Plug Valves

- 1. All valves shall be eccentric plug valves unless otherwise specified. Valves shall be as manufactured by DeZurik, Homestead, or ENGINEER approved equal.
- 2. Plug valves shall be tested in accordance with AWWA C504 Section 5. Each valve shall be performance tested in accordance with AWWA C504 Section 5.2 and shall be given a leakage test and hydrostatic test as described in AWWA C504 Paragraphs 5.3 and 5.4. The leakage test shall be applied to the face of the plug tending to unseat the valve. The Manufacturer shall furnish certified copies of reports covering proof of design testing as described in AWWA C504 Section 5.5.
- 3. Plug valves shall be of the tight closing, resilient faced, non-lubricating variety and shall be of eccentric design such that the valve's pressure member (plug) rises off the body seat contact area immediately upon shaft rotation during the opening movement. Valve pressure ratings

shall be as follows and shall be established by hydrostatic tests as specified by ANSI B16.1-1967. Valves shall be drip-tight in both directions (bi-directional) at rated pressure, 175 PSI through 12-inch diameter, 150 PSI for 14-inch diameter and above. The valve shall be provided with a 2-inch square operating nut.

4. The valve body shall be constructed of cast iron ASTM A126, Class B. Body ends shall be mechanical joint to meet the requirements of AWWA C111/ANSI A21.11 or single gasket push-on type.
5. The valve plug shall be constructed of cast iron or ductile iron and shall have a conical seating surface which is eccentrically offset from the center of the plug shafts. The plug and shafts shall be integral. The entire plug face shall be totally encapsulated with Buna N (Nitrile) rubber in all valve sizes. The rubber to metal bond must withstand 75 pounds of pull under test procedure ASTM D-429-73, Method B. When the plug is in full open position, plug geometry and body waterway contours must provide a passageway that allows flow capacity equal to 100-percent of the adjacent pipe area.
6. Valve seat mating surface shall be constructed of a welded-in overlay of not less than 90-percent nickel or be a one-piece 304 stainless steel ring. Seat ring contour must be precision machined.
7. A mechanical "brake" shall be supplied on all valves and shall be capable of "locking" the valve in any intermediate position between full-open and full-closed.
8. Valves shall have multiple V-type packing and packing glands and shall be capable of being field adjusted or repacked without the bonnet or plug being removed from the valve with the valve under the full rated pressure. Valves shall have a port position indicator.
9. For corrosion protection, the interior ferrous surfaces of all plug valves shall have a 2-part epoxy internal coating to a minimum of 20 mils thickness.
10. Valve shaft seals shall be adjustable and comply with AWWA C507 Section 10 and with AWWA C507 Section 11.
11. Manual valves shall have lever or gear actuators and tee wrenches, extension stems, floor stands, etc. as indicated on the plans. All valves 6 inches and larger shall be equipped with gear actuators. All gearing shall be enclosed in a semi-steel housing and be suitable for running in a lubricant with seals provided on all shafts to prevent entry of dirt and water into the actuator. All actuator shafts shall be supported on

permanently lubricated bronze bearings. Actuators shall clearly indicate valve position and an adjustable stop shall be provided to set closing torque. All adjustable stop shall be provided to set closing torque. All exposed nuts, bolts, and washers shall be zinc or cadmium plated. Valve packing adjustment shall be accessible without disassembly of the actuator.

12. Valves and gear actuators for submerged service shall have seals on all shafts and gaskets on the valve and actuator covers to prevent entry of water. Actuator mounting brackets for buried or submerged service shall be totally enclosed and shall have gasket seals. All exposed nuts, bolts, springs and washers shall be stainless steel.
13. Three-way plug valves shall be non-lubricated gear oriented. Valve bodies shall be ASTM A-126 Class, and be semi-steel with 125 lb. ANSI standard flanges. Plugs shall be resilient faced. Three-way valves shall be 3-way, 3 port 270 degree turn.
14. Plug valves installed such that actuators are six (6) feet or more above the floor shall have chain wheels.
15. Where shown on the Drawings, plug valves shall be installed with extended shafts and actuators. Actuators for extended shafts shall be mounted on floor stands where indicated on the Drawings or shall be of the removable handwheel type where floor stands are not called for. Six (6)-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 and shall be of 304 stainless steel where submerged and carbon steel elsewhere. Floor stands and covers, where called for, shall be of cast iron. Floor stands shall be equipped with valve position indicators. Where shown on the Drawings, plug valves shall be furnished with extended bonnets, equal to DeZurik Figure 640.
16. All buried plug valves shall have a remote position indicator in the valve box showing position of the valve. A stainless steel centering and I.D. plate shall be provided showing direction of opening and number of turns to open for each valve.

#### C. Valves for Buried Service

1. Valves for buried service shall meet all the requirements as specified herein for interior except that buried valves shall have mechanical joint ends.



2. All buried valves shall have cast-iron three (3) piece valve boxes, and valve boxes shall be provided with suitable heavy bonnets to extend to such elevation at the finished grade surface as directed by the ENGINEER. The barrel shall be two-piece, screw type, having a 5-inch shaft. The upper section shall have a flange at the bottom having sufficient bearing area to prevent settling, shall be designed so as to prevent the transmission of surface loads directly to the valve or piping, and shall be complete with cast iron covers. Covers shall have "RECLAIMED" cast into the top. The covers shall be so constructed as to prevent tipping or rattling. Valve boxes shall be manufactured by Opelika Foundry Company, Opelika, Alabama or Tyler Pipe Division, Tyler, Texas or approved equal.
3. One (1) tee-handled gate wrench of suitable length shall be furnished to operate each valve with a valve box.
4. Where valves are located out of pavement, the boxes shall be adjusted to finished grade and a concrete slab two (2) feet square and six (6)-inches thick shall be poured around the box.
5. Valve boxes shall be of the heavy duty, traffic bearing cast iron, adjustable screw type with a drop cover. The valve box assembly shall consist of a bottom section, top section and cover which is cast from gray iron, formulated to ASTM specification A-48 latest revision, class 30 minimum and shall be free from blowholes, shrinkage or other imperfections not true to pattern. The shaft size shall be 5 ¼-inch and the adjustable length shall be from 18-inch to 24-inch. The wall thickness shall be 3/16-inch  $\pm$  1/16-inch. The weight of the assembly shall be 61 pounds  $\pm$  2 pounds, with the cover weight being a minimum of 12 pounds.
6. The name of the manufacturer and foundry of origin shall be cast into each of the components of the assembly in legible form. The assembly shall be suitable for highway traffic wheel loads of 16,000 pounds and shall withstand a proof load test of 25,000 pounds without failure or permanent deflection, as per Federal Specification RR-F-621-C, latest revision. The valve box shall be cast, machined, assembled, and packaged within the United States and shall fully comply with the Buy American provisions of Public Law 102-240, enacted 12/18/91.

#### D. Check Valves

1. Check valves smaller than 10-cm (4-inch) shall have a bronze body with a bronze disk. Check valves shall absolutely prevent the return of water back through the valve when the inlet pressure decreases below the delivery pressure. The valve must be full opening, tight seating and

its seat right shall be renewable and must be securely held in place by a threaded joint; the valve disc shall be bronze and shall be suspended from a non-corrosive shaft which will pass through a stuffing box.

2. The check valve 10-cm (4-inch) and larger shall be a rubber flapper type swing check valve and the body and cover shall be cast iron construction meeting ASTM A126 Class B or ductile iron construction. The flapper shall be Buna-N having an "O" ring seating edge and be internally reinforced with steel.
3. Flapper to be captured between the body and the body cover in a manner to permit the flapper to flex from closed to full open position during flow through the valve. Flapper shall be easily removed without need to remove valve from line. Check Valves to have full pipe size flow area. Seating surface to be on a 45 degree angle requiring the flapper to travel only 35 degrees from closed to full open position, for minimum head loss and non-slam closure.
4. Non-slam closing characteristic shall be provided through a short 35 degree disc stroke and a memory flex disc return action.
5. When essential to create backflow through the check valve, i.e.; to prime or backflush a clogged pump, an external backflow device shall be included.
6. Valve exterior to be painted Phenolic Primer Red Oxide for high resistance to corrosion.
7. For corrosion protection, the interior ferrous surfaces of all check valves used in wastewater applications shall be coated with a factory applied, two-part epoxy coating to a minimum of 20 mils thick.
8. Materials of construction shall be certified in writing to conform to ASTM Standards specified above.
9. Valve shall be APCO Series 100 Rubber Flapper Swing Check Valve, as manufactured by Valve & Primer Corporation, Schaumburg, Illinois, U.S.A. or series 500 Swing Flex Valve as manufactured by Val-Matic Valve and Manufacturing Corporation or ENGINEER approved equal.
10. All valves shall have a three (3) year 100-percent replacement guarantee.

E. Pinch Check Valves

1. Pinch check valves smaller than 10-cm (4-inch) shall be Red Valves Series 2633 Buna N in a Stainless Steel body with Stainless Steel end connectors or approved equal.
2. Pinch check valves 10-cm (4-inch) and larger shall be Red Valves Series 33 Buna N in an aluminum body or ENGINEER approved equal.

F. Air Release Valves

1. Air release valves (ARV) used on wastewater force mains shall be of the automatic type designed for wastewater applications. The valve body shall be cast iron construction, ASTM A126, Class B, and all internal working parts shall be 316 Series stainless steel, and BUNA-N orifice button. The venting orifice shall be a minimum of 2.54-cm (1-inch) in diameter. The inlet openings shall be sized per manufacturer's recommendation but no less than 5-cm (2-inch) NPT screwed connection. ARVs shall be manufactured by Vent-o-mat Series RGX 316 Series stainless steel, or Bermad Flow Control Accessories 300 Series stainless steel air release valves ARI-5-022.

G. Corporation Stops

1. Corporation stops for connections to ductile iron or steel piping shall be all brass or bronze suitable for 150 PSI test pressure and similar to Mueller Co. H-15029 or equal by Clow Corporation.

H. Flange Adapter Couplings

1. Flange adapter couplings shall be of the size and pressure rating required for each installation and shall be suitable for use on either cast iron or ductile iron pipe. They shall be equal to Dresser Company, Style 128. All couplings shall have a sufficient number of factory installed anchor studs to meet or exceed the test pressure rating for this project, 100 PSI minimum.

I. Flexible Couplings:

1. Flexible couplings shall be either the split type or the sleeve type as shown on the Drawings.
  - a. Split type coupling shall be either the split type or the sleeve type as shown on the Drawings. The couplings shall be mechanical

type for radius groove piping. The couplings shall mechanically engage and lock grooved pipe ends in a positive coupling and allow for angular deflection and contraction and expansion.

- b. Couplings shall consist of malleable iron, ASTM Specification A47, Grade 32510 housing clamps in two or more parts, a single chlorinated butyl composition sealing gasket with a "C" shaped cross-section and internal sealing lips projecting diagonally inward, and two or more oval track head type bolts with hexagonal heavy nuts conforming to ASTM Specification A183 and A194 to assemble the housing clamps. Bolts and nuts shall be 316 stainless steel.
- c. Victaulic type couplings and fittings may be used in lieu of flanged joints. Pipes shall be radius grooved as specified for use with the Victaulic couplings. Flanged adapter connections at fittings, valves, and equipment shall be Victaulic Vic Flange Style 741, equal by Gustin-Bacon Group, Division of Certain-Teed Products, Kansas City, Kansas, or ENGINEER approved equal.
- d. Sleeve type couplings shall be used with all buried piping. The couplings shall be of steel and shall be Dresser Style 38, Smith Blair Style 413, Baker Allsteel, or equal. The coupling shall be provided with stainless steel bolts and nuts unless indicated otherwise.
- e. All couplings shall be furnished with the pipe stop removed.
- f. Couplings shall be provided with gaskets of a composition suitable for exposure to the liquid within the pipe.
- g. If the Contractor decides to use victaulic couplings in lieu of flanged joints, he shall be responsible for supplying supports for the joints.

J. Diaphragm Seals:

- 1. Diaphragm seals shall be installed on pressure gauge connection to all lines where shown on the Drawings, to protect pressure switches used to monitor excessive pressures on pipe lines. The diaphragm shall be "thread attached" to both piping and pressure switches. Diaphragm seals shall be constructed of cadmium plated carbon steel, except for the lower housing which shall be specifically chosen according to the fluid pressure being monitored.

2. Diaphragm seals shall have a flushing connection and be Type SB Mansfield and Green; No. 877 Trerice; Ashcroft; or ENGINEER approved equal.

K. Unions

1. Unions on ferrous pipe 2-inch in diameter and smaller shall be 150 pounds malleable iron, zinc-coated. Unions on water piping 2-inch in diameter and larger shall be flange pattern, 125 pound class, zinc-coated. Gaskets for flanged unions shall be of the best quality fiber, plastic, or leather. Unions shall not be concealed in walls, ceilings, or partitions.

L. Mechanical Type Seals

1. Mechanical type seals shall consist of an adjustable modular bolted, synthetic rubber and plastic sealing element. The sealing element shall be Link-Seal LS-300-C as manufactured by Thunderline Corp., Inkster, Michigan or ENGINEER approved equal.

M. Hose End Faucets

1. Hose end faucets for potable water supply at submersible stations shall be Zurn Model Z-1385. Faucet shall be furnished with removable key and shall be lockable.

N. Pressure Gauges

1. Each pressure gauge shall be direct mounted, cast aluminum case, with a 4-inch diameter dial and furnished with a clear glass crystal window, 3/8-inch shut-off valve, and a bronze pressure snubber. Provide diaphragm seals between shut-off valve and pressure gauge on all sludge and lines with nonclear matter in suspension of solution. All gauges shall be weatherproofed. The face dial shall be white finished aluminum with jet black graduations and figures. The face dial shall indicate the units of pressure being measured (e.g., feet, inches, etc.) or be dual scale.
2. If shown on the Drawings, each pump discharge line shall be furnished with gauges sized 0 to 100 PSI.

O. Reduce Pressure Backflow Preventor

1. If shown on the Drawings, backflow preventors shall be supplied at each pump station.

P. Flow Meters

1. Meters shall be of the magnetic type with Teflon lining, stainless steel electrodes and ultrasonic cleaning, or the universal venturi type with flanged cast or ductile iron body and bronze throat. Flow meters shall be designed to record both the peak pumping station capacity and anticipated minimum flows with equally high accuracy. The meters shall be direct reading in gallons per minute, totalizing in million gallons per day and recording on 8-inch diameter, 24-hour linear charts in gallons per minute. All meters shall also be tied to the Radio Telemetry SCADA System. The flow metering system shall be installed within the pumping station structure, if space is available, or in an exterior protected and drained pit. In all cases, meter by-pass valves and piping shall be provided.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. All 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. Valves shall be carefully inspected, opened wide and then tightly closed and the various nuts and bolts shall be tested for tightness. Special care shall be taken to prevent any foreign matter from becoming lodged in the valve seat. Valves, unless shown otherwise shall be set with their operator shaft vertically. Any valve that does not operate correctly shall be removed and replaced.
- C. Valve boxes shall be carefully centered over the operating nuts of the valves so as to permit a valve wrench or key to be fitted easily to the operating nut. Valve boxes shall be set to conform to the level of the finished surface and held in position by a ring of concrete placed under the support flange. The valve box shall not transmit surface loads to the pipe or valve. Care shall be taken to prevent earth and other material from entering the valve box. Any valve box which is out of alignment or whose top does not conform to the finished ground surface shall be dug out and reset. Before final acceptance of the work, all valve boxes shall be adjusted to finish grade. Valve operating risers shall be installed with any valves required to ensure that the operating nut is 30-inches or less from the ground surface.
- D. After installation, all valves and appurtenances shall be tested at least one (1) hour at the working pressure corresponding to the class of pipe, unless a

different test pressure is specified. If any joint proves to be defective, it shall be repaired to the satisfaction of the ENGINEER.

- E. Install all floor boxes, brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings 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, check all Drawings which have a direct bearing on their location and the Contractor shall be responsible for the proper location of these valves and appurtenances during the construction of the structures.
- F. Pipe for use with flexible couplings shall have plain ends as specified in the respective pipe sections in Division 15.
- G. Buried flanged or mechanical joints shall be made with 316, stainless steel bolts. All exposed bolts shall be made with 316 stainless steel bolts.
- H. Prior to assembly of split couplings, the grooves as well as other parts shall be thoroughly cleaned. The ends of the pipes and outside 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 then shall 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.
- I. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly for a distance of 8 inches. 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 ring and brought to proper position in relation to the pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flaires. 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.

### 3.2 SHOP PAINTING

- A. Ferrous surfaces of valves and appurtenances shall receive a coating of rust-inhibitive primer. All pipe connection openings shall be capped to prevent the entry of foreign matter prior to installation.

### 3.3 FIELD PAINTING

- A. All metal valves and appurtenances specified herein and installed in valve and meter pits will be painted as specified in Sections 09900 and 09905.

### 3.4 INSPECTION AND TESTING

- A. Completed pipe shall be subjected to hydrostatic pressure test for hours at full working pressure. All leaks shall be repaired and line retested as approved by the ENGINEER. Prior to testing, the piping shall be supported in an approved manner to prevent movement during tests.

END OF SECTION



**DIVISION 16**  
**ELECTRICAL**

## SECTION 16050

### BASIC ELECTRICAL MATERIALS AND METHODS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes: General requirements for providing basic electrical materials and methods.
- B. Related Work Specified in Other Sections Includes:
  - 1. Certain items of equipment, and various control devices including conduit and wiring which are indicated on electrical drawings to be connected, but are specified in other sections pertaining to plumbing, heating, ventilating, air conditioning, temperature control systems, process equipment, process control systems, and instrumentation. Install and connect these items to the electrical system as indicated or required in accordance with the Contract Documents.
- C. Overall Application of Specifications: This Section applies to all sections of Division 16 and to other sections that include electrical equipment requirements except when in these individual sections requirements are otherwise specified to provide and install all materials necessary for a complete operational system.
- D. Temporary Requirements: This Section applies to any temporary circuits, overcurrent devices, conduit, wiring, and other equipment required during changeover from existing to a new electrical system. This Section also applies to temporary rewiring of lighting and power circuits, instruments and devices.

##### 1.2 DEFINITIONS

- A. Hazardous Areas: Hazardous areas as defined by the NEC as Class I, Division 1, Group D, or Class I, Division 2, Group D hazardous are as follows:
  - 1. Class 1, Division 1, Group D
    - a. Wet Well
  - 2. Class 1, Division 2, Group D

a. Pump Room and Dry Well

1.3 SYSTEM DESCRIPTION

- A. Design Requirements: Design requirements are specified in the applicable sections.
- B. Performance Requirements: Performance requirements are specified in the applicable sections.

1.4 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Product Data and Information: Provide complete list of electrical equipment and materials to be furnished showing manufacturer, catalog number, size, type, voltage rating and other pertinent information.
  - 1. Provide catalog data on manufacturer's standard equipment and materials. Clearly indicate on catalog cuts the equipment and devices being proposed.
  - 2. Identification: Provide complete schedule and listing of system and equipment identification labels with legends.
- C. CONTRACTOR's Shop Drawings: Provide shop drawings on items manufactured for the Contract.
  - 1. Provide connection diagram and schematic for each piece of electrical equipment. A manufacturer's standard connection diagram or schematic showing more than one method of connection is not acceptable unless it is clearly marked to show the intended method of connection.
  - 2. Provide diagrams showing connections to field equipment. Clearly differentiate between manufacturer's wiring and field wiring.
  - 3. Provide raceway layout drawings showing conduits, boxes, and panels which contain the conductors to be provided. Include schedules listing conduit sizes and conductor content and identification.
  - 4. Where additions and modifications are made to existing equipment, provide drawings which include both retained existing equipment and new Work.

- D. Coordination Drawings: Prepare coordination drawings to a scale of 1/4"=1'-0" or larger; detailing major elements, components, and systems of electrical equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including but not necessarily limited to the following:
1. Indicate the proposed locations of major raceway systems, equipment, and materials. Include the following:
    - a. Clearances for servicing equipment, including space for equipment disassembly required for periodic maintenance.
    - b. Exterior wall and foundation penetrations.
    - c. Equipment connections and support details.
    - d. Sizes and location of required concrete pads and bases.
  2. Indicate scheduling, sequencing, movement, and positioning of large equipment during construction.
- E. Record Documents: Prepare record documents, and in addition to the requirements specified in Division 1, indicate installed conditions for:
1. Major raceway systems, size and location, for both exterior and interior; locations of control devices; distribution and branch electrical circuitry; and fuse and circuit breaker size and arrangements.
  2. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
  3. Approved substitutions, and actual equipment and materials installed.
- F. Maintenance Manuals: Prepare maintenance manuals, and in addition to the requirements specified in Division 1, include the following information for equipment items:
1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and catalog numbers of replacement parts.
  2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control,

stopping, shutdown, and emergency instructions; and summer and winter operating instructions.

3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
4. Servicing instructions and lubrication charts and schedules.

## 1.5 QUALITY ASSURANCE

- A. Codes: Provide all electrical Work in accordance with applicable local codes, regulations and ordinances. If there is a conflict between the requirements specified in the Contract Documents and the codes, follow the more stringent requirements as determined and approved.
- B. Testing: As a minimum, provide standard factory and field tests for each type of equipment. Other tests may be specified in the applicable equipment section.
- C. Labeling: Provide all electrical equipment and materials listed and approved by Underwriters Laboratories with the UL label or other OSHA recognized testing laboratories attached to it.
- D. Standard Products: Unless otherwise indicated, provide electrical 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. When two or more units of the same class of material and equipment are required, provide the products of the same manufacturer.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. General: Deliver, store and handle all products and materials as specified in Division 1 and as follows:
- B. Shipping and Packing: Provide materials and equipment suitably boxed, crated or otherwise completely enclosed and protected during shipment, handling, and storage. Clearly label such boxes, crates or enclosures with manufacturer's name, and name of material or equipment enclosed.
- C. Acceptance at Site: Conform to acceptance requirements as required in Division 1.

Repair or replace all materials and equipment damaged by handling and storage as directed at no additional Contract cost.

- D. Storage and Protection: Protect materials and equipment from exposure to the elements and keep them dry at all times. Handle and store to prevent damage and deterioration in accordance with manufacturer's recommendations.

## 1.7 PROJECT CONDITIONS

- A. General: The Drawings indicate the extent and general arrangement of the principal electrical elements, outlets and circuit layouts. Connect and install all electrical elements and devices to form a workable system as required by the Contract Documents whether the connections and installations are specifically stated in the Specifications or shown. Provide necessary materials and installation wherever required to conform to the specific requirements of the furnished equipment and for proper installation of the Work.
- B. Schematics: In general the runs of feeders are shown schematically and are not intended to show exact routing and locations of raceways. Verify actual and final arrangement, equipment locations, and prepare circuit and raceway layouts before ordering materials and equipment. Equipment locations are approximate and are subject to modifications as determined by equipment dimensions.
- C. Coordination of Work: Coordinate the Work so that the electrical equipment may be installed without altering building components, other equipment or installations.
- D. Departure from Design: If departures are deemed necessary due to structural conditions, obstructions or other problems, provide details of such departures and the reasons for requesting approval as soon as practicable but not later than the submittal of the raceway layout drawings. Do not make any departures without written approval.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

### 3.1 ROUGH-IN

- A. Final Location: Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.

## 3.2 ELECTRICAL INSTALLATIONS

- A. Sequence, coordinate, and integrate the various elements of electrical systems, materials, and equipment. Comply with the following requirements:
1. Coordinate electrical systems, equipment, and materials installation with other building components.
  2. Verify all dimensions by field measurements.
  3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.
  4. Coordinate the installation of required supporting devices and sleeves to be set in cast-in-place concrete and other structural components, as they are constructed.
  5. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
  6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
  7. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
  8. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the ENGINEER for resolution.
  9. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
  10. Install electrical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.

11. Install access panel or doors where units are concealed behind finished surfaces.
12. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

### 3.3 CUTTING AND PATCHING

- A. Perform cutting and patching as specified in Division 1. In addition to the requirements specified in Division 1, the following requirements apply:
  1. Perform cutting, fitting, and patching of electrical equipment and materials required to:
    - a. Uncover Work to provide for installation of ill-timed Work.
    - b. Remove and replace defective Work.
    - c. Remove and replace Work not conforming to requirements of the Contract Documents.
    - d. Remove samples of installed Work as specified for testing.
    - e. Install equipment and materials in existing structures.
    - f. Locate existing structural reinforcing with a pachometer where core drilled penetrations are required so as not to cut the steel reinforcing.
  2. Cut, remove, and properly dispose of selected electrical equipment, components, and materials as indicated, including but not limited to removal of electrical items indicated to be removed and items made obsolete by the new Work. Deliver all the existing removed to the OWNER as directed.
  3. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.
  4. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
  5. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.



6. Patch finished surfaces and building components using new materials as specified for the original installation and experienced Installers. Installers' qualifications refer to the materials and methods required for the surface and building components being patched.

END OF SECTION

SECTION 16110  
ELECTRICAL RACEWAY SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing electrical raceway systems as indicated, in accordance with the Contract Documents.
- B. Related Work Specified in Other Sections Includes:
  - 1. Section 09900 – Painting and Coating

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
  - 1. ANSI C80.1 - Specifications for Rigid Steel Conduit, Zinc Coated
  - 2. ANSI C80.3 - Specifications for Electrical Metallic Tubing, Zinc Coated.
  - 3. ANSI C80.5 - Specifications for Rigid Aluminum Conduit
  - 4. ANSI C80.6 - Intermediate Metal Conduit (IMC) - Zinc Coat
  - 5. ANSI/NFPA 70 - National Electrical Code
  - 6. NEMA RN1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
  - 7. NEMA TC2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80)
  - 8. UL 1 - Flexible Metal Conduit
  - 9. UL 6 - Rigid Metal Conduit
  - 10. UL 360 - Liquid-Tight Flexible Steel Conduit
  - 11. UL 651 - Schedule 40 and 80 Rigid PVC Conduit
  - 12. UL 797 - Electrical Metallic Tubing

13. UL 1242 - Intermediate Metal Conduit
14. Federal Specification WW-C-540C-Conduits, Metal, Rigid (Electrical, Aluminum)

### 1.3 SUBMITTALS

- A. Provide all submittals, including the following, as specified in Division 1 and Section 16050.

### 1.4 QUALITY ASSURANCE

- A. Codes: Provide all materials and workmanship to meet the requirements of ANSI/NFPA 70 National Electrical Code.
- B. Regulatory Requirements: Provide UL listed components.

### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all products and materials as specified in Division 1.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted.
  1. Rigid steel and intermediate metal conduits and electrical metallic tubing:
    - a. Allied Tube and Conduit
    - b. Wheatland Tube Company
    - c. LTV Steel Tubular Products Company
  2. PVC coated steel conduits fitting and boxes:
    - a. Robroy Industries
    - b. Occidental Coating Company
    - c. Perma-Cote Industries
  3. Rigid nonmetallic conduits:
    - a. Carlon Company
    - b. Certainteed Corporation
    - c. National Pipe Company

4. Aluminum Conduits:
  - a. V.A.W. of America, Inc.
  - b. Easco Aluminum
  - c. Alumex, Inc.
  
5. Liquidtight flexible steel conduit:
  - a. Electri-Flex Company
  - b. The International Metal Hose Co.
  - c. Alfex Corp.
  - d. Anamet, Inc.
  
6. Conduit Fitting and Connectors
  - a. Appleton Electric Company
  - b. Thomas & Betts
  - c. OZ/Gedney
  - d. Killark
  - e. Adulet-PLM
  
7. Boxes and Enclosures:
  - a. Appleton Electric Company
  - b. Raco/Bell
  - c. Steel City
  - d. Hoffman
  - e. Hope
  
8. Strut Channel and Fittings
  - a. Allied Tube & Conduit
  - b. B-Line Systems, Inc.
  - c. Kindorf
  - d. Enduro
  - e. Strut Tech
  - f. Unistrut
  
9. Fire Stop System
  - a. 3M/Electrical Products Division
  - b. International Protective Coatings
  - c. Nelson Electric

## 10. Terminal Blocks

- a. Phoenix Contact
- b. Entrelec
- c. Weidmuller

## 2.2 RACEWAYS

- A. General: Provide minimum 3/4-inch raceways.
- B. Raceway Requirements: Provide raceways meeting the following requirements:
  1. Provide rigid steel, heavy wall, hot-dip galvanized in accordance with the requirements of UL-6 and ANSI C80.1.
  2. Provide rigid nonmetallic Schedule 80 PVC electrical conduit in accordance with the requirements of UL Standard 651 and NEMA Standard TC2 with solvent cement joints.
  3. Provide liquidtight flexible single strip steel, hot-dip galvanized conduit with PVC jacket in accordance with requirements of UL 1. Provide a continuous copper bonding conductor wound spirally between convolutions on the inside of the conduit meeting requirements of UL 360 for conduit sizes 1-1/4-inch and smaller.

## 2.3 FITTINGS

- A. General: Provide fittings of similar material as raceways.
- B. Fittings Requirements: Provide fittings meeting the following requirements:
  1. Set screw or indenter type fittings are not acceptable. Use threaded connectors for all rigid or intermediate metal conduits.
  2. Use solvent cement connections for all rigid nonmetallic conduits.
  3. Use insulated connectors for liquidtight flexible conduit.
  4. Expansion/Deflection Fittings: Use a deflection and expansion coupling for rigid and intermediate metal conduits that provide a 3/4 inch movement in all directions from normal and a 30 degree angular deflection. Use coupling that includes internal bonding jumper.

Use a nonmetallic expansion coupling for nonmetallic conduits that provides a 4 inch maximum expansion.

5. Bushings
  - a. Provide insulated nonmetallic bushing rated 105 degrees C for all installations where bonding is not required.
  - b. Provide insulated metallic grounding and bonding bushing rated 150 degrees C where bonding is required.
6. Fittings for Hazardous Locations:
  - a. Provide fittings that conform to the requirements of NEC Chapter 5 for Class I, Division 1, Group D hazardous locations.
  - b. Provide seal fittings suitable for either horizontal or vertical installation.

## 2.4 WALL AND FLOOR PENETRATIONS

### A. Watertight:

1. For individual conduit penetrations in new exterior walls or floors provide watertight sealing sleeves consisting of a steel sleeve with pressure ring and clamps.
2. For individual conduit penetrations in existing walls or floors, provide watertight sealing bushing consisting of a neoprene sealing ring between two PVC coated steel pressure discs. Provide stainless steel captive screws for sealing ring compression.

## 2.5 BOXES AND CABINETS

### A. Outlet Box Requirements:

1. Provide cast aluminum boxes for aluminum conduit systems.
2. Provide galvanized cast iron boxes for galvanized rigid steel conduit systems.
3. Provide nonmetallic boxes and covers in PVC conduit systems.
4. Provide watertight gasketed covers held with nonferrous screws for all cast metal boxes.

### B. Junction and Pull Box Requirements:

1. Provide cast aluminum boxes with mounting lugs, threaded hubs and gasket covers for surface mounted boxes
2. Provide fabricated sheet metal boxes when cast metal box weight exceeds 50 pounds. Construct box from 1/8-inch thick galvanized sheet steel or aluminum with sides return channel flanged around cover opening. Provide angle or channel supporting frame. Provide continuously welded and ground smooth seams. Provide mounting lugs and threaded conduit hubs.
3. Provide cast steel or fabricated 10-gauge Type 316 stainless steel for boxes either partially or fully encased in concrete. For partially encased boxes provide sides return channel flanged around cover opening. For fully encased boxes provide flush covers. Provide continuously welded and ground smooth seams. Provide mounting lugs and threaded conduit hubs.
4. Provide watertight gasketed covers held with nonferrous captive knurled head screw slot bolts.
5. Provide two padlocking hasps for boxes containing medium voltage cables.
6. Construct all fabricated boxes located indoors to NEMA 13 requirements.
7. Manufacture all boxes located outdoors to NEMA 4 requirements.
8. Manufacture all boxes located in hazardous areas to NEMA 7 requirements.

C. Terminal Box Requirements:

1. Provide minimum 12 gauge stainless steel fabricated box with mounting lugs, floor stand, and hinged doors.
2. Equip the door with continuous piano hinge and 3 point lockable latch. Provide print pocket on inside of door.
3. Fabricate back plate of 12 gauge minimum steel with white enamel finish for mounting terminals and wire troughs.
4. Provide wire troughs consisting of plastic ducts with snap slot design and removable covers. Run all wiring within wire troughs.
5. Furnish a schedule of terminals with the following information
  - a. Source
  - b. Type of Signal

- c. Function
- 6. Provide removable jumpers to allow operation of the equipment.
- 7. Separate analog terminals from all other terminals.
- 8. Provide number of terminals shown. Where the number of terminals are not shown, provide sufficient terminals for each wire entering the terminal box plus 20 percent but not less than 10 spare terminals.
- 9. Terminals:
  - a. All catalog numbers refer to Phoenix Contact Type for the purpose of establishing the standard of quality and general configuration desired.
  - b. Provide symmetrical type steel mounting rails, DIN-EN50022.
  - c. Analog Signals: Provide terminals in enclosed housing suitable for wires from 22 to 12 AWG rated 600 volts with gray body, knife disconnect and test connection socket on both sides of disconnect, Phoenix Contact Type UK 5-MTK-P/P.
  - d. Control and Alarm Signals: Provide terminals suitable for wires from 18 to 8 AWG rated 50 amperes at 600 volts, blue body, Phoenix Contact Type UK10.

## 2.6 SUPPORTING DEVICES

- A. Raceway Supports: Provide raceway supports meeting the following requirements:
  - 1. Do not use perforated straps or plumbers tape for conduit supports.
  - 2. Provide expansion bolts or inserts for fasteners in concrete, toggle bolts for hollow masonry or frame construction, and preset inserts for prestressed concrete.
  - 3. Conduit Straps and Backs:
    - a. For metallic conduits, use steel or malleable iron.
    - b. For nonmetallic and PVC coated conduits, use PVC coated malleable iron.



4. Conduit Hangers
  - a. For metallic conduits, use steel adjustable conduit hangers or clevis hangers.
  - b. For nonmetallic and PVC coated conduits, use PVC coated adjustable conduit hangers.
5. Beam Clamps:
  - a. For metallic conduits, use malleable iron with steel bolt.
  - b. For nonmetallic and PVC coated conduit, use PVC coated malleable iron with stainless steel bolt.
6. Trapeze Hangers:
  - a. For metallic conduits use 12 gauge 1-1/2-inch square steel channels with steel channel straps to secure conduits.
  - b. For nonmetallic or PVC coated conduit, use either PVC coated 12 gauge 1-1/2-inch square steel channels or 1-5/8-inch square fiberglass channels. Use PVC coated straps with stainless steel bolts for securing conduits.
  - c. Provide addition channels welded together to limit the deflection to 1/240th of span.
7. Thread Rod
  - a. Provide thread rod with the minimum size as follows:
    - (1) Conduit Hangers
      - (a) 3/4-inch to 1-1/2-inch conduit: 1/4-inch thread rod
      - (b) 2-inch to 3-1/2-inch conduit: 3/8-inch thread rod
      - (c) 4-inch and larger: 1/2-inch thread rod
    - (2) Trapeze Hangers: Provide thread rod of sufficient size to support the load. Use a minimum of 3/8-inch thread rod.
  - b. For Metallic Conduit Systems: Use continuous threaded galvanized steel rod.

- c. For Nonmetallic or PVC Coated Conduit Systems: Use a continuous threaded PVC coated galvanized steel rod.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. General: Install electrical equipment and material of the size, type and general routing as shown or required.
- B. Coordination with Reinforcing: Install raceway, fittings, boxes and cabinets free from direct contact with reinforcing steel.
- C. Alignment: Provide fasteners, anchor bolts, anchorage items and supports as required to insure proper and rigid alignment. Attach equipment with fasteners sized according to size and weight of the equipment and the thickness of the supporting surface.
- D. Aluminum Coating: Where aluminum is placed in contact with dissimilar metal or concrete, separate contact surfaces with gasket, nonabsorptive tape or coating as specified in Section 09900 to prevent corrosion.
- E. Grounding: Make metallic raceways electrically and mechanically continuous and ground as required. Install conduits continuous between outlets, boxes, cabinets and panels.

### 3.2 INSTALLATION

- A. General: Unless otherwise indicated, install conduits exposed, parallel or perpendicular to building floors, ceilings and walls, and to avoid interference with other work. Cut conduits square and deburr the cuts to the same degree as the conduit manufacturer. Saw cut aluminum conduit to prevent reduction in internal area. Fasten conduit securely to outlets, junction, pull and terminal boxes. Provide caps and seals to prevent the entrance of foreign material and moisture during installation and before pulling wire.
  - 1. Where conduit size is not shown, provide conduits one size larger than indicated in Table 4, Chapter 9 of the NEC.
  - 2. Keep conduit at least six inches away from high temperature piping, ducts, flues and surfaces. For mounting on concrete and masonry surfaces provide a minimum of 1/4 inch air space between conduit and mounting surface. Support and fasten conduit to building structural members spaced

in accordance with electrical codes. Support conduit at least every eight feet or less in accordance with NEC requirements.

3. When two or more exposed conduits are in the same general routing, provide parallel installation with symmetrical bends and for three or more provide trapeze hangers. Size trapeze hangers with space for 25 percent additional conduits.
4. Make changes in direction with bends or fittings. Make field bends and offsets with a hand bender or conduit-bending machine.
5. Run conduit with no more than the equivalent of (three) 90 degree bends between pull points. Provide no more than (125) feet of conduit runs between pull points. Provide pull boxes where shown, specified or wherever required to install conductors and to meet the above requirement.
6. Install pull and junction boxes in accessible locations with working space in front of and around the installation. Obtain approval to locate boxes in finished areas.
7. Install an expansion fitting when a conduit crosses structural expansion joint.
8. Unless otherwise approved, install conduits to cross at right angles to structural expansion joints.
9. Where approved for encased installation, install conduits in slabs as close to the middle of concrete slabs as practicable without disturbing reinforcement. Do not use conduit with an outside diameter exceeding one-third of the slab thickness. Do not place conduits closer than three diameters on centers, except at cabinet locations where the slab thickness is increased.
10. Pitch conduits to outlet boxes to avoid trapping moisture. Where dips are unavoidable in exposed conduit runs, install drain fitting at low point.

B. Conduit Material Types: Provide conduit as follows:

1. Use rigid steel conduits in all indoor and outdoor installations or concrete encased within structures.
2. Install rigid nonmetallic Schedule 80 conduits underground and in wet well structures, unless specifically detailed otherwise.
3. Hazardous Locations:

- a. Hazardous locations include the existing and new wet well and are classified Class 1, Division 1, Group D as defined by NEC.
- b. Install all conduits and appurtenances in accordance with the requirements of Chapter 5 in NEC.
- c. Provide seal fittings for all conduits that enter or leave a hazardous location.

C. Connections to Equipment

1. Use double locknuts and bushing for all boxes, enclosures and cabinets located in dry areas.
2. Use watertight hub fittings for all boxes, enclosures and cabinets located below grade and in wet, damp or corrosive areas.
3. Provide rigid conduit connection where equipment is fixed and not subject to adjustment, mechanical movement or vibration. Provide union fittings to permit removal of equipment without cutting or breaking conduit.
4. Use liquidtight flexible conduit connection where equipment is subject to adjustment, mechanical movement or vibration.
5. Coat all threads in steel conduit runs with zinc dust in oil or other corrosion preventive compound before making connections.
6. Coat all threads in aluminum conduit runs with graphite or other corrosion preventive compound.

3.3 CLEANING AND PAINTING

- A. Shop Paint: Paint conduits meeting the requirements of Section 09900.

END OF SECTION

## SECTION 16120

### WIRES AND CABLES – 600 VOLTS AND BELOW

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes: Requirements for providing all wires and cables rated at 600 volts and below for complete electrical systems as shown.
- B. Related Work Specified In Other Sections Includes:
  - 1. Section 16050 - Basic Electrical Materials and Methods
  - 2. Section 16950 - Electrical Testing Requirements

##### 1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
  - 1. ASTM B 3 - Standard Specifications for Soft or Annealed Copper Wire

##### 1.3 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1 and Section 16050.
- B. Product Data and Information: Provide manufacturer's catalog data for each type of wire furnished.

##### 1.4 QUALITY ASSURANCE

- A. General: Provide wire in accordance with applicable IEEE and NEMA standards, meeting the requirements of the NEC and UL listed.
- B. Tests: Provide cables factory tested prior to shipment in accordance with ICEA standards for the insulation specified.

##### 1.5 DELIVERY, STORAGE AND HANDLING

- A. General: Deliver, store and handle wire and cable in accordance with the manufacturer's instructions and as specified in Division 1.
- B. Store cable reels on concrete or other hard surface or on 2x4 wood laggings.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted.

1. Wire and Cable

- a. American
- b. Southwire
- c. Rome

2. Instrumentation Cable

- a. Belden
- b. Dekoron
- c. Okonite

3. Multiconductor Cable

- a. Okonite
- b. Rome
- c. Southwire

4. Wire Connectors

- a. Thomas & Betts
- b. 3 M
- c. Ideal

5. Color Coding Marker

- a. Brady
- b. Thomas & Betts

### 2.2 MATERIALS

A. Conductors: Provide soft drawn or annealed copper conductors with 98 percent minimum conductivity, meeting requirements of ASTM B 3. Use stranded conductors except solid No. 12 and No. 10 AWG may be used in lighting fixture and convenience outlet wiring.

B. Insulation: Provide wires and cables with insulation as follows:

1. Power, control and lighting wiring

- a. Single Conductor: Provide insulation as follows:

<u>Conductor Size</u>	<u>NEC Type Letter</u>	<u>Insulation Material</u>
Nos. 14, 12 and 10 AWG	XHHW	Cross-linked Polyethylene
No. 8 AWG and Larger	RHW	Cross-linked Polyethylene

- b. Multiconductor Cables: Insulate individual conductors with 15 mils of polyethylene or PVC and 4 mil nylon jacket. Cable wrap the cable conductor with type binder and an outer jacket not less than 45 mils of PVC. Use ICEA Method 1 for color coding wires.

2. Instrumentation Wiring: The use of manufacturer's name and catalog number is for the purpose of establishing quality and general configuration designed.

- a. Two conductor or single pair: Stranded No. 16 AWG wire, 600 volt polyethylene insulation, tinned copper drain wire, overlapped metalized tape overall shield providing 100 percent shield coverage and outer jacket of PVC. Belden Cat. No. 8719.

- b. Three Conductor: Stranded No. 16 wire, 600 volt polyethylene insulation, tinned copper drain wire, overlapped metalized tape overall shield providing 100 percent shield coverage and outer jacket of PVC. Belden Cat. No. 8618.

- c. Multiple Pairs or Triads: Provide individually shielded pairs or triad of stranded No. 16 AWG wire with overall shield. Insulate each wire for 600 volts with 15 mils of PVC and a 4 mil nylon jacket. Assemble pairs or triads with tinned copper drain wire and metalized tape shield providing 100 percent shield coverage. Cable pair or triad together with tinned copper drain wire and overall metalized tap shield.

- C. Printed Data on Covering: Use wire and cable with the following information surface printed at regular intervals throughout the entire length.

1. Manufacturer or trade name.
2. Size of conductor.
3. Type of insulation.
4. Voltage classification.

## 2.3 WIRE CONNECTIONS AND CONNECTING DEVICES

- A. Connectors for No. 10 AWG and Smaller: Use insulated compression type butt connectors.
- B. Connectors for No. 8 AWG and Larger: Use UL, Inc. listed compression type tube connectors for parallel or butt splices. Provide companion preformed plastic insulating covers or tape to provide insulation equal to conductor insulation.
- C. Miscellaneous Connectors: Use preinsulated spring connectors for lighting and receptacle splices and pigtails.
- D. Solderless Lugs: Provide solderless terminal lugs for stranded and multiple solid conductors at connection to terminals or use UL listed crimp tool compression style lugs.
- E. Control Wire Terminations: Provide spade lug or pressure type control conductor connection terminations for control wiring terminations. Make lug bolting at devices or bus bars with a flat washer, a Belleville washer and a locknut.

## 2.4 COLOR CODING

- A. Use a vinyl impregnated cloth tape resistant to oil, dirt and heat for conductor color coding.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Swab new and existing conduits to be used to clear debris and remove moisture before conductor installation. Install conductors in raceways with no splices between boxes.
- B. Pulling Equipment: Pull conductors using proper equipment without exceeding manufacturer's recommendation for maximum pulling tension. Protect conductor insulation jacket at all times from twists, kinks, scrapes, punctures and other damage. Replace damaged conductors. Pull wires and cables into ducts and conduit without the use of lubricants, except where such use is necessary and approved by the cable manufacturer and the ENGINEER. Use UL listed lubricating compound compatible with the conductor insulated jacket and with the raceway.



Use lines of nylon or polypropylene, propelled by carbon dioxide, or compressed air, to snake or pull wire and cable into conduits. Do not use flat steel tapes or steel cables.

- C. Seals: Provide a seal between the conductor and conduit for conduits entering buildings or from areas where the temperature change may cause condensation or moisture. Seal the conduits after the conductors are in place.
- D. Identify all cables as specified in Section 16195.
- E. Color Coded Tape: Apply color coding tape at all terminations and splices with overlapping turns for a minimum length of two inches, starting two inches back from the termination point. Provide color code tape in all boxes and manholes.

Provide color coding throughout the entire network for service, feeder, branch, control and low energy signal circuit conductors. Use the following color code for conductors.

<b>Color Coding System</b>	<b>Phase A</b>	<b>Phase B</b>	<b>Phase C</b>	<b>Neutral</b>	<b>Ground</b>
208/120 three phase	Black	Red	Blue	White	Green
480/277 three phase	Brown	Yellow	Purple	Gray	Green
Control and low-energy signal	Orange	---	---	White	Green
Gas and fire detection systems	Pink	---	---	---	---
Instrumentation	Tan	---	---	---	---
dc circuits	Olive	---	---	---	---

- F. Terminations: Leave a minimum of six inches of free conductor at each connected outlet and a minimum of nine inches at unconnected outlets.
- G. NEC Requirements: Install wiring in accordance with applicable provisions of National Electrical Code, and as indicated.
- H. Conductor Sizing: Size conductors in accordance with the NEC and the following:
  1. Size for branch lighting circuits so that the greatest voltage drop between lighting panel and center of load does not exceed two percent at rated load.

2. Size conductors to limit the maximum conductor temperature to less than 75 degrees C, except where specifically stated otherwise.
  3. Use minimum conductor sizes as follows:
    - a. Power and lighting branch circuits, No. 12 AWG.
    - b. 120-volt control circuits, No. 14 AWG.
    - c. Instrumentation and signal wiring, 2 or 3 conductors No. 16 AWG stranded shielded.
  4. Size conductors as shown or as required by the actual load to be served, whichever is larger.
- I. Splicing: Pull cables from building or structure to building or structure with no splice in the duct systems.
- J. Hazardous Areas: Seal all conduits in hazardous areas before admission of hazardous gases to the area.
- K. Accuracy of Information: The number and sizes of wires and conduits indicated are for guidance only and are not necessarily the correct number and sizes necessary for actual equipment installed. Install as many wires and conduits as required and necessary for a complete electrical system, and provide adequately for the equipment actually installed.

### 3.2 CONDUCTOR IDENTIFICATION

- A. Labeling: Label each wire at both termination points and at each splice point in junction boxes. Carry individual conductor or circuit identification throughout, with circuit numbers or other identification clearly stamped on terminal boards and printed on directory cards in distribution cabinets and panelboards.
- B. Identification: Identify each wire in junction boxes and cabinets where the total number of control and signal wires is three or more and no terminal board is provided, by means of plastic slip on wire marker.
- C. Plastic Tags: In manholes, identify each wire by laminated plastic tag located so it can be easily seen.
- D. Color Coordination: Connect circuit conductors of the same color to the same phase throughout the installation.

### 3.3 WIRE AND CABLE CONNECTIONS TO EQUIPMENT

- A. Provide electrical connections to all equipment in strict accordance with the manufacturer's approved wiring diagrams, the Plans, or as approved. Repair or replace any damaged equipment resulting from erroneous connections.

### 3.4 CONNECTOR AND TERMINAL LUG INSTALLATION

- A. UL Requirements: Install all connectors and terminal lugs in accordance with UL requirements and manufacturer's recommendations.

### 3.5 QUALITY ASSURANCE

- A. Test the following 600-volt wires and cables after installation but before final connections are made up:
  - 1. All secondary feeders from the substation transformers.
  - 2. All feeders between and from the low voltage switchgear assemblies.
  - 3. All feeders from motor control centers to motors 30 hp and larger.
  - 4. All feeders from variable speed drive units.
  - 5. All feeders from motor control centers, to lighting panels and dry-type transformers.

For the above listed cables, apply a test voltage of 1,500 volts ac for a period of 1 minute between all conductors in the same conduit, and between each conductors and ground.

- B. Make all tests and submit certified test results. Replace any cables that fail the tests.
- C. Perform continuity test to demonstrate proper cable connection.

END OF SECTION

## SECTION 16150

### ELECTRICAL REQUIREMENTS FOR SHOP-ASSEMBLED EQUIPMENT

#### PART 1 GENERAL

##### 1.1 SUMMARY

A. Section Includes: Requirements for providing, installing and testing shop-assembled equipment as indicated, in accordance with the Contract Documents. Shop-assembled equipment panels and other items are specified under the driven equipment sections and may require external field connection to ancillary devices and other system components for interlocks and alarms. Provide all field wiring as required by the system and equipment specified under the driven equipment sections. This field wiring may not be specified or shown. This equipment includes but is not limited to the following:

1. Air monitoring equipment
2. Chemical feed equipment
3. Chlorination equipment
4. Miscellaneous control equipment

##### 1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum)
2. UL 486A - Wire Connectors and Soldering Lugs for Use with Copper Conductors.

##### 1.3 SYSTEM DESCRIPTION

A. Design Requirements: Design the Shop Assembled equipment using the Components and Appurtenances meeting the requirements specified in Division 16.

##### 1.4 SUBMITTALS

A. General: Provide all submittals, including the following, as specified in Division 1.

- B. Product Data and Information: Provide manufacturer's data on all equipment and devices in the assembly, including voltages, number of phases, current ratings, capacities and other relevant data.
- C. Shop Drawings: Provide shop drawings for the shop-assembled equipment, including the following:
  - 1. Layout drawings of the assembly showing accurately scaled basic equipment sections, auxiliary compartments and combination sections. Show special relationships of assemblies to associated equipment, including plan and front views of the equipment. Provide a device summary.
  - 2. Wiring diagrams for assemblies showing connections to electrical power. Clearly differentiate between shop-installed portions of wiring and field installed portions.
  - 3. Provide construction drawings for equipment requiring field assembly. Clearly differentiate between shop-assembled portions and field assembled portions.
- D. Quality Control: Provide manufacturer's test reports and certified performance records of all equipment installed. Provide field test reports after equipment is installed.

## 1.5 QUALITY ASSURANCE

- A. Codes: Comply with local codes and all other applicable codes.
- B. Regulatory Requirements: Comply with applicable Regulatory Agency requirements.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all products and materials as specified in Division 1.

## PART 2 - PRODUCTS

### 2.1 FABRICATION

- A. General: Provide shop-assembled equipment as standard products manufactured by companies regularly engaged in the manufacture of such equipment.

- B. Factory Assembled Requirements: Provide control panels for shop-assembled equipment as complete factory assembled units that require only external connections for installation including main disconnect and all electrical features necessary for the proper operation of the units.
- C. Controls:
1. Motor 1/2 Hp and Larger:
    - a. Design motors for 480-volt, 3-phase, 60-hertz operation, with all controls at 115 volts or less.
    - b. Provide a combination circuit breaker along with all required control transformers, relays, timers, heaters and other necessary incidentals to form a complete functioning unit.
    - c. Provide NEMA size 1 or larger starters.
  2. Motors less than 1/2 Hp:
    - a. Design motors for 120-volt, single phase operation/
    - b. Provide manual motor starter with neon pilot light.
  3. Provide all controls and equipment as specified in Section 16482.
- D. Control Components: Install principal control components in NEMA 250 rated enclosures as follows:

AREA	ENCLOSURE
Above grade indoor	NEMA 12 – Industrial
Outdoor and below grade elevation	NEMA 4 – Watertight indoor
Corrosive areas	NEMA 4X – Watertight and corrosion-resistant stainless steel external hardware. Provide all external operators made of the same materials as that of the enclosure.

All areas listed Class I, Division 1, NEMA 7 – Explosion-proof or 2, Group D

E. Miscellaneous Controls:

1. Furnish float switches, pressure switches, limit switches, thermostats and other auxiliary control devices to satisfy the intended service.
2. Rate contacts at 10-amperes, 120 volts, 60-hertz ac, unless otherwise specified.
3. Provide limit switches to function in accordance with contact development charts.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Install shop-assembled equipment as indicated, in accordance with manufacturer's written instructions.
- B. Coordination: Coordinate cabling and wiring as necessary to interface installation of shop-assembled equipment.
- C. Torque Requirements: Tighten electrical connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals in accordance with UL Standard 486A.
- D. Grounding Connections: Make equipment grounding connections for the shop-assembled equipment as specified and shown. Tighten connections in accordance with UL Standard 486A to assure permanent and effective grounding.
- E. Adjustments: Make all necessary adjustments to the equipment to provide complete and satisfactory operation upon completion of the Contract.

### 3.2 CLEANING AND PAINTING

- A. Shop Painting: Paint the shop-assembled equipment enclosures.
- B. Field Painting: Clean and touch up scratched and marred surfaces to match original finish.

END OF SECTION

## SECTION 16160

### CHLORINE FLOW PACING CONTROL PANEL

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. The control panel shall be supplied containing all the electrical and mechanical equipment necessary to provide for the operation of two chemical metering pumps. All panels shall include provisions for turning pumps on and off and controlling pump speed, manually and automatically, alternating lead pump with each pump cycle or manually, indications for operation and alarm conditions, testing and indication of all operational features, and terminal strip wired and indicated for all telemetry contacts. A minimum of 8 spare terminal strip contacts shall be provided to allow for expansion, repair or alterations.

##### 1.2 QUALITY ASSURANCE

- A. All work shall comply with the applicable codes, standards, rules and regulations published by IEEE, ANSI, NEC, National Electric Safety Code and NEMA Standard IC-1 Industrial Control.

##### 1.3 SUBMITTALS

- A. Shop drawings shall be submitted showing layout materials and components control panels, as specified on the drawings.

#### PART 2 - PRODUCTS

##### 2.1 GENERAL

- A. The control panel shall be NEMA 4x, Type 304, 14 Gauge Stainless Steel with continuous welds on all seams. A rolled lip shall be provided around three sides of the door and around all sides of the enclosure opening. A neoprene gasket attached with oil resistant adhesive and held in place with stainless steel retaining clips shall be installed around the door. All hardware except the print pocket shall be stainless steel. Two modular replacement aluminum subpanels shall be provided to hold the components for the controls. The outer door shall contain a self-storing wind resistant rod.
- B. Mounted on the exterior of the enclosure shall be a generator receptacle, power available light, alarm bell, alarm reset button and 2 each air vents. All parts mounted to the enclosure shall be secured with stainless steel



hardware. Panel and exterior control components shall be labeled with nameplate with engraved white letters on black background.

- C. The power subpanel shall contain a main circuit breaker, emergency circuit breaker, motor circuit breakers, control circuit breaker, duplex receptacle breaker, across the line magnetic motor starters with over load protection on each leg, and control voltage fuse transformer. All control wiring shall be color coded per IPCEA (minimum 18 colors) size 18 AWG, rated for 300 V, 80 degrees C, stranded, tinned copper with PVC phase monitor, relays, terminal strips, ground fault duplex receptacle, trouble light and neutral block. The main and emergency breaker shall be interlocked to assure only one breaker can operate at one time.
- D. The inner dead front door shall be constructed of aluminum. The inner dead front shall have rounded edges and shall be mounted on an .063" aluminum continuous aircraft hinge with a stainless steel pin. The inner dead front shall be fastened to the enclosure and hinged with stainless steel screws. The dead front shall be supported on the vertical break opposite the hinge with a continuous support and shall not depend on breakers or other components. The inner dead front shall contain breaker knock-outs for protrusion of the breaker handles. Mounted on the inner dead front door shall be status lights, pump run lights, elapsed time meters, HOA switches, 3 position alternator mode switch, trouble switch and thermal overload reset buttons. All components shall be equal to and directly interchangeable with those listed on the drawing.
- E. Each control panel shall be provided with a phase monitor and surge protection to ensure protection for each pump circuit.
- F. The panel shall be provided with an LED panel convenience light to illuminate the interior of the panel at night. The switch for this light shall be a heavy duty single pole switch located on the inner dead front door.
- G. The duplex ground fault protected (15 amps) outlet shall be mounted internally in the bottom of the panel in an aluminum junction box.
- H. Two 1-1/2" emergency wire access covers shall be located internally in the bottom left of the panel, constructed of 1-1/2" Square D threaded closing plate.
- I. Each control panel shall have a control transformer, where required as indicated, to provide 120 volts single phase A.C. control power. Both legs of the primary shall be protected by a thermal magnetic Type FA 2 pole circuit breaker minimum frame size as manufactured by the Square D Company, one leg of the secondary of the control transformer shall be protected by a thermal magnetic, Type FA circuit breaker minimum frame size as

manufactured by the Square D Company, the other leg shall be grounded. The capacity of the control transformer shall be adequate to operate all the control devices in the circuit to include power for motor space heaters with a minimum capacity of 0.75 KVA.

- J. When a single phase control panel is specified, two single phase modules shall be installed on power subpanel. Equip panel with two extra run capacitors and two extra start capacitors as spare parts.
- K. Power meter shall be provided in a NEMA 4X enclosure.
- L. Provide a separate power disconnect switch located in line immediately after the power meter ahead of the control panel. The switch shall be housed in an aluminum or stainless steel NEMA 4X enclosure fitted with a locking hoop and padlock keyed to County Standards.

## 2.2 WIRING

- A. All wiring shall be neatly laced or shall be installed in plastic Panduit raceways. The raceways shall be sized so that not more than 50% of the design capacity is used.
- B. All terminations to external devices shall terminate on terminal blocks.
- C. All control wiring shall be color coded, size 18 AWG rated for 300 volts, 80 C, stranded tinned copper PVC insulated.
- D. A wiring and circuit schematic sized 11 inches by 17 inches shall be permanently affixed to the interior of the enclosure door. The schematic shall be extruded vinyl homopolymer laminate or approved equal. Also included in door shall be a print pocket large enough for an 8.5" x 11" clipboard to be mounted at start up. A plastic or aluminum warning sign with legend "DANGER-HIGH VOLTAGE" shall be mounted on the exterior main panel door. The warning sign design and colors shall be in accordance with OSHA specifications and must be affixed to door without screws or rivets. (No holes to be drilled in exterior door).
- E. All wiring shall be color coded and numbered as shown in the drawings.

## 2.3 NAME PLATES

- A. Each switch, circuit breaker, indicating light, push-button, meter, relay etc. shall have an engraved laminated plastic background color coded nameplate mounted above for proper identification: Red for alarm and emergency breaker, Black for power, Green for level, and blue for controls. Letters shall be a minimum of 1/4 inch in height.

## 2.4 OPERATION

- A. (Reserved)
- B. In order to insure pump back-up guarantee and also to distribute almost equal pump time to each of the two pumps, an alternator shall be included in the panel. The alternator will have the capability of setting either pump 1 or pump 2 to be lead pump continuously. This capability shall be accomplished by an alternator selector switch labeled Lead #1, Lead #2, and Auto.
- C. Should the "Pump-Off" regulator fail, the system will keep the station in operation and provide a visual indication of the regulator failure.
- D. In the event of phase reversal, loss of any phase, or low voltage of any phase, control voltage shall be interrupted through the phase monitor. The phase monitor shall automatically reset upon removal of any and all of the above conditions.

## 2.5 RELAYS:

- A. Relay shall be general purpose plug in relay, 8 pin (DPDT) or 11 pin/blade (3PDT), with 220 VAC 10 AMP rated contacts. 24 volt coil relay shall have Octal-type mounting. 120 volt coil shall have square-base relay-type mounting. Relay shall be Syrelec model RPT-2C8-24A, RPT-3C11-24A, RKT-2C-110A, RKT-3C-110A, or approved equal.
- B. Time delay relay shall be general purpose 8 pin/blade or 11 pin/blade plug in timing relay with 24 VAC or 120 VAC coil, or time delay module in conjunction with standard relay above. Timing mode shall be on-delay adjustable for 0.5 seconds (maximum), to 30 seconds (minimum) with contacts rated at 220 VAC 10 AMP. 24 volt time delay relay shall be Turck Multi-prox, Inc., Time Cube CT2-E20 with Syrelec RPT-2C8,24A, or CT3-E20 with Syrelec RPT-3C11-24A, or approved equal. 120 volt time delay shall be Syrelec model K-AR2-F100-110 (K-AR2-F10-110 for relay - TD1) or K-AR2-B-110 or approved equal.
- C. 12 volt time delay relay shall be DIN Rail mounted with 12 volt DC coil, timing mode shall be on-delay adjustable for 1 second (maximum), to 90 seconds (minimum) will contact rated from 220 VAC at 10 amps. Time delay relays shall be Syrelec model B-AR-F100-12D, or approved equal.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Control panels shall be installed as shown on the drawings.
- B. All work shall be in a neat and workmanlike manner by a certified master electrician holding a current competency card and registered with the State of Florida.
- C. Electrical work shall be coordinated so as not to interfere with or delay other construction operations.
- D. Perform all necessary cutting, sleeving, excavating and backfilling for the installation of the equipment and the restoration thereafter.
- E. Install all equipment and control devices furnished by equipment manufacturers with their equipment and complete wiring in accordance with manufacturer's recommendations and approved wiring diagrams. Any OWNER furnished equipment will be connected by the CONTRACTOR.
- F. The ends of all conduits shall be carefully reamed free from burrs after threading and before installation. All cuts shall be made square. All joints shall be made up tight. Care shall be taken to see that all power conduit runs either from a permanent and continuous ground connection point, or a bond wire is provided within the conduit.
- G. The CONTRACTOR shall permanently and effectively ground all raceways, devices, and utilize equipment in accordance with requirements of National Electrical Code, and as shown on Drawings.

### 3.2 ELECTRICAL WORK - GENERAL

- A. See Section 16050.

### 3.3 GROUNDING - SECONDARY VOLTAGE SYSTEM

- A. See Section 16450.

### 3.4 DISCONNECT BOX

- A. A heavy duty NEMA 4x lockable GE or equivalent nonfusible disconnect switch mounted in type 304 stainless steel enclosure. CONTRACTOR to use mounting provided. Holes are not to be drilled in disconnect box. Sized for voltage, current and phase for particular installation as approved by ENGINEER.

### 3.5 OUTSIDE LIGHTNING ARRESTOR

- A. A lightning arrestor, GE or approved equal, sized for voltage, current and phase for particular installation as approved by ENGINEER shall be mounted on the outside bottom of the disconnect box.

### 3.6 PUMP CABLE CONNECTORS AND SEALS

- A. CGB Connectors packed with removable sealants shall be installed in a ventilated enclosure under the control panel in accordance with the lift station drawing.

### 3.7 CONDUIT

- A. For all above ground conduit and installation, and from junction box into panel, refer to specification, RIGID STEEL CONDUIT section 16110.
- B. For all below ground conduit and installation and from junction box to wet well, refer to Specification, Non-Metallic Conduit Section 16110.

### 3.8 PERMITS

- A. All required permits and inspection certificates shall be obtained and paid for by the CONTRACTOR and be made available to the OWNER at the completion of the work.

### 3.9 START-UP

- A. The manufacturer shall provide all necessary instruments and special apparatus to conduct any test that may be required to insure that the system is operating as designed. A written start-up report is required and must be furnished to OWNER within 30 days of start-up.

### 3.10 GUARANTEE

- A. Submit a written guarantee to the OWNER that all electrical work and material furnished provided under this contract is free of defects for a period of one year after final acceptance of the job. There will be no additional charge to the OWNER to repair or replace any such work which is found to be defective within the guarantee period. Should a defect occur and the CONTRACTOR or his representative not be available for immediate repair, an interim repair by others may be made without violation of the guarantee.

END OF SECTION

## SECTION 16195

### ELECTRICAL IDENTIFICATION

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes: Requirements for providing materials for the identification of electrical equipment, components, conduits, cables and wiring.
- B. Related Work Specified in Other Sections Includes:
  - 1. Section 09900 – Painting and Coating.
  - 2. Section 16050 - Basic Electrical Materials and Methods.

##### 1.2 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Product Data and Information: Provide manufacturer's catalog data for nameplates, labels and markers.
  - 1. Provide manufacturer's instructions indicating application conditions and limitations of use; and storage, handling, protection, examination and installation of product.
- C. CONTRACTOR's Record Drawings: Provide CONTRACTOR's record drawings accurately showing actual location of markers for underground ducts, handholes and manholes, at completion of the Project.

##### 1.3 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all products and materials as specified in Division 1.

#### PART 2 - PRODUCTS

##### 2.1 MATERIALS AND COMPONENTS

- A. General: Provide identification materials listed and classified by UL or tested by an acceptable Electrical Testing Company certifying the equivalence of the materials to UL listing requirements and OSHA approved.

- B. Laminated Plastic Nameplates: Provide engraved three layer laminated plastic nameplates with black letters on white background and fastened with corrosion resistant screws. Use of mounting cement is not acceptable.
1. Provide nameplates with 1-inch high lettering for switchgears, switchboards, motor control centers, control panels, relay panels, contactor panels, panelboards, and similarly grouped equipment, transformers and disconnect switches.
  2. Provide nameplates with 1/2-inch high lettering for individual components of a group such as main breakers, switchgear units, switchboard units, motor control center units and similar devices.
  3. Provide nameplates with 1/4-inch high lettering for remote motor controllers, control stations, relays and similar equipment.
  4. Provide nameplates for each motor identifying service or function and lettering of an appropriate size to suit each motor.
  5. Provide approved laminated directories of circuits with typewritten designations of each branch circuit in each panelboard.
  6. Provide smaller lettering for a neat, legible nameplate where the amount of lettering causes excessively large nameplates.
- C. Wire Markers: Identify wire bundles and each individual wire.
1. Provide a brass or rigid fiber identifying tag engraved with the conduit number where conduits enter motor control centers, switchgear, control panels, terminal boxes and the like. Attach tags to wire bundles with nylon self-locking "TyRaps".
  2. Provide engraved PVC split sleeve wire markers on each wire at all termination points. Engraving to include conduit number prefix and wire number suffix. Relate wire numbers to termination numbers.
  3. Include wire numbers on all wiring and schematic diagrams and on all record drawings.
- D. Conduit Marking Paint: Provide conduit marking paint for identifying the different conduit systems as follows:
1. 480-Volt System
  2. 208/120-Volt System
  3. 240/120-Volt System
  4. 24/48/125-Volt DC System

- E. Underground Warning Tape: Provide 4-inch wide detectable type plastic tape in red (electric) and orange (communications) colors with suitable warning describing the type of buried electrical lines.

## PART 3 - EXECUTION

### 2.1 PREPARATION

- A. Surface Preparation: Degrease and clean surfaces to receive nameplates, labels and marking paint.

### 2.2 INSTALLATION

- A. General: Install nameplates on the front of equipment, parallel to the equipment lines and secured with corrosion resistant screws.
  - 1. Install laminated nameplates identifying:
    - a. Each electrical equipment enclosure
    - b. Individual equipment and devices
- B. Wire Markers: Install wire markers on each conductor at panelboard gutters, pull boxes, terminal boxes, outlet and junction boxes and at load connection identifying:
  - 2. On power and lighting circuits - branch circuit or feeder number indicated on drawings
  - 3. On control circuits - control wire number on schematic and interconnection diagram on drawings
- C. Conduit Markers: Paint colored marking bands on each conduit longer than 6 feet at intervals of 20 feet on center to identify the wiring voltage system contained in the conduit.
- D. Underground Warning Tape: Install one underground warning tape for each trench up to 18 inches wide. For trenches wider than 18 inches provide two underground warning tapes, one at each edge of the trench. Place the tape or tapes 6 inches below the finished grade.

END OF SECTION



## SECTION 16410

### CIRCUIT AND MOTOR DISCONNECTS

#### PART 1 - GENERAL

##### 1.1 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 16050, Basic Electrical Materials and Methods, covering the items included under this Section. Shop Drawing submittals shall include:
  - 1. Product data for each type of product specified.

##### 1.2 QUALITY ASSURANCE

- A. Codes and Standards:
  - 1. Electrical Component Standards: Provide components which are listed and labeled by UL. Comply with UL Standard 98 and NEMA Standard KS 1.

#### PART 2 - PRODUCTS

##### 2.1 MANUFACTURERS

- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
  - 1. Allen-Bradley.
  - 2. Cutler-Hammer.
  - 3. General Electric Co.
  - 4. Square D Company.

##### 2.2 CIRCUIT AND MOTOR DISCONNECT SWITCHES

- A. Provide NEMA 4X enclosure to match the rating of the area in which switch is installed. For motor and motor starter disconnects through 100 horsepower, provide units with horsepower ratings suitable to loads.
- B. Circuit Breaker Switches: Where individual circuit breakers are required, provide factory-assembled, molded-case circuit breakers with permanent instantaneous magnetic and thermal trips in each pole, and with fault-current limiting protection, ampere ratings as indicated. Construct with overcenter, trip-free, toggle type operating mechanisms with quick-make, quick-break action and positive handle indication. Provide push-to-trip feature for testing and exercising circuit breaker trip mechanism. Construct breakers for mounting and operating in any physical

position and in an ambient temperature of 40 degrees C. Provide with AL/CU-rated mechanical screw type removable connector lugs.

- C. Non-fusible Disconnects: (Heavy-duty) switches of classes and current ratings as indicated.
- D. Service Switches: (Heavy-duty) Non-fusible/circuit breaker switches. UL listed for use as service equipment under UL Standard 98 or 869.

### 2.3 ACCESSORIES

- A. Special Enclosure Material: Provide special enclosure material as follows for switches indicated:
  - 1. Stainless Steel for NEMA 4X switches.

### PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 16420  
MOTOR CONTROLLERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Motor controllers.

1.2 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 1650, Basic Electrical Materials and Methods, covering the items included under this Section. Shop Drawing submittals shall include:

1. Shop Drawings: Submit Shop Drawings of motor controllers showing dimensions and sizes.
2. Product Data: Submit manufacturer's data and installation instructions on motor controllers.
3. Wiring Diagrams: Submit power and control wiring diagrams for motor controllers

1.3 QUALITY ASSURANCE

- A. Codes and Standards:

1. UL Compliance: Comply with applicable requirements of UL 486A and B, and UL 508, pertaining to installation of motor controllers. Provide controllers and components which are UL listed and labeled.
2. NEMA Compliance: Comply with applicable requirements of NEMA Standards ICS 2, "Industrial Control Devices, Controllers and Assemblies," and Pub No. 250, "Enclosures for Electrical Equipment (1,000 Volts Maximum)," pertaining to motor controllers and enclosures.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
1. Allen-Bradley Co.

2. Cutler-Hammer Products/Eaton Corp.
3. General Electric Co.
4. Square D Company.

## 2.2 MOTOR CONTROLLERS

- A. Except as otherwise indicated, provide motor controllers and ancillary components which comply with manufacturer's standard materials, design, and construction in accordance with published product information and as required for a complete installation.
- B. Solid-State Reduced Voltage Controllers: Provide 3-phase, solid-state, reduced voltage motor controllers of sizes and ratings indicated.
  1. The controller shall be microprocessor-based and shall provide as a minimum the following modes of operation.
    - a. Soft start with selectable kick-start.
    - b. Soft stop.
    - c. Current limit.
  2. The controller shall be self-calibrating and shall automatically adjust itself for line voltage, frequency and current fluctuations. It shall have adjustable starting acceleration and stopping deceleration. Provide transient protection for all controllers furnished.

## PART 3 – EXECUTION (NOT USED)

END OF SECTION

## SECTION 16450

### GROUNDING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes: Requirements for providing a complete grounding system as specified and shown. Grounding includes but is not limited to: electric equipment enclosures, ground grid systems with grounding rods, grounding conductors, bonding jumpers, grounded conductors, water pipe connections, and building and miscellaneous structure metal frames.
- B. Related Work Specified in Other Sections Includes:
  - 1. Section 16050 - Basic Electrical Materials and Methods.
  - 2. Section 16110 - Electrical Raceway Systems.
  - 3. Section 16120 - Wires and Cables - 600 Volts and Below.

##### 1.2 REFERENCES

- A. Codes and Standards: The following codes and standards are referred to in this Section:
  - 1. NEC - National Electrical Code

##### 1.3 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
  - 1.
- B. Product Data and Information: Provide manufacturer's catalog data for the following:
  - 1. Grounding and grounded conductors
  - 2. Grounding connectors, clamps and bushings
  - 3. Grounding rods
  - 4. Bonding jumpers
- C. Shop Drawings: Provide shop drawings showing the locations and length of grounding rods. Label the size and material used for grounding rods. Provide details pertaining to grounding electrode conductors, grounding and grounded

conductors, grounding connections and the ground grid for buildings, structures, lighting units, manholes and handholes.

- D. Quality Control: Provide a field report of the system ground impedance test results.

#### 1.4 QUALITY ASSURANCE

- A. Construct a complete grounding system in accordance with applicable ANSI, an IEEE standards and the NEC and local codes.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all products and materials as specified in Division 1 and as follows:

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted.
  - 1. Grounding and Grounded Conductors
    - a. American Insulated Wire Corporation.
    - b. Rome Cable.
  - 2. Grounding Connectors, Clamps and Bushings
    - a. Burndy Corporation.
    - b. O-Z/Gedner Company.
    - c. Erico Products.
    - d. Thomas and Betts.
  - 3. Grounding Rods
    - a. Harger Lightning Protection, Inc.
    - b. Thomson Industries, Inc.
    - c. Carolina Galvanizing Utility Products Division.
    - d. Erico International Corp.

## 2.2 MATERIALS

- A. General: Provide conductor sizes as shown or required.
- B. Materials: Use conductors in accordance with the requirements specified in Section 16120.
- C. Bare conductors: Use bare copper conductor where buried in earth, embedded in concrete or exposed.
- D. Insulated Conductors: Use copper conductor with green color insulation rated at 600 volts where installed in conduits or other enclosed raceways.

## 2.3 CONNECTORS

- A. Grounding Clamps and Bolted Connectors: Use grounding clamps and bolted connectors suitable for devices or cables being connected.
- B. Welding: Use the exothermic welding process for buried, concealed and accessible connections to structural members, ground rods, and case grounds. Clean and paint welds embedded in the ground or encased in concrete with asphalt base paint.
- C. Bolted Connectors: Use bolted connectors for grounding of ground buses and equipment.
- D. Pipe Grounding: Use copper, brass, or bronze grounding clamps for grounding pipes. Do not use strap type clamps for this purpose.
- E. Grounding Bushings: Provide grounding bushings for conduits where conduits are not effectively grounded by firm contact to the grounded enclosure.

## 2.4 GROUNDING RODS

- A. Length and Size: Provide grounding rods 3/4-inch in diameter and 10 feet long.
- B. Grounding Rod Material: Stainless steel.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Install conductors to preclude exposure to physical damage. Install connections firm and tight. Arrange conductors and connectors without placing

strain on the connections. Bury equipment grounding conductors as shown, or at a minimum of 12 inches below grade. Bring loops or taps up for connection to equipment or other items to be grounded.

1. Install an insulated grounding conductor in all conduits.
  2. When raceways are used to contain and protect grounding conductors, install in accordance with Section 16110 and NEC.
  3. Where conductors are installed in nonmetallic raceway, install the grounding conductor in addition to the neutral wire, for system sized in accordance with NEC or as scheduled.
  4. Perform exothermic welding with properly sized molds.
- B. Grounding Rod Installation:
1. Install grounding rods as shown with the top of the rod a minimum of 12 inches below grade.
  2. Drive grounding rods into permanently moist soil.
  3. Provide additional ground rod sections as required to reach permanently moist soil.
  4. Install cast iron junction box without bottom for access to grounding rod and conductor where shown.
- C. Equipment Grounding: Ground each piece of electrical equipment using a conductor in the raceway feeding the equipment in accordance with NEC.
- D. Grounding Conductors: Connect the grounding conductor between the equipment and the grounding system. Where a ground bar is furnished with the panelboard, connect the grounding conductor to the bar.
- E. Miscellaneous Grounding: Provide grounding for the following:
1. Ground receptacles and switches and their metal plates through positive ground connection to the yoke/strap, outlet box and grounding system grounding wire installed in the conduit.
  2. Ground racks, supports, frames, covers and metal parts in manholes or handholes, controllers, motor frames, surge capacitors, arrestors, lighting fixtures, metal structures, exposed noncurrent carrying metal, mechanical equipment, hoist beams, cranes and similar items.



### 3.2 FIELD QUALITY CONTROL

- A. Tests: Conduct a witnessed test to determine the ground impedance for the entire system using a ground loop impedance tester. Provide a maximum impedance of 2 ohms at any point of the test. Add additional grounding rods if necessary to meet this requirement.

END OF SECTION

## SECTION 16950

### ELECTRICAL TESTING REQUIREMENTS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes: Requirements of field testing and certification of electrical equipment and materials provided under various other sections to assess their equivalence to UL Inc. listing/labeling.
- B. Related Work Specified in Other Sections Includes:
  - 1. All relevant electrical sections.

##### 1.2 REFERENCES

- A. General: Codes and standards referred to in this section are:
  - 1. ANSI - American National Standards Institute
  - 2. IEEE - Institute of Electrical and Electronics Engineers
  - 3. NEC - National Electrical Code
  - 4. NEMA - National Electrical Manufacturers Association
  - 5. NFPA - National Fire Protection Association
  - 6. NETA - International Electrical Testing Association Inc.
  - 7. UL - Underwriters' Laboratory, Inc.

##### 1.3 SUBMITTALS

- A. General: Provide all submittals including the following, as specified in Division 1 and Section 16050.
  - 1. UL Testing: Furnish standard test parameters in accordance with the acceptable codes and standard for all the equipment and materials tested for equivalence to UL listing.
  - 2. Test Reports and Certificates: Furnish test reports and certificates for all equipment and materials tested for equivalence to UL listing for approval.

## PART 2 - PRODUCTS

### 2.1 TESTING COMPANIES

A. General: Acceptable testing companies are as listed below:

1. MET Electrical Testing Co., Inc.
2. UL Underwriters Laboratories, Inc.
3. Other OSHA approved testing facilities

### 2.2 SOURCE QUALITY CONTROL

A. Tests: Furnish all testing and certification in accordance with the latest NETA, ANSI, IEEE and NEMA Standards to meet the UL listing requirements in conformance with NFPA Standard and NEC.

## PART 3 - EXECUTION

### 3.1 PREACCEPTANCE TEST AND CERTIFICATION

A. General: Obtain the test reports and certifications for UL equivalence prior to acceptance of all materials and equipment requiring such tests and certification.

END OF SECTION

# LEE COUNTY

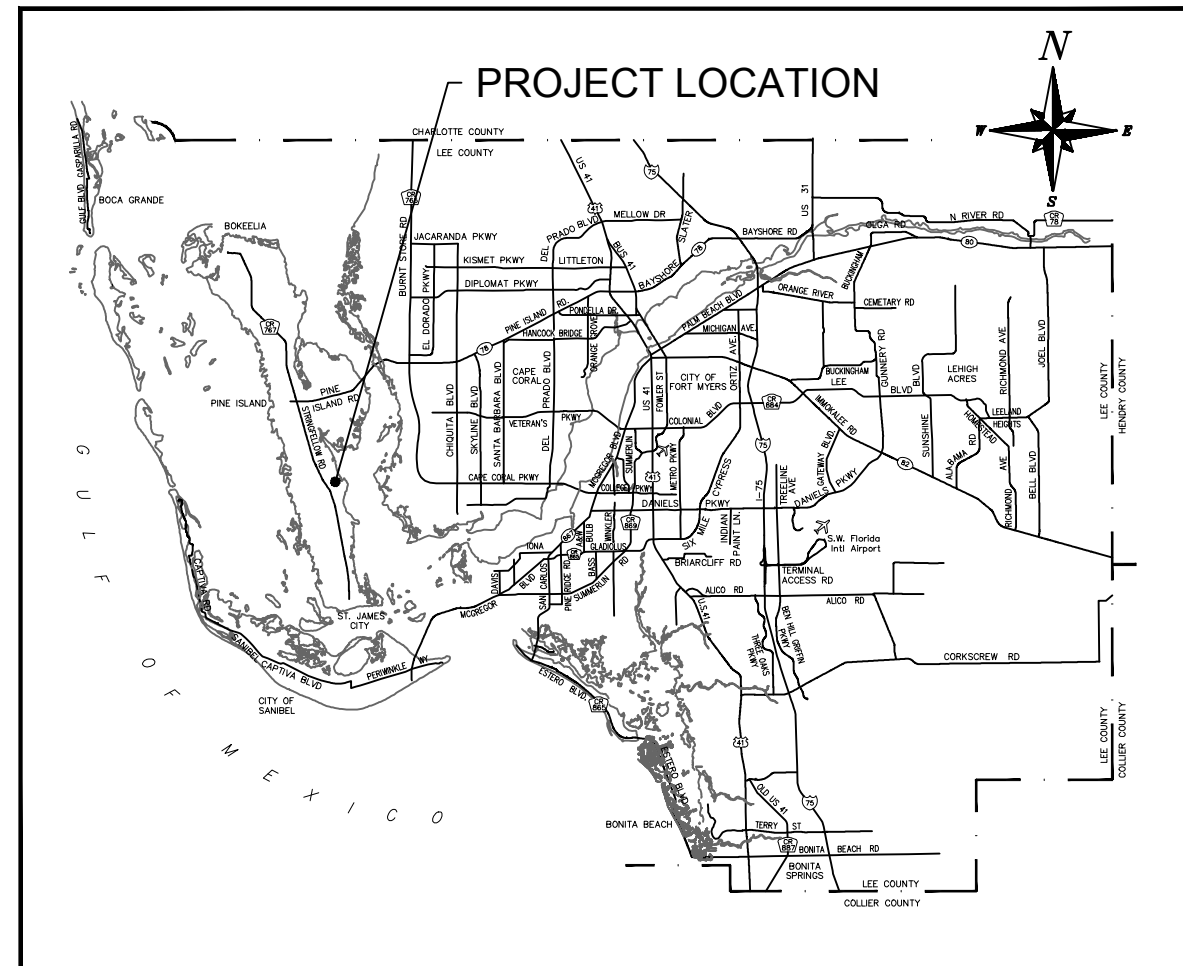
## BOARD OF COUNTY COMMISSIONERS

### LEE COUNTY UTILITIES ENGINEERING

#### PINE ISLAND WASTEWATER TREATMENT PLANT EFFLUENT PUMP STATION REPLACEMENT LEE COUNTY, FLORIDA

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C-101	EXISTING SITE PLAN
C-102	EFFLUENT PUMP STATION DEMOLITION AND SITE PLAN
C-301	PUMP STATION SECTIONS
C-501	CIVIL DETAILS
C-502	CIVIL DETAILS
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I-206	CHLORINE FLOW PACE CONTROL PANEL LAYOUT ANALOG OUTPUTS



ATTENTION IS DIRECTED IN THE FACT THAT THESE PLANS MAY HAVE BEEN REDUCED IN SIZE THROUGH REPRODUCTION. THIS MUST BE CONSIDERED WHEN OBTAINING SCALED DATA.

#### LEE COUNTY COMMISSIONERS

DIST 1.	John Manning
DIST 2.	Cecil L Pendergrass
DIST 3.	Larry Kiker
DIST 4.	Brian Hamman
DIST 5.	Frank Mann

#### COUNTY MANAGER

Roger Desjarlais

#### ASSISTANT COUNTY MANAGER, PUBLIC WORKS

Douglas L. Meurer, P.E.

#### DIRECTOR OF PUBLIC UTILITIES

Pamela S. Keyes, P.E.

DATE

MAILLAKAKIS MIKES, P.E.  
FLORIDA P.E. # 63876

LEE COUNTY UTILITIES  
1500 MONROE STREET, 3rd FLOOR  
FT. MYERS, FL 33901

# GENERAL NOTES

## GENERAL NOTES

- ALL LABOR, MATERIALS, AND METHODS OF CONSTRUCTION SHALL BE IN STRICT ACCORDANCE WITH THE MINIMUM ENGINEERING AND CONSTRUCTION STANDARDS ADOPTED BY LEE COUNTY, THE PLANS, AND CONSTRUCTION SPECIFICATIONS. WHERE CONFLICTS OR OMISSIONS EXIST, LEE COUNTY'S STANDARDS SHALL DICATE. SUBSTITUTIONS AND DEVIATION FROM PLANS AND SPECIFICATIONS SHALL BE PERMITTED ONLY WHEN WRITTEN APPROVAL HAS BEEN ISSUED BY THE ENGINEER.
- DURING CONSTRUCTION, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM THE WORK IN ACCORDANCE WITH O.S.H.A. REQUIREMENTS. THE CONTRACTOR'S SIGNATURE AFFIXED TO THE CONTRACT AGREEMENT WITH THE OWNER IS CONSIDERED CERTIFICATION OF CONFORMANCE TO SUCH REQUIREMENTS.
- SHOP DRAWINGS OF ALL MATERIALS BEING USED SHALL BE SUBMITTED TO THE ENGINEER AND LEE COUNTY UTILITIES FOR APPROVAL PRIOR TO INSTALLATION.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ANY REQUIRED PERMITS ARE OBTAINED AND IN HAND BEFORE BEGINNING ANY CONSTRUCTION. NO CONSTRUCTION OR FABRICATION OF ANY ITEM SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED ALL PLANS AND ANY OTHER DOCUMENTATION FROM ALL OF THE PERMITTING AND ANY OTHER REGULATORY AUTHORITIES. ANY PENALTIES, STOP WORK ORDERS ON ADDITIONAL WORK RESULTING FROM THE CONTRACTOR BEING IN VIOLATION OF THE REQUIREMENTS ABOVE SHALL BE FULLY BORNE BY THE CONTRACTOR.
- THE LOCATION OF ALL EXISTING UTILITIES SHOWN ON THE PLANS HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE AND ARE GIVEN FOR THE CONVENIENCE OF THE CONTRACTOR. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR INACCURACY. PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE VARIOUS UTILITIES AND TO MAKE THE NECESSARY ARRANGEMENTS FOR ANY RELOCATION OF THESE UTILITIES WITH THE OWNER OF THE UTILITY. THE CONTRACTOR SHALL EXERCISE CAUTION WHEN CROSSING UNDERGROUND UTILITY, WHETHER SHOWN ON THE PLAN OR LOCATED BY THE UTILITY COMPANY. UTILITIES THAT INTERFERE WITH THE PROPOSED CONSTRUCTION SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER FIRST. FEES ASSOCIATED WITH UTILITY RELOCATION SHALL BE BORNE BY THE CONTRACTOR. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSURE UTILITIES ARE RELOCATED IN ACCORDANCE WITH RESPECTIVE UTILITY COMPANY STANDARDS IF IT IS REQUESTED THAT UTILITY COMPANIES MOVE THEIR PARTICULAR UTILITIES. ANY DELAY OR INCONVENIENCE CAUSED TO THE CONTRACTOR BY THE RELOCATION OF THE VARIOUS UTILITIES SHALL BE INCIDENTAL TO THE CONTRACT AND NO EXTRA COMPENSATION WILL BE ALLOWED.
- THE CONTRACTOR SHALL SCHEDULE A PRECONSTRUCTION MEETING TO BE HELD BETWEEN THE COUNTY, UTILITIES, THE ENGINEER OF RECORD AND CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION.
- THE SEQUENCE OF CONSTRUCTION SHALL BE SUCH THAT ALL UNDERGROUND INSTALLATIONS OF EVERY KIND, SHALL BE PLACED BENEATH THE PAVEMENT AND ITS EDGES PRIOR TO THE CONSTRUCTION OF THE PAVEMENT. THE PAVEMENT SHALL NOT BE CUT WITHOUT PRIOR APPROVAL OF THE ENGINEER.
- CONSTRUCTION INSPECTION WILL BE PROVIDED BY THE ENGINEER OF RECORD. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST 48 HOURS PRIOR TO BEGINNING CONSTRUCTION AND AT LEAST 48 HOURS BEFORE REQUIRING INSPECTION ON EACH AND EVERY PHASE OF WORK. THE CONTRACTOR SHALL NOTIFY THE ENGINEER A MINIMUM OF 48 HOURS NOTICE PRIOR TO SCHEDULED TESTING. NO FINAL TESTING WILL BE ACCEPTED UNLESS WITNESSED BY THE ENGINEER'S REPRESENTATIVE.
- CONTRACTOR IS RESPONSIBLE FOR HIS RESPECTIVE SURVEYING AND LAYOUT FROM BENCHMARK PROVIDED ON CONSTRUCTION PLANS. SURVEY MONUMENTATION DISTURBED DURING CONSTRUCTION SHALL BE REPLACED UPON COMPLETION OF THE WORK BY A REGISTERED LAND SURVEYOR.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREVENTING CONSTRUCTION ACTIVITIES FROM TAKING PLACE OUTSIDE OF THE LIMITS OF CONSTRUCTION SHOWN ON THE PLANS. ON-SITE OR OFFSITE AREAS DISTURBED SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER.
- THE CONTRACTOR SHALL MAINTAIN A CURRENT SET OF CONSTRUCTION PLANS AND PERMITS ON THE JOB SITE DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE TWO (2) SETS OF RECORD DRAWINGS TO THE ENGINEER OF RECORD WITHIN TWO (2) WEEKS AFTER CONSTRUCTION HAS BEEN COMPLETED ON EACH PHASE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE NECESSARY TESTING TO ASSURE THAT THE PROPER COMPACTION HAS BEEN ACHIEVED ON THE SUBGRADE, BASE, AND ALL OTHER PERTINENT AREAS THAT HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BEAR ALL COSTS ASSOCIATED WITH TESTING AND RETESTING OF THE AREAS AND SHALL PROVIDE THE OWNER AND THE ENGINEER WITH COPIES OF THE CERTIFICATION OF COMPACTION FROM THE TESTING COMPANY. COMPACTION SHALL MEET THE REQUIREMENTS OF LEE COUNTY UTILITIES LATEST STANDARDS.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE EXISTING SITE CONDITIONS OF SOIL PRIOR TO N.T.P. CONTRACTOR TO DETERMINE IF ANY OFF SITE MATERIALS WILL NEED TO BE IMPORTED TO ACHIEVE THE GRADES SPECIFIED ON THE PLANS.
- PRIOR TO BID PREPARATION, THE CONTRACTOR MUST BECOME FAMILIAR WITH THE OVERALL SITE CONDITIONS AND PERFORM ADDITIONAL INVESTIGATIONS AS DETERMINED NECESSARY TO UNDERSTAND THE LIMIT AND DEPTH OF EXPECTED ORGANIC SILT PEAT AREAS, ADEQUACY OF EXISTING MATERIALS AS FILL, DEWATERING REQUIREMENTS, CLEAN FILL REQUIRED FROM OFFSITE, AND MATERIALS TO BE DISPOSED OF OFFSITE, ALL OF WHICH WILL AFFECT HIS PRICING. ANY DELAY, INCONVENIENCE, OR EXPENSE CAUSED TO THE CONTRACTOR DUE TO INADEQUATE INVESTIGATION OF EXISTING CONDITIONS SHALL BE INCIDENTAL TO THE CONTRACT, AND NO EXTRA COMPENSATION WILL BE ALLOWED. THE MATERIALS ANTICIPATED TO BE ENCOUNTERED DURING CONSTRUCTION MAY REQUIRE DRYING PRIOR TO USE AS BACKFILL, AND THE CONTRACTOR MAY HAVE TO IMPORT MATERIALS, AT NO EXTRA COST, FROM OFFSITE TO MEET THE REQUIREMENTS FOR COMPACTION AND PROPER FILL.
- ALL PIPE AND FITTINGS SHALL BE PRESSURE TESTED & LEAKAGE TESTED AS SPECIFIED IN SECTION 15044 OF THE PROJECT MANUAL & BY APPROVED CITY, STATE & FEDERAL STANDARDS. FOR ALL LEAKAGE AMOUNTS GREATER THAN "ALLOWABLE LEAKAGE" AS SPECIFIED IN CONTRACT DOCUMENTS AND APPROVED COUNTY STANDARDS, ALL LEAKS SHALL BE UNCOVERED AND REPAIRED
- CONTRACTOR TO PROTECT ALL BACKFLOW PREVENTORS, E.T.C. ANY DAMAGED EXISTING ABOVE GROUND IMPROVEMENTS MUST BE REPLACED IN LIKE KIND WITHIN 48 HOURS AT NO COST TO THE OWNER.
- ALL PIPING SHALL HAVE 36 INCHES MINIMUM COVER UNLESS OTHERWISE NOTED. COVER LESS THAN 36 INCHES SHALL BE APPROVED BY OWNER & ENGINEER. CONTRACTOR SHALL TAKE CARE TO PROVIDE PROPER GRADE ELEVATIONS AND ALIGNMENTS. COVER GREATER THAN 8-FT BELOW FINISHED GRADE SHALL BE APPROVED BY OWNER & ENGINEER, WITH DEPTHS NOTED ON AS-BUILT DRAWINGS, UNLESS PIPE IS INSTALLED VIA DIRECTIONAL DRILL.
- THE CONTRACTOR SHALL LOCATE WATER AND WASTEWATER MAINS AT PROPOSED TIE-IN LOCATIONS TO VERIFY ACTUAL LOCATION, SIZE, ELEVATION, AND MATERIAL PRIOR TO ORDERING MATERIALS FOR SAID WORK. THE EXISTING UTILITIES HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR INACCURACY.
- CONTRACTOR MUST NOTIFY EXISTING EMPLOYEES ON TIMING AND DURATION OF CONSTRUCTION AND MUST MAINTAIN ACCESS TO TREATMENT PLANT DURING CONSTRUCTION. IF COMPLETE ACCESS IS NOT POSSIBLE, CONTRACTOR SHALL PROVIDE 48 HOUR NOTICE OF ANY TEMPORARY DRIVEWAY CLOSURES, AND SUCH CLOSURES SHALL BE COORDINATED WITH THE COUNTY FOR CLOSURES EXCEEDING ONE HALF HOUR.
- NEW OR RELOCATED, UNDERGROUND FORCE MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST THREE (3) FEET BETWEEN THE OUTSIDE OF THE MAIN AND THE OUTSIDE OF ANY EXISTING FORCE MAIN OR PIPE LINE CONVEYING RECLAIMED WATER REGULATED UNDER PART III OF CHAPTER 62-610 FAC.
- NEW OR RELOCATED, UNDERGROUND FORCE MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST TEN (10) FEET BETWEEN THE OUTSIDE OF THE MAIN AND ALL PARTS OF ANY EXISTING OR PROPOSED "ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEM".
- ALL EXISTING POTABLE WATER AND WASTEWATER MAINS SHALL REMAIN OPERATIONAL AND SHALL NOT BE TAKEN OUT OF SERVICE DURING CONSTRUCTION WITHOUT APPROVAL FROM OWNER. ANY APPROVED REMOVAL FROM SERVICES SHALL NOT EXCEED 3 HOURS.
- FITTINGS MAY BE USED FOR PIPE ALIGNMENT CHANGES RATHER THAN DEFLECTING JOINTS AT THE CONTRACTOR'S EXPENSE.
- IF IT IS DETERMINED THAT UTILITY POLES REQUIRE HOLDING OR RELOCATION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXPENSES ASSOCIATED WITH THEIR HOLDING AND/OR RELOCATION.

- UNLESS OTHERWISE NOTED, ALL UNDERGROUND PIPE FITTINGS SHALL BE DUCTILE IRON RESTRAINED JOINT IN ACCORDANCE WITH SECTION 15050 OF THE PROJECT MANUAL AND DETAILS.
- THE CONTRACTOR SHALL LOCATE ALL FORCE MAINS AT PROPOSED TIE-IN LOCATIONS TO VERIFY ACTUAL LOCATION, SIZE, ELEVATION, AND MATERIAL PRIOR TO ORDERING NEW MATERIALS.
- ALL PIPING INSTALLED BENEATH STRUCTURES SHALL BE DUCTILE IRON AND ENCASED A MINIMUM OF TWO (2) FEET BEYOND THE STRUCTURE SLAB.
- ALL SLABS EXPOSED TO RAINFALL SHALL BE SLOPED AT A MINIMUM OF 0.1%.
- SHEETING AND SHORING WILL BE REQUIRED TO CONFORM WITH THE "FLORIDA SAFE TRENCH ACT" REQUIREMENTS WHERE NECESSARY TO PROTECT EXISTING PAVEMENT STRUCTURES AND FOUNDATIONS.
- CONTRACTOR SHALL BE A LICENSED UNDERGROUND UTILITY CONTRACTOR WITH THE STATE OF FLORIDA AND THE COUNTY.
- DUCTILE IRON PIPE AND FITTINGS SHALL BE ENCASED IN POLYETHYLENE TWENTY (20) FEET ON EACH SIDE OF ANY CROSSING OF METALLIC GAS MAINS, ELECTRIC TRANSMISSION EASEMENTS AND TRANSMISSION STRUCTURES AS OUTLINED IN AWWA C105/ANSI A21.5. ALL PIPING LOCATED WITHIN THESE TRANSMISSION EASEMENTS SHALL BE POLYETHYLENE ENCASED.
- LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES EXPOSED DURING CONSTRUCTION SHALL BE ACCURATELY RECORDED ON THE CONSTRUCTION RECORD DRAWINGS. THE OWNER SHALL BE IMMEDIATELY NOTIFIED OF ANY CONFLICTS WITH PROPOSED CONSTRUCTION.
- ALL WATER, SEWER AND RECLAIMED WATER PIPE, PIPE FITTINGS AND APPURTENANCES INSTALLED UNDER THIS PROJECT WILL BE COLOR CODED OR MARKED IN ACCORDANCE WITH SUBPARAGRAPH 62-555.320(21)(b)3 F.A.C., USING BLUE AS PREDOMINANT COLOR FOR WATER; GREEN FOR WASTEWATER; AND PURPLE FOR RECLAIMED WATER.
- WHEN USING SCALED DATA, CONSIDER THAT THESE PLANS MAY HAVE BEEN ALTERED IN SIZE DURING REPRODUCTION.
- WHEN OBTAINING DATA AND INFORMATION FROM THE PLANS, FIGURES SHALL BE USED IN PREFERENCE TO SCALED DIMENSIONS AND LARGER SCALE DRAWINGS IN PREFERENCE TO SMALLER SCALE DRAWINGS.
- THE CONTRACTOR SHALL PROVIDE FOR BYPASSING AND / OR HAULING WASTEWATER DURING APPROVED INTERRUPTIONS OF WASTEWATER FLOWS AND CONNECTIONS. A CONTRACTOR PLAN SIGN AND SEALED BY A PROFESSIONAL ENGINEER TO LCU FOR APPROVAL PRIOR TO IMPLEMENTATION BY CONTRACTOR.

## DEMOLITION

- THE CONTRACTOR SHALL OBTAIN NECESSARY PERMITS AND LICENSES FOR PERFORMING THE DEMOLITION WORK AND SHALL FURNISH A COPY OF SAME TO THE ENGINEER PRIOR TO COMMENCING THE WORK. THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE PERMITS.
- THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES OR LOCAL AUTHORITIES FURNISHING GAS, WATER, ELECTRICAL, TELEPHONE, OR SEWER SERVICE SO THEY CAN REMOVE, RELOCATE, DISCONNECT, CAP OR PLUG THEIR EQUIPMENT IN ORDER TO FACILITATE DEMOLITION.
- THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL TREES, STRUCTURES, AND UTILITIES NOT MARKED FOR REMOVAL OR DEMOLITION AND SHALL PROMPTLY REPAIR ANY DAMAGE AS DIRECTED BY THE ENGINEER AT NO COST TO THE OWNER.
- THE CONTRACTOR SHALL PROTECT ALL UTILITIES AND OTHER IMPROVEMENTS SHOWN ON THESE PLANS AND UTILITIES AND OTHER IMPROVEMENTS NOT SHOWN. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR REPAIRS OF UTILITIES AND OTHER IMPROVEMENTS DAMAGED DURING CONSTRUCTION AND SHALL MAINTAIN SUFFICIENT PROTECTION FOR ALL UTILITIES REQUIRED TO PROTECT THEM FROM DAMAGE AND TO PROTECT THE PUBLIC DURING CONSTRUCTION
- THE CONTRACTOR SHALL REMOVE PAVING MARKED FOR DEMOLITION WHICH INCLUDES ALL ASPHALT, CONCRETE AND BASE.
- THE CONTRACTOR SHALL REMOVE UNSALVAGEABLE MATERIALS AND YARD WASTE FROM THE SITE IMMEDIATELY AND DISPOSE OF IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
- THE CONTRACTOR SHALL SAW-CUT A SMOOTH STRAIGHT EDGE ON ANY PAVEMENT PROPOSED FOR DEMOLITION PRIOR TO ITS REMOVAL. PRIOR TO CONNECTING PROPOSED PAVEMENT TO EXISTING PAVEMENT, THE CONTRACTOR SHALL ENSURE THAT THE EDGE OF THE EXISTING PAVEMENT IS STRAIGHT AND UNIFORM.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND PROPER DISPOSAL OF ALL REMOVED/DEMOLISHED PIPE, STRUCTURES, EQUIPMENT, AND APPURTENANCES.
- THE CONTRACTOR SHALL TAKE SITE PHOTOS AND VIDEO DOCUMENTATION OF EXISTING PRE-CONSTRUCTION CONDITIONS. IN ACCORDANCE WITH SECTION 01390.

## EARTHWORK AND SITEWORK

- ORGANIC SOILS BELOW UTILITY TRENCHES SHALL BE REMOVED AND REPLACED WITH SUITABLE MATERIAL AND COMPACTED TO NO LESS THAN 98% OF THE MODIFIED PROCTOR MAXIMUM DENSITY (AASHTO T - 180).
- ASPHALTIC CONCRETE TO FDOT STANDARD SPECIFICATION (LATEST EDITION) SECTION 916.1 OR LEE COUNTY DOT REQUIREMENTS, WHICHEVER IS GREATER.
- PAVEMENT MARKINGS SHALL BE REFLECTIVE PAINT. (STOP BARS TO BE THERMOPLASTIC).
- CONCRETE FLUMES, WALKS, AND CURBS SHALL BE CONSTRUCTED WITH 3,000 PSI CONCRETE (MINIMUM).
- ON-SITE AREAS DISTURBED BY THE CONSTRUCTION SHALL BE STABILIZED WITH SOD, (SAME AS SURROUNDING AREA OR BETTER) OR APPROVED EQUAL.
- DEWATERING COSTS ASSOCIATED WITH THE INSTALLATION AND CONSTRUCTION OF THE UNDERGROUND UTILITIES AND RECLAIMED WATER MAINS SHALL BE INCLUDED AS PART OF THE CONSTRUCTION BID COSTS.
- COMPACTED BACKFILL SHALL BE PLACED ALONG SIDE OF AND OVER ALL UTILITIES, IN ACCORDANCE WITH SECTION 02222 AND 02223. THE ENGINEER WILL REQUIRE THAT COMPACTION TESTS BE TAKEN TO VERIFY BACKFILL COMPACTION. THE COST OF SUCH COMPACTION TESTS WILL BE BORNE BY THE CONTRACTOR.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE NECESSARY TESTING TO ASSURE THAT THE PROPER COMPACTION HAS BEEN ACHIEVED ON THE SUBGRADE, BASE, AND ALL OTHER PERTINENT AREAS THAT HAVE BEEN COMPLETED, IN ACCORDANCE WITH SECTION 02222 AND 02223. THE CONTRACTOR SHALL BEAR ALL COSTS ASSOCIATED WITH TESTING AND RETESTING OF THE AREAS AND SHALL PROVIDE THE OWNER AND THE ENGINEER WITH COPIES OF THE CERTIFICATION OF COMPACTION FROM THE TESTING COMPANY.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE EXISTING SITE CONDITIONS PRIOR TO CONSTRUCTION TO DETERMINE IF ANY OFF SITE MATERIAL IS NEEDED TO BE IMPORTED TO ACHIEVE THE GRADES SPECIFIED ON THE PLANS.
- EXCESS FILL FROM SITE SHALL BE STOCKPILED BY THE CONTRACTOR, IN A LOCATION DETERMINED BY THE OWNER OR THE OWNER'S REPRESENTATIVE AND THE ENGINEER.
- CLEAR AREAS INDICATED SHALL BE COMPLETELY CLEAR OF ALL TIMBER, BRUSH, STUMPS, ROOTS, GRASS, WEEDS, RUBBISH, AND ALL OTHER DEBRIS AND OBSTRUCTIONS RESTING ON OR PROTRUDING THROUGH THE SURFACE OF THE GROUND.

## EROSION CONTROL AND SEDIMENTATION

- DISTURB ONLY THE AREA THAT IS NEEDED FOR CONSTRUCTION.
- WHEN POSSIBLE, CLEAR LAND IN STAGES. CLEAR AND FINISH CONSTRUCTION ON ONE PIECE OF LAND THEN MOVE ON TO THE NEXT.
- THE CONTRACTOR MUST INSTALL AND MAINTAIN SOD ON ALL DISTURBED AREAS (UNLESS OTHERWISE NOTED IN THE CONSTRUCTION DRAWINGS) WITHIN 48 HOURS OF DISTURBANCE, AND AT ANY OTHER TIME AS NECESSARY TO PREVENT EROSION, SEDIMENTATION OR TURBID DISCHARGES TO ANY DOWNSTREAM WATER BODY, WETLAND, OR OFFSITE PROPERTY. SODDING ON SLOPES 3:1 AN STEEPER SHALL BE STAKED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROJECT COMPLIANCE WITH APPLICABLE STATE WATER QUALITY STANDARDS DURING CONSTRUCTION. WATER AND WIND EROSION SHALL BE MINIMIZED AS DEFINED IN THE STATE AND MUNICIPAL REGULATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO IMPLEMENT CONTROL MEASURES NOT SHOWN IN DRAWINGS, IF SITE CONDITIONS REQUIRE. COSTS ASSOCIATED WITH TURBIDITY CONTROL AND SEDIMENT STABILIZATION SHALL BE BORNE BY THE CONTRACTOR.
- THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL ALSO OPERATE AND MAINTAIN EROSION AND SEDIMENT CONTROL DEVICES AND STRUCTURES IN ACCORDANCE WITH THE REGULATIONS SET FORTH IN THE NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) AS SHOWN IN THE EROSION CONTROL PLAN IN SECTION 02276 OF THE TECHNICAL SPECIFICATIONS. IT WILL BE THE GENERAL CONTRACTOR'S RESPONSIBILITY TO ADMINISTER THE EROSION CONTROL PLAN, INCLUDING LOG ENTRIES, AS WELL AS APPLICABLE MORE RESTRICTIVE MEASURES DURING CONSTRUCTION, IF NECESSARY.
- THE CONTRACTOR SHALL TAKE MEASURES NECESSARY TO CONTROL TURBIDITY INCLUDING, BUT NOT LIMITED TO, THE INSTALLATION OF TURBIDITY BARRIERS AT LOCATIONS WHERE THE POSSIBILITY OF "INFERRING SUSPENDED SOLIDS INTO ANY RECEIVING WATER BODY EXISTS DUE TO THE PROPOSED WORK". TURBIDITY BARRIERS MUST BE MAINTAINED AT ALL LOCATIONS UNTIL CONSTRUCTION IS COMPLETED AND DISTURBED SOIL AREAS ARE STABILIZED. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR REMOVING THE BARRIERS. AT NO TIME SHALL THERE BE ANY OFFSITE DISCHARGE WHICH VIOLATES THE WATER QUALITY STANDARDS IN CHAPTERS 62-302 AND 62-4, FLORIDA ADMINISTRATIVE CODE.
- ALL EROSION CONTROL MEASURES SHOWN ARE RECOMMENDED AND MAY BE MODIFIED AS NEEDED BY THE CONTRACTOR DEPENDING ON SITE CONDITIONS.

## NOTES

- ALL JOINTS SHALL BE MECHANICALLY RESTRAINED.
- ALL PVC POTABLE WATER PIPING SHALL BE BLUE AND WASTEWATER PIPING SHALL BE GREEN AND REUSE PIPING SHALL BE PURPLE.
- ALL DIP FITTINGS, BELL RESTRAINTS AND RESTRAINED MECHANICAL JOINTS SHALL BE POLYWRAPPED AND TAPED.
- PIPE DEFLECTIONS SHALL NOT EXCEED PIPE MANUFACTURERS REQUIREMENTS.

## BYPASS PUMPING CAPACITY REQUIREMENTS

P.S.	FIRM CAPACITY (GPM)	TDH (FT)
EFFLUENT P.S.	520	37

## UTILITY CONTACT INFORMATION

LEE COUNTY WATER & SEWER	ATTN: ED NEEFE	(239) 357-6486
	DARRYL PARKER	(239) 357-0246
FLORIDA POWER & LIGHT	ATTN: ENGINEERING	(239) 334-7754

THIS LISTING IS NOT WARRANTED OR REPRESENTED TO BE ALL-INCLUSIVE OF THE UTILITIES IN THE AREA.

## PIPING MATERIAL SCHEDULE

MARK	SERVICE	BURIED PIPE			BURIED FITTINGS		TEST PRESSURE (PSI)
		MATERIAL	CLASS	LINING	MATERIAL	LINING	
RW	RECLAIMED WATER	DUCTILE IRON	MIN 250	CEMENT MORTAR	DUCTILE IRON	CEMENT MORTAR	150

MIKES MAILLAKAKIS, P.E. DATE  
FLORIDA P.E.#63876  
LEE COUNTY UTILITIES  
1500 MONROE STREET, 3rd FL  
FT. MYERS, FL 33901

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APPROVED BY:	MIKES MAILLAKAKIS
PROFESSIONAL ENGINEER	FLORIDA PE NO. 63876
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PUBLIC WORKS  
LEE COUNTY  
SOUTHWEST  
FLORIDA  
1500 MONROE STREET

LEE COUNTY  
UTILITIES  
ENGINEERING  
FORT MYERS, FLORIDA 33901

PINE ISLAND WASTEWATER TREATMENT PLANT  
EFFLUENT PUMP STATION REPLACEMENT

GENERAL NOTES

SHEET  
G001  
of  
37  
SHEETS

**LIST OF STANDARD ABBREVIATIONS**

<b>A</b> AAP ALARM ANNUNCIATOR PANEL AARV AUTOMATIC AIR RELEASE VALVE AAV AUTOMATIC AIR VENT AB ANCHOR BOLT ABAN ABANDONED ABRSV ABRASIVE ABS ACRYLONITRILE BUTADIENE STYRENE ABV ABOVE AC ALTERNATING CURRENT ACCOMP ASPHALT-COATED ACP CORRUGATED METAL PIPE ADSB ASBESTOS CEMENT PIPE ADDN ADDENDUM ADH ADHESIVE AFF ABOVE FINISHED FLOOR AFG ABOVE FINISHED GRADE AFS ABOVE FINISHED SLAB AHD AHEAD AL ALUMINUM ALT ALTERNATE AMP AMPERE AMT AMOUNT APRX APPROXIMATE(LY) ARCH ARCHITECT(URAL) AS ALUM SOLUTION ASPH ASPHALT ASSY ASSEMBLY AVE AVENUE AC AIR CONDITIONING AVV AIR/VACUUM AIR VALVE	<b>B</b> BAF BAFFLE BCV BALL CHECK VALVE BF BLIND FLANGE BFV BUTTERFLY VALVE BHP BRAKE HORSEPOWER BI BLACK IRON BITUM BITUMINOUS OR BITUMASTIC BL BASELINE BLDG BUILDING BLK BLOCK BM BENCH MARK BOC BACK OF CURB BOTTON BOTTOM BP BASE PLATE BRG BEARING BSP BLACK STEEL PIPE BV BALL VALVE BW BOTH WAYS BWW BACKWASH WATER	<b>C</b> CAP CAPACITY CA COMPRESSED AIR CAV COMBINATION AIR VALVE CB CATCH BASIN CCC CHLORINE CONTACT CHAMBER CE CHLORINATED EFFLUENT CFM CUBIC FEET PER MINUTE CFS CUBIC FEET PER SECOND CV CHECK VALVE CI CAST IRON CIP CAST IRON PIPE CISP CAST IRON SOIL PIPE CJ CONSTRUCTION JOINT CKT CIRCUIT CL CENTER LINE CL2 CHLORINE GAS CLF CHAIN LINK FENCE CLR CLEAR OR CLEARANCE CLVT CULVERT CMP CORRUGATED METAL PIPE CMPA CORRUGATED METAL PIPE ARCH CMU CONCRETE MASONRY UNIT CND CONDUIT CNR CORNER CO CLEAN OUT CO2 CARBON DIOXIDE COAG COAGULANT COL COLUMN COM COMMON CONC CONCRETE CONN CONNECTION CONSTR CONSTRUCTION(N) CONT CONTINUOUS CONTR CONTRACT(OR) COORD COORDINATE CO COMPANY CP CONCRETE PIPE CPA CONCRETE PIPE ARCH CPLG COUPLING CPVC CHLORINATED POLYVINYL CHLORIDE CR CONCENTRIC REDUCER CS CHLORINE SOLUTION CSS CASING CTV CABLE TELEVISION CY CUBIC YARD CYL CYLINDER G&G CURB AND GUTTER C/C CENTER TO CENTER	<b>D</b> DAT DATUM DBL DOUBLE DC DIRECT CURRENT DEMO DEMOLITION DEPT DEPARTMENT DESC DESCRIPTION DET DETAIL DF DIESEL FUEL DI DUCTILE IRON DIA DIAMETER DIFF DIFFUSER DIM DIMENSION DIP DUCTILE IRON PIPE DISCH DISCHARGE DIR DIRECTION DMH DROP MANHOLE DN DOWN DR DRAIN DV DIAPHRAGM VALVE DW DRIVEWAY DWG DRAWING DWW DRAIN, WASTE, AND VENT	<b>E</b> EA EACH ECC ECCENTRIC EF EACH FACE EFF EFFLUENT EFL EASEMENT LINE EL ELEVATION ELAST ELASTOMERIC ELEC ELECTRICAL EMER EMERGENCY EMC ENCASE(MENT) ENGR ENGINEER EPDM EDGE OF PAVEMENT EPDM ETHYLENE PROPYLENE DIENE MONOMER EPRF EXPLOSION PROOF EQUIPMENT ER ECCENTRIC REDUCER ESTM EASEMENT EST ESTIMATE(D) EW EACH WAY EXC EXCAVATE EXP EXPANSION EXST EXISTING EXST GR EXISTING GRADE EXT EXTERIOR EXTN EXTENSION	<b>F</b> FAB FABRICATED FCA FLANGED COUPLING ADAPTER FB FLAT BAR FCV FLOW-CONTROL VALVE FD FLOOR DRAIN FDN FOUNDATION FE FILTERED EFFLUENT FHY FIRE HYDRANT FIG FIGURE FIN FINISHED FIN FLR FINISH FLOOR FIN GR FINISH GRADE FL FLANGE(D) FLG FLANGE(D) FLL FLOW LINE FLTR FILTER FM FORCE MAIN FPM FEET PER MINUTE FPS FEET PER SECOND FRP FIBERGLASS REINFORCED PLASTIC FT FOOT OR FEET FUT FUTURE FV FOOT VALVE FW FINISHED WATER FWP FACTORY WIRE PANEL FF FACE TO FACE	<b>G</b> GA GAUGE GAL GALLON(S) GALV GALVANIZED GIP GALVANIZED IRON PIPE GJ GROOVE JOINT GND GROUND GPD GALLONS PER DAY GPH GALLONS PER HOUR GPM GALLONS PER MINUTE GPS GALLONS PER SECOND GR GRADE GRGT GRATING GSG GALVANIZED STEEL GSP GALVANIZED STEEL PIPE GSR GROUND STORAGE RESERVOIR GST GROUND STORAGE TANK GROUT GROUT GV GATE VALVE	<b>H</b> HB HOSE BIBB HD HEAVY-DUTY HDPE HIGH-DENSITY POLYETHYLENE HDR HYDRAULIC HFA HYDROFLUOSILICIC ACID HGR HANGER HGT HEIGHT HNDRL HAND RAIL HOA HAND-OFF-AUTO HORIZ HORIZONTAL HP HORSEPOWER HPA HIGH PRESSURE AIR HR HOUR HVAC HEATING, VENTILATION, AND AIR CONDITIONING HWL HIGH WATER LEVEL HWY HIGHWAY HZ HERTZ	<b>I</b> ID INSIDE DIAMETER IN INCHES INF INFILUENT INT INTERSECTION INTR INTERIOR INV INVERT IP IRON PIPE IPS INTERNATIONAL PIPE STANDARD IR INTERNAL RECYCLE IW IRRIGATION WATER	<b>J</b> JB JUNCTION BOX JT JOINT	<b>K</b> KIP KIP (1,000 LB) KPL KICK PLATE KV KILOVOLT KVA KILOVOLT-AMPERE KW KILOWATT KWH KILOWATT-HOUR	<b>L</b> LAB LABORATORY LAM LAMINATE OR LAMINATION LATL LATERAL LAV LAVATORY	<b>M</b> METER MAINT MAINTAIN OR MAINTENANCE MAN MANUAL(LY) MAS MASONRY MATL MATERIAL MAX MAXIMUM MCC MOTOR CONTROL CENTER ME MITERED END MECH MECHANICAL MECH MATCH EXISTING GRADE MFR MANUFACTURE(R) MG MILLION GALLONS MGD MILLION GALLONS PER DAY MH MANHOLE MI MILE(S) MIN MINIMUM, MINUTE(S) MISC MISCELLANEOUS MJC MECHANICAL JOINT ML MIXED LIQUOR MO MASONRY OPENING MON MONUMENT MPH MILES PER HOUR MPT MALE PIPE THREAD MS MOTOR STARTER MSP MOTOR STARTER PANEL MTD MOUNTED MV MOTORIZED VALVE MW MANWAY MWL MEAN WATER LEVEL MWP MAXIMUM WORKING PRESSURE	<b>N</b> NORTH N&OCI NORTHWEST NE NEARBY NE NOT IN CONTRACT NO NUMBER NOM NOMINAL NPT NATIONAL PIPE THREAD NPT NATIONAL PIPE TAPER (THREAD) NFW NON-FRUITABLE WATER NRS NON-RISING SYSTEM NTS NOT TO SCALE NW NORTHWEST N/A NOT APPLICABLE	<b>O</b> O2 OXYGEN OC ON CENTER OD OUTSIDE DIAMETER ODP OPEN DRIP PROOF OF OUTSIDE FACE OH OVER HEAD OHV OVER HEAD WIRE OPP OPPOSITE OPT OPTIONAL OR OFFICIAL RECORDS OS OUTSIDE SCREW AND YOKE O&M OPERATION AND MAINTENANCE	<b>P</b> PA PROCESS AIR PC POINT OF CURVE PCM PERMANENT CONTROL MONUMENT PE PLAIN END PG PRESSURE GAGE PI POINT OF INTERSECTION PL PLATE PL PROPERTY LINE PNV PINCH VALVE POB POINT OF BEGINNING POJ PUSH-ON JOINT POL POLYMER PP POWER POLE PPD POUNDS PER DAY PPM PARTS PER MILLION PREFAB PREFABRICATED PRESS PRESSURE PRV PRESSURE REDUCING VALVE PRW PROCESS WATER PSF POUNDS PER SQUARE FOOT PSI POUNDS PER SQUARE INCH PSIA POUNDS PER SQUARE INCH ABSOLUTE PSIG POUNDS PER SQUARE INCH GAGE PT POINT OF TANGENCY PV PLUG VALVE PVC POLYVINYL CHLORIDE PVMT PAVEMENT PW POTABLE WATER PWR POWER	<b>Q</b> Q FLOW QTY QUANTITY	<b>R</b> RAD RADIUS RAS RETURN ACTIVATED SLUDGE RC REINFORCED CONCRETE RCB REINFORCED CONCRETE BOX RCP REINFORCED CONCRETE PIPE RCPA REINFORCED CONCRETE PIPE ARCH RD ROAD RDR REDUCER REBAR REINFORCING STEEL REF REFERENCE REINF REINFORCED(D)ING(MENT) REM REMOVE(ABLE) REQD REQUIRED RF RAISED FACE RJ RESTRAINED JOINT RM ROOM RBPB REDUCED PRESSURE BACKFLOW PREVENTER RPM REVOLUTIONS PER MINUTE	<b>R</b> RR RAILROAD RT RIGHT RVT RIVETED RW RAW WATER RWW RAW WASTEWATER R/W RIGHT-OF-WAY	<b>S</b> SOUTH SA SAMPLE LINE SAN SANITARY SAN SCHEDULE SD STORM DRAIN SE SOUTHEAST SECT SECTION SEFF SECONDARY EFFLUENT SF SQUARE FOOT OR FEET SHT SHEET(ED)ING SIG SIGNAL SIM SIMILAR SL SLUDGE SLV SLEEVE SM SHEET METAL SOLN SOLUTION SP SOIL PIPE, SPACE(ING) SPEC SPECIFICATION SPRT SUPPORT SQ SQUARE SS SANITARY SEWER SSE SUBSTANDARD EFFLUENT SST STAINLESS STEEL ST STREET STA STATION STD STANDARD STK STAKE STL STEEL STR STRAIGHT STRUCT STRUCTURAL SURF SURFACE SVCE SOLVED VALVE SVCE SERVICE SVC SERVICE WATER SW SOUTHWEST SWM SIDEWATER DEPTH SWSH SURFACE WASH SYM SYMBOL SYMM SYMMETRICAL SIDEWALK	<b>T</b> TAN TANGENT TOP OF CLEAR TBM TEMPORARY BENCH MARK TB-xx TEST BORING-xx (e.g. TB-1) TD TRENCH DRAIN TD TOTAL DYNAMIC HEAD TE TOTALLY ENCLOSED TEFC TOTALLY ENCLOSED FAN COOLED TEL TELEPHONE TENV TOTALLY ENCLOSED NON-VENTILATED THD THREADED THK THICKNESS TLM TELEMETRY TOB TOP OF BANK TOC TOP OF CURB TOS TOE OF SLOPE TOT TOTAL TP TELEPHONE POLE TS THICKENED SLUDGE TV TELEVISION TYP TYPICAL T&B TOP AND BOTTOM	<b>U</b> UD UNDERDRAIN UG UNDERGROUND ULT ULTIMATE UN UNION UN UNLESS OTHERWISE NOTED USE UNDERGROUND ELECTRIC UTC UNDERGROUND TELEPHONE CABLE UTIL UTILITY	<b>V</b> V VOLT(S) VAC VACUUM VAR VARIES VC VERTICAL CURVE VCP VITRIFIED CLAY PIPE VEL VELOCITY VERT VERTICAL VFD VARIABLE FREQUENCY DRIVE VOL VOLUME	<b>W</b> W WATT, WEST WAS WASTE ACTIVATED SLUDGE WCO WALL CLEAN OUT WF WIDE FLANGE WH WALL HYDRANT WL WATER LINE WM WATER MAIN WP WATER PROOF(ING), WORKING	<b>W</b> WPR WORKING PRESSURE WS WATER SURFACE WSP WELDED STEEL PIPE WT WEIGHT WTP WATER TREATMENT PLANT WW WASH WATER WWF WELDED WIRE FABRIC WWM WELDED WIRE MESH WWTP WASTEWATER TREATMENT PLANT W/W WITH W/O WITHOUT	<b>X</b> XFER TRANSFER	<b>Y</b> Y YARD(S) YD YARD YH YARD HYDRANT YR YEAR(S) YR
---	---	---	---	---	---	--	--	--	---	--	--	--	---	---	---	------------------------------------	---	--	---	--	---	--	---	--	---------------------------	--

**PIPING LEGEND**

FITTING/ APPURTENANCE	FLANGED				MECHANICAL JOINT				GROOVE JOINT				SOLVENT WELD			
	SINGLE-LINE		DOUBLE-LINE		SINGLE-LINE		DOUBLE-LINE		SINGLE-LINE		DOUBLE-LINE		SINGLE-LINE		DOUBLE-LINE	
	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED
BEND																
TEE																
WYE																
REDUCER																
CAP/ BLIND FLANGE					N/A	N/A	N/A	N/A								
PLUG	N/A	N/A	N/A	N/A					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUTTERFLY VALVE																
BALL VALVE					N/A	N/A	N/A	N/A								
CHECK VALVE					N/A	N/A	N/A	N/A								
GATE VALVE																
PLUG VALVE																
AUTOMATIC CONTROL VALVE					N/A	N/A	N/A	N/A								
PINCH VALVE					N/A	N/A	N/A	N/A								

**CIVIL LEGEND**

	PROPERTY LINE
	RIGHT OF WAY LINE (R-O-W)
	LIMITS OF CONSTRUCTION
	EASEMENT
	PROPOSED CONTOUR MAJOR
	PROPOSED CONTOUR MINOR (LABEL OPTIONAL)
	WATER
	STORM SEWER
	SANITARY SEWER
	SANITARY SEWER (FORCE MAIN)
	GUARD RAIL
	STEEL FENCE
	WOOD FENCE
	VEGETATION
	SPOT ELEVATION
	TREE - EVERGREEN
	TREE - PALM TREE
	TREE - DECIDUOUS
	LIGHT POLE
	POWER POLE
	UTILITY POLE
	MANHOLE
	SEWER MANHOLE
	SEWER VALVE
	SEWER CLEANOUT
	MONITORING WELL
	WATER VALVE
	WATER WELL
	WATER METER
	HYDRANT
	STORM MANHOLE
	STORM CULVERT END
	FLARED END - RCP
	MONUMENT

**REFERENCE SYMBOLS**

	DENOTES SECTION LETTER IDENTIFICATION
	DENOTES DETAIL NUMBER IDENTIFICATION
	DENOTES DRAWING NO WHERE SECTION IS LOCATED
	DENOTES DRAWING NO WHERE DETAIL IS LOCATED
	DENOTES SECTION LETTER IDENTIFICATION
	DENOTES DETAIL NUMBER IDENTIFICATION
	DENOTES DRAWING NO WHERE SECTION IS LOCATED
	DENOTES DRAWING NO WHERE DETAIL IS LOCATED

**HATCHING LEGEND**

	ASPHALT OR CONCRETE SURFACE (SIDEWALK OR ROADWAY)		PRECAST CONCRETE
	ROADWAY/SIDEWALK OPEN CUT RESURFACE		GROUT
	SODDED OR SEEDDED AND MULCHED AREA OR EXISTING WETLAND		CONCRETE UNIT MASONRY (PLAN)
	EARTH		STEEL
	EXISTING PIPES, STRUCTURES, EQUIPMENT TO BE REMOVED		ALUMINUM
	CAST-IN-PLACE CONCRETE		GRATING

**CADD LEGEND**

	VISIBLE LINE		PROPOSED
	HIDDEN LINE		PROPOSED
	CENTER LINE		PROPOSED
	PHANTOM LINE		PROPOSED
	MATCHLINE		PROPOSED
	BREAK LINE		PROPOSED
	DIMENSION LINES AND LEADERS		1/32" NOTE

MIKES MAILLAKAKIS, P.E. DATE  
FLORIDA P.E.#63876  
LEE COUNTY UTILITIES  
1500 MONROE STREET, 3rd FL  
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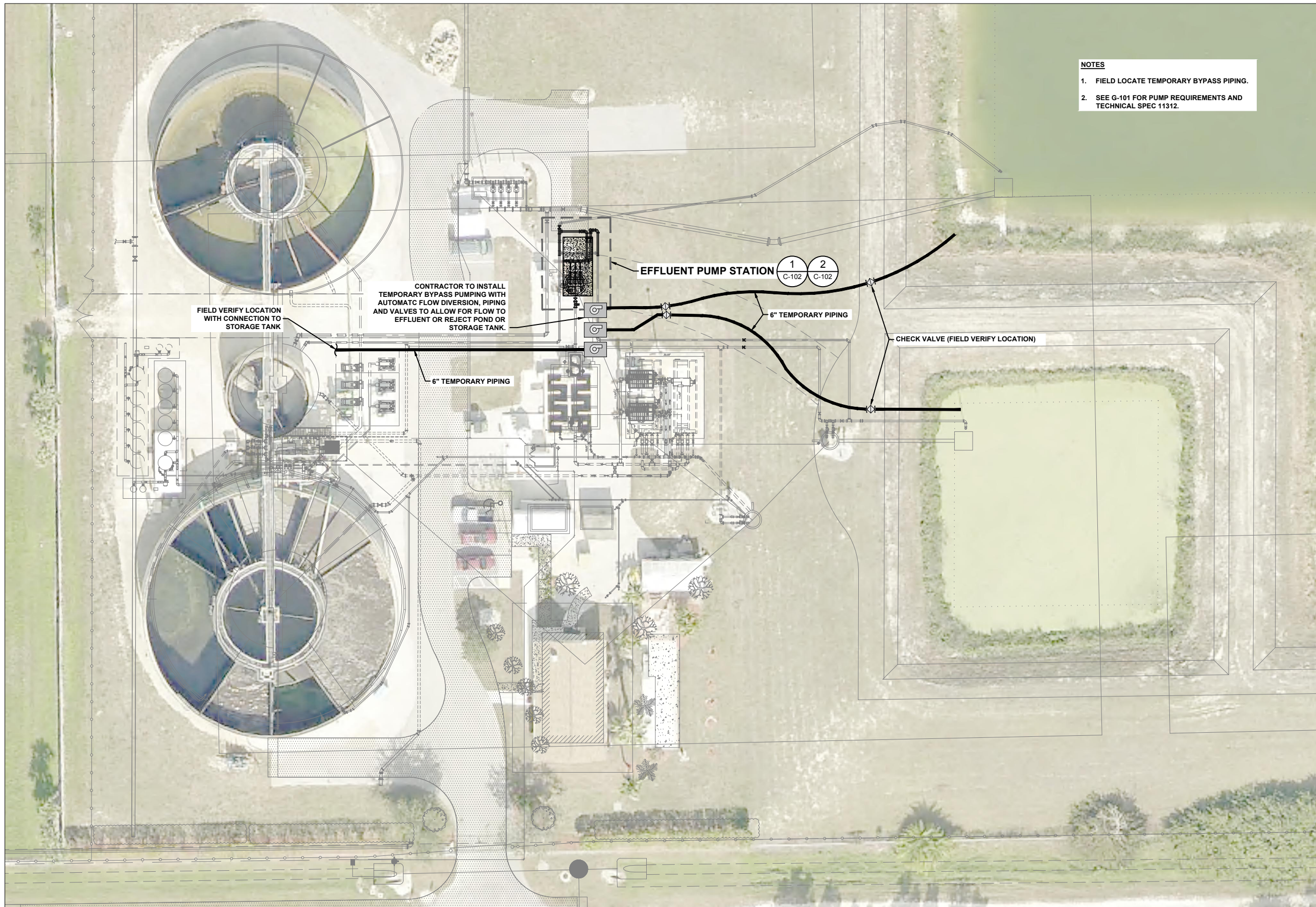
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PROFESSIONAL ENGINEER FLORIDA PE NO. 63876
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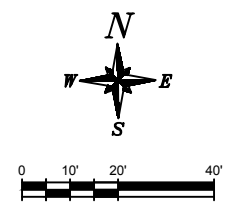
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PINE ISLAND WASTEWATER TREATMENT PLANT  
EFFLUENT PUMP STATION REPLACEMENT  
LEGENDS AND ABBREVIATIONS

SHEET  
G002  
of  
37  
SHEETS



- NOTES**
1. FIELD LOCATE TEMPORARY BYPASS PIPING.
  2. SEE G-101 FOR PUMP REQUIREMENTS AND TECHNICAL SPEC 11312.



FIELD VERIFY LOCATION WITH CONNECTION TO STORAGE TANK

CONTRACTOR TO INSTALL TEMPORARY BYPASS PUMPING WITH AUTOMATIC FLOW DIVERSION, PIPING AND VALVES TO ALLOW FOR FLOW TO EFFLUENT OR REJECT POND OR STORAGE TANK.

EFFLUENT PUMP STATION 1 C-102 2 C-102

6" TEMPORARY PIPING

CHECK VALVE (FIELD VERIFY LOCATION)

6" TEMPORARY PIPING


MIKES MAILLAKAKIS, P.E. DATE  
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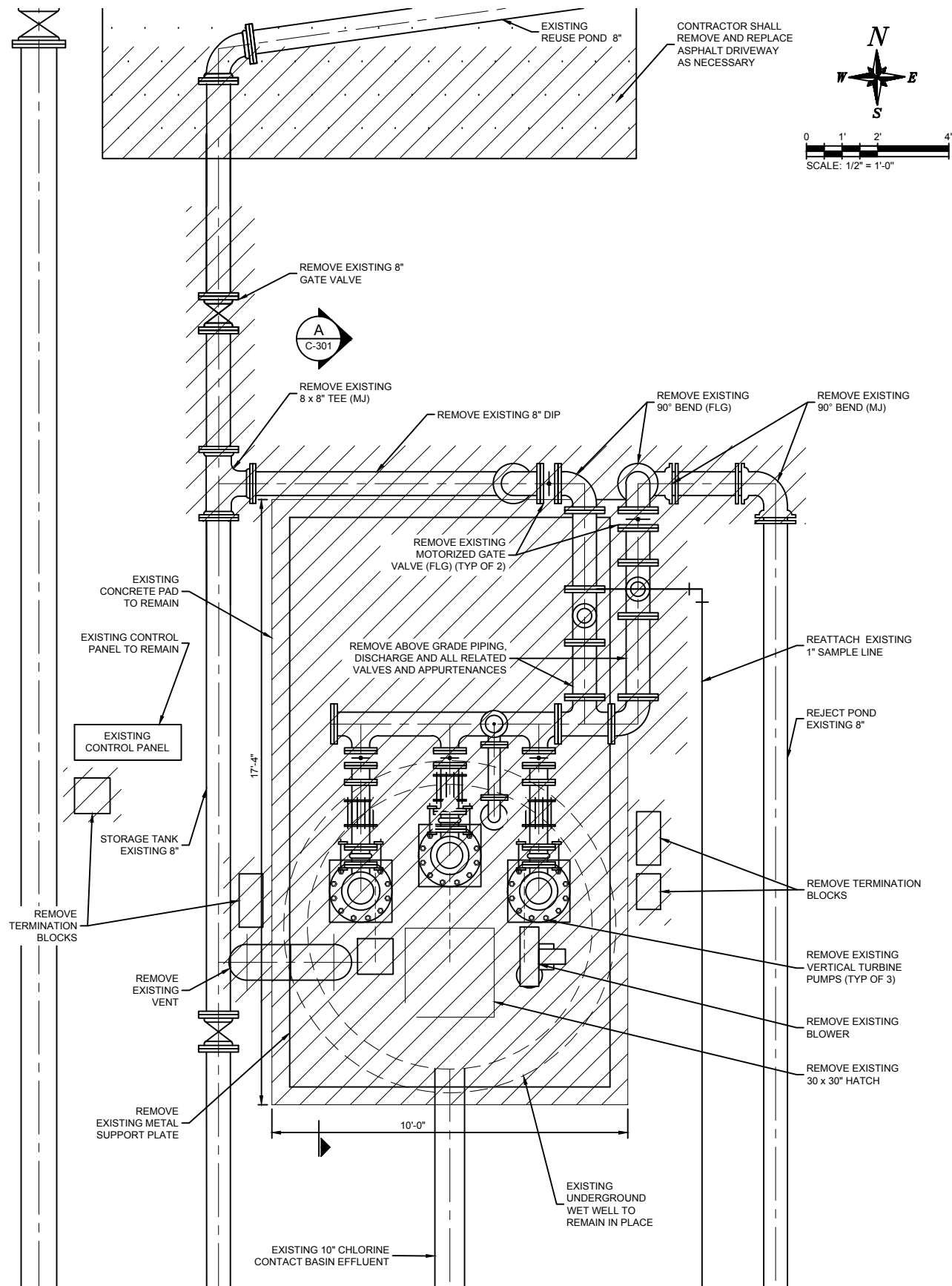

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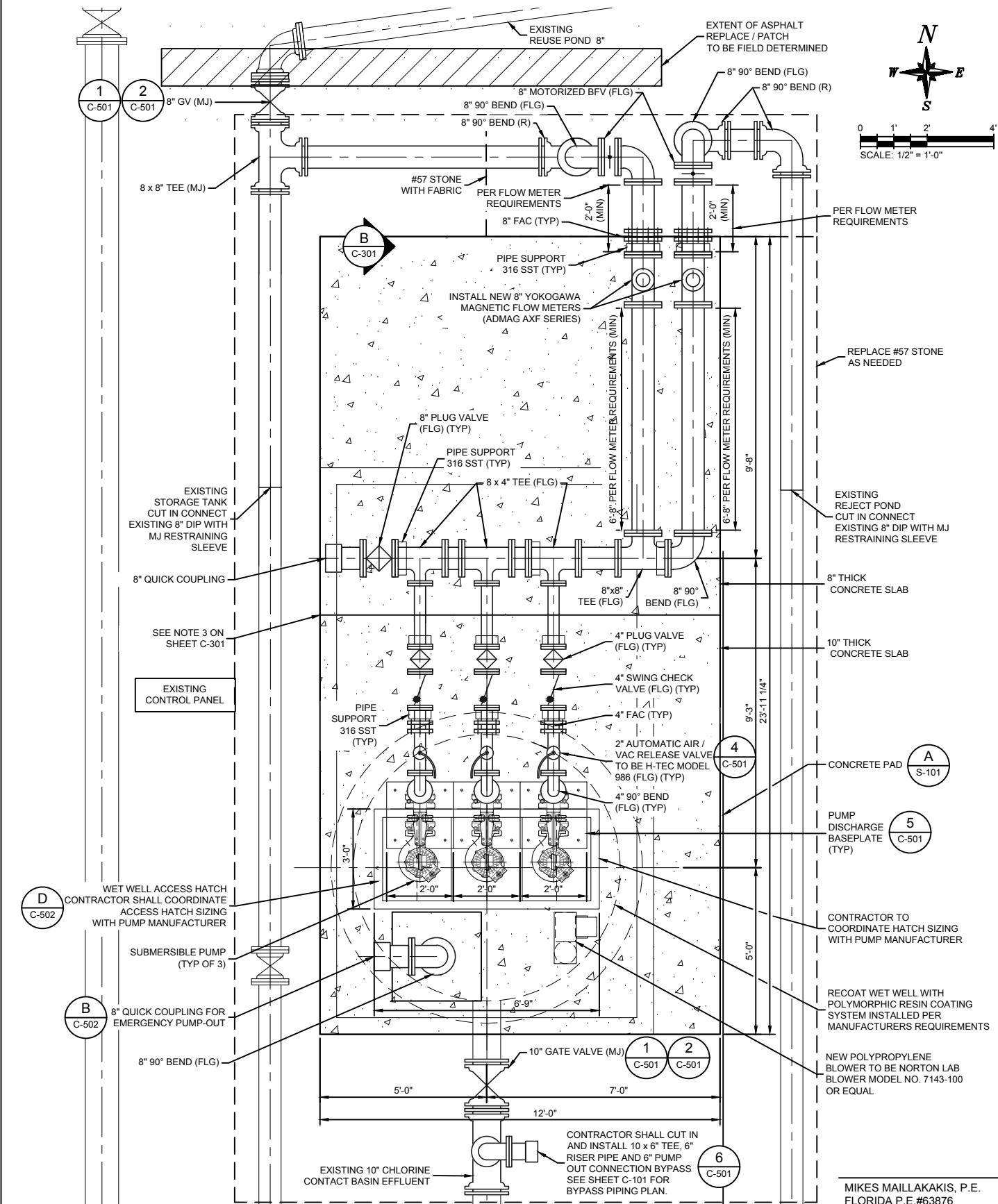
**PINE ISLAND WASTEWATER TREATMENT PLANT**  
**EFFLUENT PUMP STATION REPLACEMENT**  


---

**EXISTING SITE PLAN**



**1**  
C-101  
**EFFLUENT PUMP STATION  
DEMOLITION PLAN**  
SCALE: 1/2" = 1'-0"



**2**  
C-101  
**EFFLUENT PUMP STATION  
SITE PLAN**  
SCALE: 1/2" = 1'-0"

- NOTES:**
- CONTRACTOR SHALL COORDINATE ALL TIE-INS WITH COUNTY PERSONNEL AT LEAST ONE WEEK PRIOR TO CONNECTION.
  - ALL PIPE JOINTS SHALL BE MECHANICALLY RESTRAINED.

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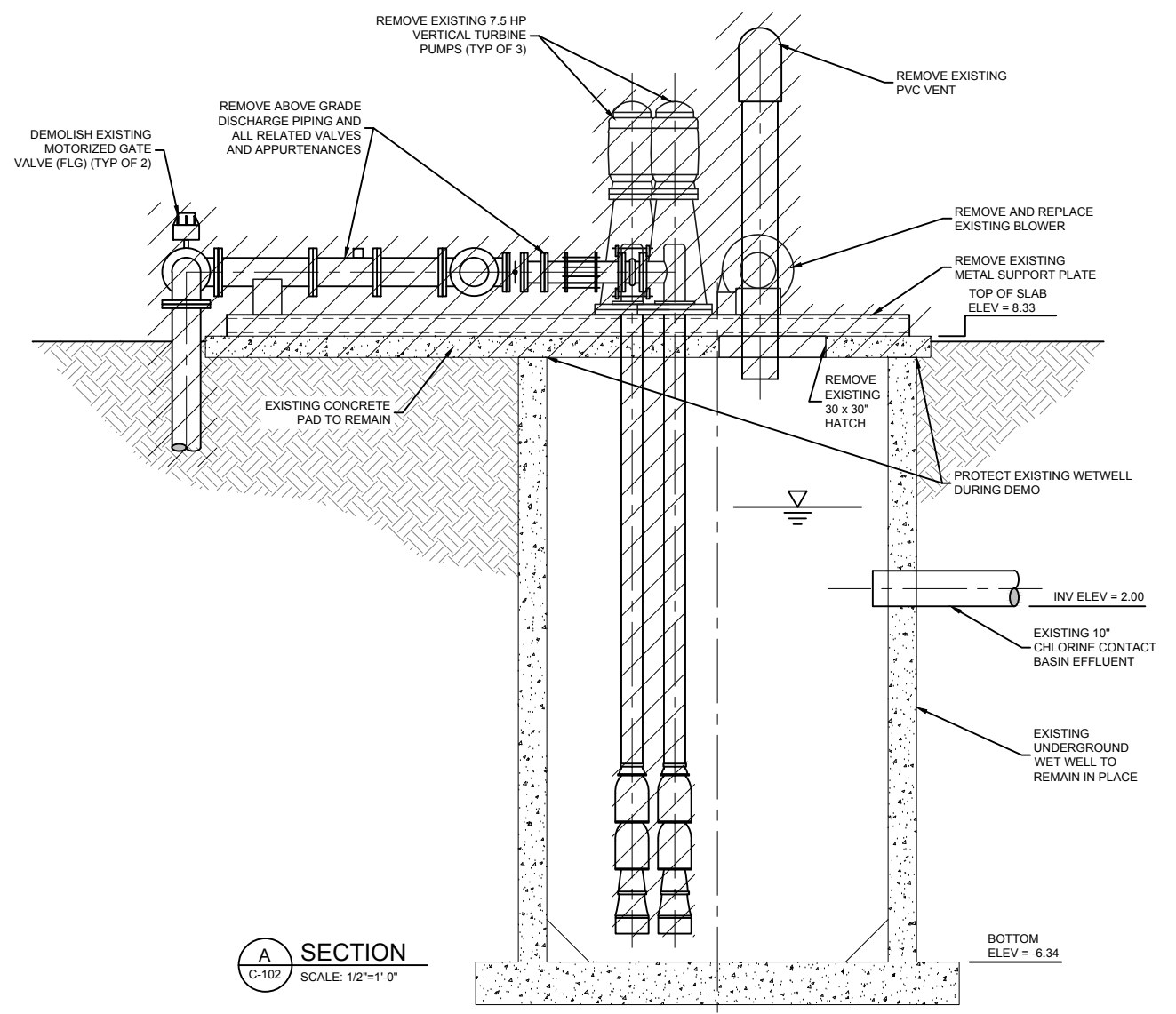
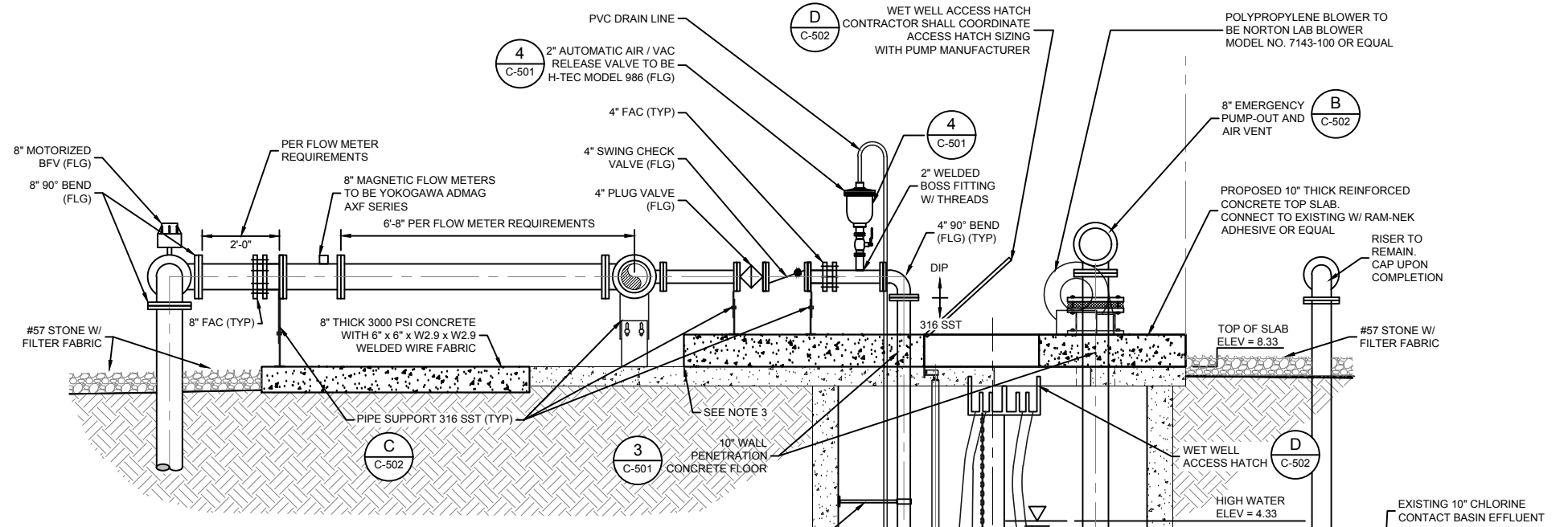
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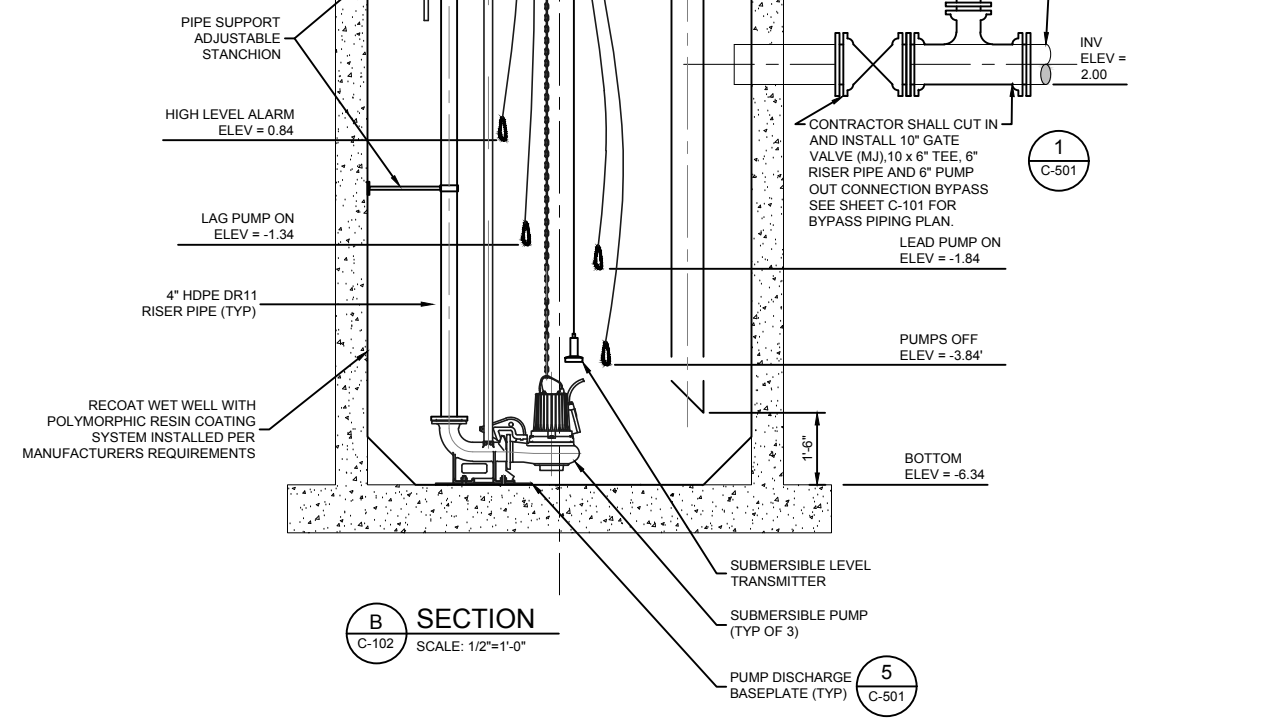
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**PINE ISLAND WASTEWATER TREATMENT PLANT**  
**EFFLUENT PUMP STATION REPLACEMENT**  
**EFFLUENT PUMP STATION DEMOLITION SITE PLAN**





**A SECTION**  
C-102 SCALE: 1/2"=1'-0"



**B SECTION**  
C-102 SCALE: 1/2"=1'-0"

- NOTES:
- CONTRACTOR SHALL COORDINATE ALL TIE-INS WITH COUNTY PERSONNEL AT LEAST ONE WEEK PRIOR TO CONNECTION.
  - ALL PIPE JOINTS SHALL BE MECHANICALLY RESTRAINED.
  - COORDINATE THROUGH SHOP DRAWINGS AND FIELD MEASUREMENTS SO THERE IS NO CONFLICT OF PIPE SUPPORTS W EXPANSION JOINT. REFER TO S-101

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**PINE ISLAND WASTEWATER TREATMENT PLANT**  
**EFFLUENT PUMP STATION REPLACEMENT**  
**EFFLUENT PUMP STATION SECTIONS**

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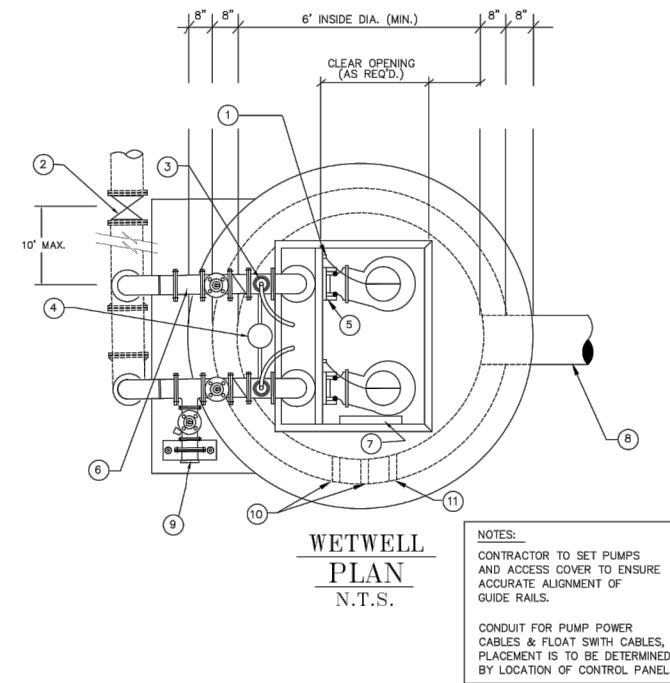
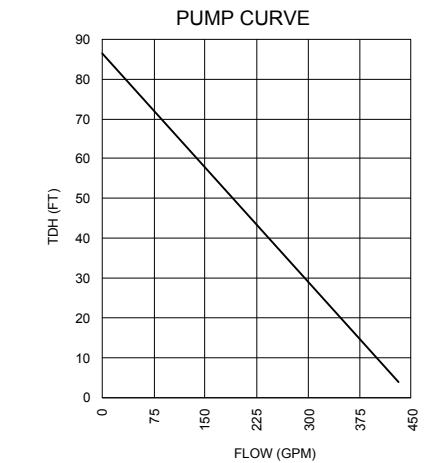


GENERAL NOTES AND REQUIREMENTS

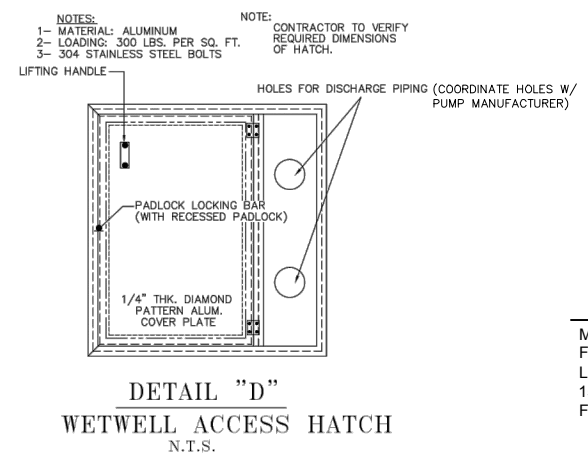
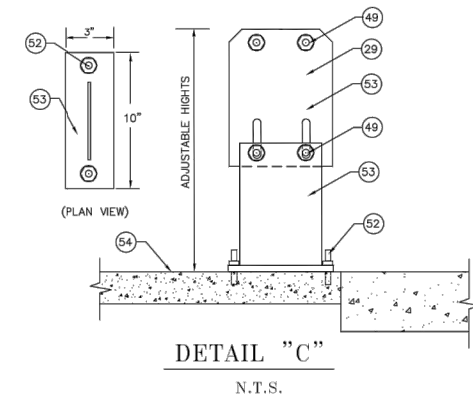
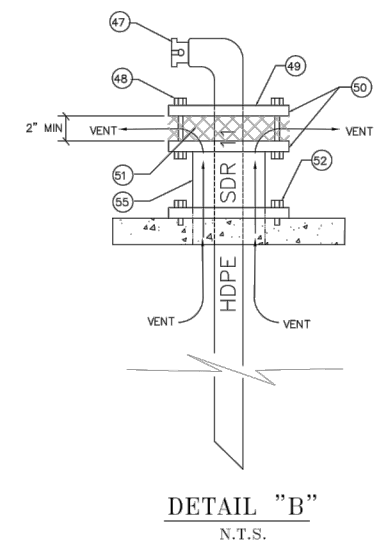
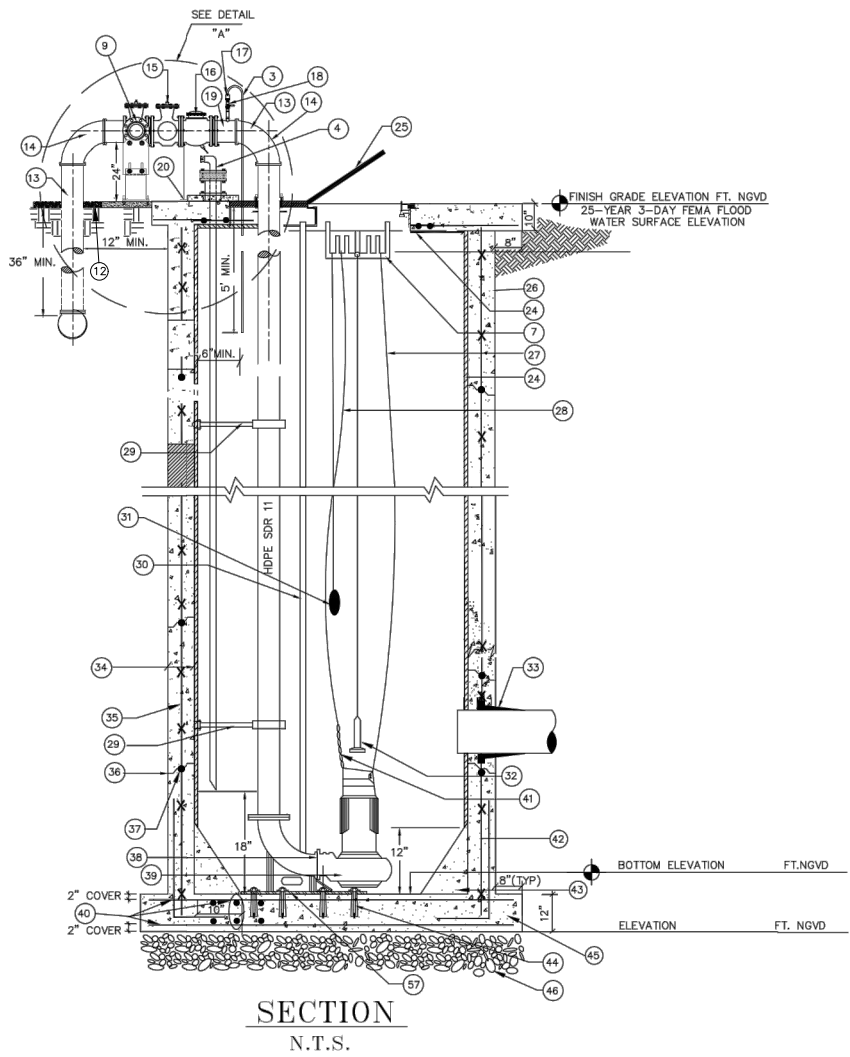
- 1 1/4" THK. SERIES 300 STAINLESS STEEL HOOKS FOR HOIST CABLES
- 2 PLUG VALVE
- 3 PCV DRAIN LINE FROM AIR RELEASE VALVE TO WET WELL
- 4 EMERGENCY PUMP OUT AND AIRVENT (SEE DETAIL "B")
- 5 GUIDE RAILS
- 6 SPOOL PIECE
- 7 STAINLESS STEEL FLOAT CABLE SUPPORT
- 8 INFLUENT PIPE INSTALLED RADIALLY FROM WETWELL CENTER
- 9 FEMALE QUICK CONNECT COUPLER WITH CAP AND PLUG VALVE
- 10 POWER CABLE
- 11 FLOAT CONTROLS
- 12 FILTER CLOTH WITH 4" OF COMPACTED #57 STONE
- 13 PIPE
- 14 90° BEND
- 15 PLUG VALVE
- 16 SWING FLEX CHECK VALVE
- 17 2" AUTOMATIC AIR RELEASE VALVE (SEE LCU APPROVED MATERIAL LIST) ON EACH DISCHARGE PIPE
- 18 2" STAINLESS STEEL BALL VALVE (SEE APPROVED MATERIAL LIST)
- 19 HDPE BRANCH CABLE DE 3408 ASTM D3360 (BLACK) WITH FEMALE THREADED INERT BRASS ALLOY STAINLESS COMPRESSION RING GRADE TYPE 304 OR 316
- 20 STAINLESS STEEL PIPE SUPPORT (SEE DETAIL "C")
- 21 NEOPRENE GASKET
- 22 STAINLESS STEEL FLANGE RING
- 23 HDPE RIM (FUSED TO HDPE PIPE)
- 24 LINER OR COATING (SEE LCU APPROVED MATERIAL LIST)
- 25 ALUMINUM HATCH (SEE DETAIL D)
- 26 COAL TAR EPOXY (BELOW FINISHED GRADE)
- 27 SENSOR CABLE
- 28 SERIES 316 STAINLESS STEEL 1/4" CABLE
- 29 SERIES 316 STAINLESS STEEL PIPE SUPPORT
- 30 2" SERIES 316 STAINLESS STEEL GUIDE RAILS
- 31 HIGH WATER ALARM SIGNAL ON
- 32 SUBMERSIBLE LEVEL TRANSMITTER
- 33 CAST IN PLACE FLEXIBLE PIPE CONNECTION WITH SERIES 316 STAINLESS STEEL CLAMP C-923. CHARDON RUBBER, O/E (TYP.) WALL THICKNESS 8" MIN.
- 34 STEEL REINFORCEMENT
- 35 RAM-NEK BLANKET OUTER SIDE OF WET WELL
- 36 RAM-NEK OR EQUAL PREFORMED PLASTIC GASKET MATERIAL BETWEEN PRECAST UNITS (TYP.)
- 37 AUTOMATIC DISCHARGE CONNECTION TO SUIT PUMP
- 38 SUBMERSIBLE PUMPS
- 39 #5 AT 8" CENTER
- 40 SERIES 316 STAINLESS STEEL 3/8" CHAIN (1'-6" LONG)
- 41 #4 AT 8" CENTER
- 42 CONC. OR PORTLAND TYPE II & SAND MIX
- 43 3/4" DIA. x 8" STAINLESS STEEL WEDGE BOLT SCREW ANCHORS, 8 EA. REFER TO LCU STANDARD DETAIL
- 44 BASE SECTION TO BE A MONOLITHIC CASTING
- 45 12" MIN. COMPACTED #57 STONE
- 46 CAM LOCK COUPLING ON EMERGENCY PUMP OUT
- 47 STAINLESS STEEL BOLTS
- 48 BLIND FLANGE
- 49 STAINLESS STEEL CLAMP
- 50 STAINLESS STEEL SCREEN CLOTH
- 51 STAINLESS STEEL CONCRETE BOLTS
- 52 3/8" STAINLESS STEEL
- 53 8" OR 10" THICK 3,000 P.S.I. CONCRETE SLAB
- 54 AIR VENT TO BE 2 PIPE SIZES LARGER THAN EMERGENCY PUMP OUT. THE ACTUAL LOCATION IS TO BE DETERMINED IN THE FIELD.
- 55 PUMP DISCHARGE BASE PLATE, REFER TO LCU STANDARD DETAIL

NUMBER OF PUMPS	NO. 1	NO. 2	NO. 3
PUMP MANUFACTURER	FLYGT	FLYGT	FLYGT
PUMP MODEL NO.	NP 3102	NP 3102	NP 3102
IMPELLER NO.	125	125	125
TYPE OF PUMP	SUBMERSIBLE	SUBMERSIBLE	SUBMERSIBLE
DESIGN CAPACITY PER PUMP	260 GPM	260 GPM	260 GPM
TOTAL DYNAMIC HEAD	33 FT	33 FT	33 FT
SHUT-OFF HEAD	87 FT	87 FT	87 FT
DESIGN SPEED	3,490 PRM	3,490 PRM	3,490 PRM
HORSEPOWER PER PUMP	6.5	6.5	6.5
VOLTS	460	460	460
PHASE POWER	3 PH	3 PH	3 PH
PUMP DISCHARGE SIZE	4"	4"	4"
LAG PUMP ELEVATION	-1.34'	-1.34'	-1.34'
HIGH WATER ALARM	0.84'	0.84'	0.84'
PUMP OFF ELEV	-3.84'	-3.84'	-3.84'
DIAMETER WET WELL	8.00'	8.00'	8.00'
TOP OF WET WELL ELEV	8.33'	8.33'	8.33'
BOTTOM ELEV	-6.34'	-6.34'	-6.34'
INFLUENT PIPE ELEV	2.00'	2.00'	2.00'

BASIS OF DESIGN		
	ADF (GPM)	PHF (GPM)
EXISTING	347	520



NOTES:  
 CONTRACTOR TO SET PUMPS AND ACCESS COVER TO ENSURE ACCURATE ALIGNMENT OF GUIDE RAILS.  
 CONDUIT FOR PUMP POWER CABLES & FLOAT SWTH CABLES. PLACEMENT IS TO BE DETERMINED BY LOCATION OF CONTROL PANEL.



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PINE ISLAND WASTEWATER TREATMENT PLANT  
 EFFLUENT PUMP STATION REPLACEMENT  
 CIVIL DETAILS

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**STRUCTURAL GENERAL NOTES**

- A. THESE GENERAL NOTES PRESENT AND/OR SUMMARIZE KEY PROJECT INFORMATION FOR THE DRAWING READER'S CONVENIENCE. SEE ALSO INDIVIDUAL DRAWING NOTES AND PROJECT SPECIFICATIONS FOR FURTHER DETAILS AND REQUIREMENTS.
- B. ALL REFERENCES TO REFERENCE STANDARDS HEREIN ARE TO MOST RECENT ISSUE IN EFFECT AS OF THE DATE OF THESE DOCUMENTS, UNLESS NOTED OTHERWISE IN PROJECT SPECIFICATIONS OR ON THE DRAWING
- C. ALL ELEVATIONS ARE REFERENCED TO TOP OF SLAB ELEVATION = 8.33 FT.
- D. ALL EXISTING DIMENSIONS SHOWN WITH THE ± SYMBOL ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR BEFORE FABRICATION AND CONSTRUCTION.
- E. SUBMIT SHOP DRAWINGS AS SPECIFIED IN PROJECT SPECIFICATIONS.
- F. ABBREVIATIONS

ADD'L ADDITIONAL	EXTG EXISTING	PL PLATE
AISC AMERICAN INSTITUTE OF STEEL CONSTRUCTION	F.V. FIELD VERIFY	REF REFERENCE
BOT. BOTTOM	GALV GALVANIZED	REINF. REINFORCEMENT
BRG. BEARING	GR. GRADE	REQ. REQUIRE
BTWN BTWN BETWEEN	GRTG GRATING	REQ'D REQUIRED
CCJ CRACK CONTROL JOINT	HK HOOK	REV REVISION
CJ CONSTRUCTION JOINT	HORIZ HORIZONTAL	SCHED SCHEDULE
CL CENTER LINE	I.J. ISOLATION JOINT	SF SQUARE FOOT
CLR CLEAR	LANGLE	SHT. SHEET
CONC CONC CONCRETE	LOC LOCATION	SIM. SIMILAR
CONST CONST CONSTRUCTION	MATL MATERIAL	SPA. SPACE
CONT CONT CONTINUOUS	MAX MAXIMUM	SPEC SPECIFICATIONS
COORD COORD COORDINATE	MECH MECHANICAL	SS STAINLESS STEEL
CTR CENTER	MEMB MEMBRANE	STD STANDARD
DEMO DEMOLISH	MFR MANUFACTURER	STL STEEL
DIA DIAMETER	MIN MINIMUM, MINUTE	STRUCT STRUCTURE(AL)
DIM DIMENSION	MISC. MISCELLANEOUS	SYM SYMMETRICAL
DIST DISTANCE	MTL METAL	T TREAD
DN DOWN	N NEW	T/O.C. TOP OF CONCRETE
DTL DETAIL	N.S. NEAR SIDE	T/ TOP OF
DWG(S) DRAWING(S)	N.T.S. NOT TO SCALE	TEMP TEMPORARY
DWL DOWEL	NA NOT APPLICABLE	THK THCKNESS
E EXISTING	NO NUMBER	TOF TOP OF FOOTING
EA EACH	NOM NOMINAL	TOS TOP OF SLAB
EF EACH FACE	O.C. ON CENTER	TRANSV. TRANSVERSE
EJ EXPANSION JOINT	O.D. OUTSIDE DIAMETER	TYP TYPICAL
EL / ELEV. ELEVATION	OPH OPPOSITE HAND	UNO UNLESS NOTED OTHERWISE
ELEC (ELECTRIC(AL))	OPNG OPENING	V.I.F. VERIFY IN FIELD
ENGR ENGINEER	OPP OPPOSITE	VERT VERTICAL
EQ EQUAL	ORIG ORIGINAL	W/ WITH
EQUIP EQUIPMENT	PEMB PRE-ENGINEERED METAL BUILDING	W/O WITHOUT
EW EACH WAY	PERF PERFORATED	W/S WATER STOP.
EXIST EXISTING	PERP PERPENDICULAR	WWF WELDED WIRE FABRIC

**DESIGN CRITERIA**

- A. REFERENCES:
- ICC INTERNATIONAL BUILDING CODE, 2012 EDITION RISK CATEGORY III IN ACCORDANCE WITH TABLE 1604.5
  - STATE BUILDING CODE: FLORIDA BUILDING CODE
  - ASCE/SEI 7-10 - MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES
- B. DEAD LOADS:
- UNIFORM DEAD LOAD = (SELF WEIGHT)
- PUMP DEAD LOAD = 800 LB
- C. LIVE LOADS (U.N.O.):
- UNIFORM LIVE LOAD = 300 PSF
- PUMP THRUST LOAD = 310 LB

**FOUNDATIONS**

- A. ALLOWABLE BEARING PRESSURES AS FOLLOWS:
- VERTICAL BEARING PRESSURE = 1,500 PSF (ASSUMED)

**STRUCTURAL CONCRETE**

- A. REFERENCES:
- ACI 318-11 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
  - ACI SP-66 ACI DETAILING MANUAL
  - CRSI MSP-2-01 MANUAL OF STANDARD PRACTICE
  - CRSI REINFORCING BAR DETAILING
  - CRSI PLACING REINFORCING BARS
- B. MATERIALS
- STRUCTURAL CONCRETE
    - MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS ( $f_c$ ).....4000 PSI
    - ALL CONCRETE EXPOSED TO THE ELEMENTS SHALL BE AIR-ENTRAINED IN ACCORDANCE WITH ASTM C260 SEE SPECIFICATIONS.
    - ALL CONCRETE IN 8" WALLS OR COLUMNS WITH TWO PLANES OF REINFORCEMENT SHALL HAVE MAXIMUM 3/4" AGGREGATE. IT IS RECOMMENDED THAT THE CONTRACTOR CONSIDER SUPER-PLASTICIZED CONCRETE PER SPECIFICATIONS.
    - ALL CONCRETE AGGREGATE SHALL COMPLY WITH ASTM C33 (NORMAL WEIGHT).
  - REINFORCEMENT
    - REINFORCING BARS: ASTM A615, GRADE 60
  - ACCESSORIES
    - BAR SUPPORTS CLASS 1, MAXIMUM PROTECTION (CRSI MANUAL OF STANDARD PRACTICE) FOR ALL SLABS AND BEAMS WITH SOFFITS EXPOSED TO VIEW
  - GROUT: HIGH STRENGTH, NON-SHRINK STRUCTURAL GROUT. SEE SPECIFICATIONS.
- C. REINFORCEMENT DETAILING
- ALL REINFORCING STEEL DETAILS SHALL BE IN ACCORDANCE WITH THE ACI CODE REQUIREMENTS (ACI 318 - CURRENT EDITION).
  - REINFORCING STEEL PLACING DRAWINGS AND BAR LISTS SHALL CONFORM TO THE ACI OR CRSI DETAILING MANUALS. ALL BAR SUPPORTS MUST BE CLEARLY DETAILED
  - CONCRETE COVER FOR REINFORCING SHALL BE INDICATED ON THE APPLICABLE REINFORCING STEEL SHOP DRAWINGS. HOWEVER, NO REINFORCING IN AREAS EXPOSED TO EARTH, WEATHER, SEWAGE OR WATER SHALL HAVE COVER LESS THAN TWO INCHES.
  - SPECIFIED COVER FOR REINFORCING PER ACI 318 (BUILDING STRUCTURES):
    - BAR SUPPORTS (BOTTOM).....3.0"
    - ALL CONCRETE (TOP).....2.0"
  - HOOKS AND BENDS SHALL MEET ACI STANDARD UNLESS OTHERWISE INDICATED.
  - SPLICES: CONTINUOUS REINFORCING BARS SHALL BE FURNISHED WITH CLASS 'B' TENSION LAPS SPLICES INCLUDING CORNER BARS, UNLESS NOTED OTHERWISE.
  - MECHANICAL SPLICES SHALL NOT BE PERMITTED.
  - REINFORCING STEEL FABRICATION AND PLACEMENT SHALL BE IN ACCORDANCE WITH CRSI MANUAL OF STANDARD PRACTICE AND CRSI PLACING REINFORCING BARS (LATEST EDITIONS).
  - SPREAD BARS AROUND SMALL OPENINGS AND SLEEVES IN SLABS AND WALLS WHERE POSSIBLE AND WHERE BAR SPACING WILL NOT EXCEED 1.5 TIMES THE NORMAL SPACING. DISCONTINUE BARS AT LARGE OPENINGS WHERE NECESSARY AND PROVIDE AN AREA OF REINFORCEMENT EQUAL TO THE INTERRUPTED REINFORCEMENT DISTRIBUTING ONE-HALF OF THIS REINFORCEMENT EACH SIDE OF THE OPENING (TENSION LAP SPLICED). HOLES LARGER THAN 12 INCHES IN ANY DIRECTION SHALL HAVE (1) #6 X 4'-0" DIAGONAL BARS IN BOTH FACES AT EACH CORNER
  - ALL REINFORCING SHALL BE HELD SECURELY IN POSITION WITH STANDARD ACCESSORIES IN CONCRETE
  - NO REINFORCING STEEL SHALL BE FIELD BENT WITHOUT THE APPROVAL OF THE STRUCTURAL ENGINEER. FIELD BENDING OF PLAIN REINFORCEMENT, IF PERMITTED, SHALL BE PERFORMED USING AN APPROVED AND APPROPRIATE SIZED PORTABLE HYDRAULIC DEVICE THAT MAKES ACI STANDARD RADIUS BENDS. NO OTHER FIELD BENDING METHOD SHALL BE PERMITTED.
  - WELDING, INCLUDING TACK WELDING, FOR REINFORCING STEEL IS PROHIBITED. WELDING OF REINFORCING STEEL AND HIGH STRENGTH BOLTS, IE. A36, F1554, WILL BE PERMITTED ONLY BY WRITTEN APPROVAL OF THE ENGINEER.
  - ALL OPENINGS THROUGH WALLS, SLABS OR OTHER STRUCTURAL ELEMENTS NOT DETAILED ON THE STRUCTURAL DRAWINGS MUST BE LOCATED BY THE CONTRACTOR AND SHOWN ON THE APPLICABLE REINFORCING STEEL SHOP DRAWINGS. THE FINAL LOCATION OF ALL OPENINGS MUST BE REVIEWED BY THE ENGINEER BEFORE THE CONCRETE IS POURED.
  - MODIFICATION AND REPAIR TO EXISTING CONCRETE: (A) SEE CONCRETE SPECIFICATIONS FOR COMPLETE EXPLANATION. (B) CONNECTION METHODS - METHOD A - BONDING TO SATURATED SURFACE METHOD B - BONDING BY USING BONDING AGENT METHOD C - DOWELS USING EPOXY BONDING AGENT
- D. SEE THE MECHANICAL, ELECTRICAL AND SUPPLIERS DRAWINGS AND THE SPECIFICATIONS FOR THE LOCATIONS OF SPECIAL ANCHORS, SLEEVES, PIPES, CONDUITS AND OTHER DETAILS NOT SHOWN ON THE STRUCTURAL DRAWINGS.
- E. EMBEDDED PIPES OR CONDUIT. MAXIMUM DIAMETER ONE THIRD x SLAB OR WALL THICKNESS, SPACED MINIMUM OF 3 TIMES DIAMETER ON CENTER.
- F. SUBMITTALS
- CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING THE FOLLOWING DOCUMENTS TO THE ENGINEER OF RECORD:
    - CONCRETE MIX DESIGN
    - CONCRETE REINFORCING DRAWINGS
- G. PROVIDE 3/4" CHAMFER ON ALL EXPOSED EDGES
- H. PROVIDE BROOM FINISH OF EXPOSED SLABS

TENSION DEVELOPMENT / LAP SPLICE SCHEDULE (UNCOATED BARS)				
DEVELOPMENT / LAP SPLICE LENGTH IN CONCRETE ( $f_c = 4000$ PSI)				
BAR SIZE	DEVELOPMENT LENGTH (IN)		CLASS 'B' LAP SPLICE LENGTH (IN)	
	BAR TYPE 1	BAR TYPE 2	BAR TYPE 1	BAR TYPE 2
3	15	22	19	28
4	19	29	25	37
5	24	36	31	47
6	29	43	37	56
7	42	63	54	81
8	48	72	62	93
9	54	81	70	105
10	61	91	79	118
11	74	111	97	145

BAR TYPE 1 - CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAN  $d_b$ , CLEAR COVER NOT LESS THAN  $d_b$ , AND STIRRUPS OR TIES THROUGHOUT  $l_d$  NOT LESS THAN CODE MINIMUM  
 OR  
 CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAN  $2'd_b$  AND CLEAR COVER NOT LESS THAN  $d_b$ .

BAR TYPE 2 - TOP BARS WITH MORE THAN 12" OF FRESH CONCRETE CAST BELOW AND OTHER CASES

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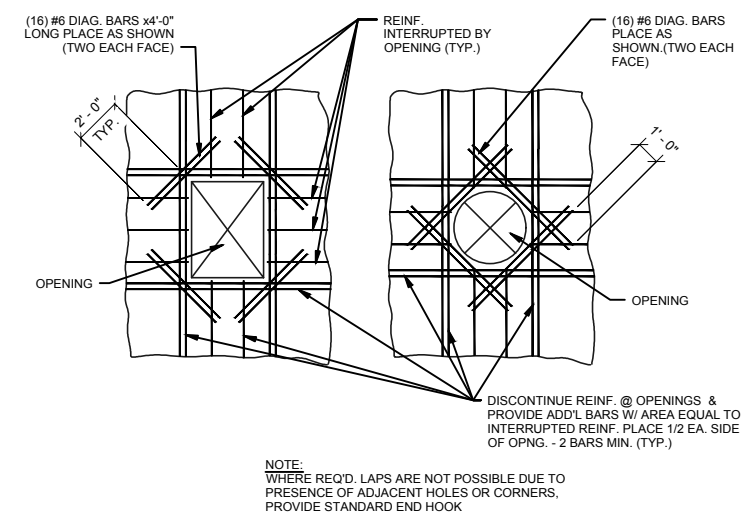
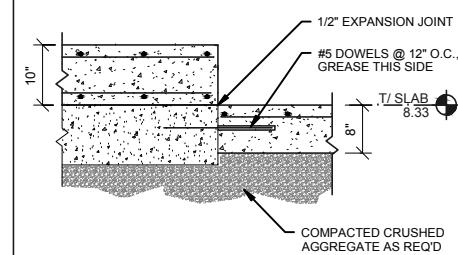
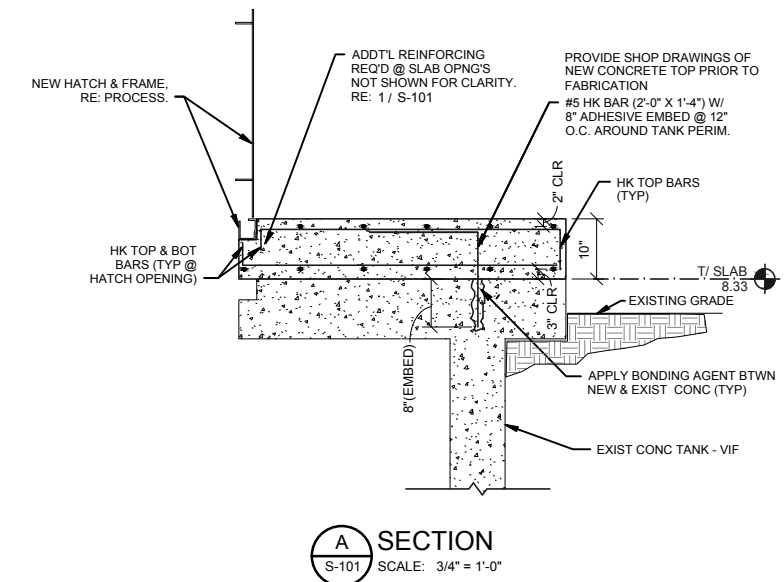
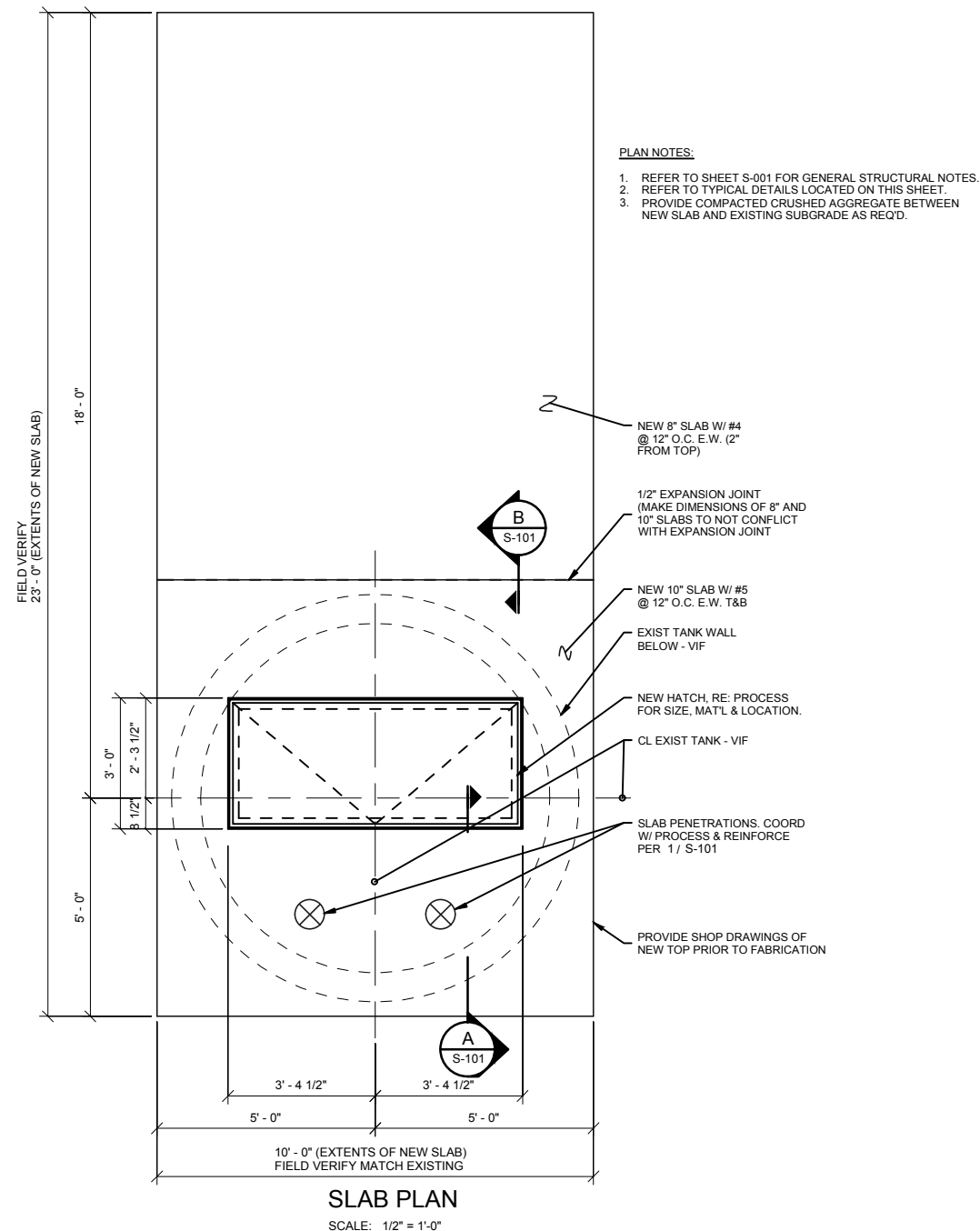
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PINE ISLAND WASTEWATER TREATMENT PLANT  
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BACKGROUND PLAN AND ONE LINE SYMBOLS			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	CONTROL SWITCH (SEL. OR P.B.) SEE CIRCUITS FOR SPECIFIC TYPE		LOW VOLTAGE DISCONNECT SWITCH
	SEE CIRCUITS FOR SPECIFIC TYPE FLOAT SWITCH - FLOW SWITCH		LOW VOLTAGE FUSE (BELOW 600V)
	TEMPERATURE - HUMIDISTAT SWITCH (SUBSCRIPT = NO. OF STAGES)		ALL STARTERS SHALL BE FULL VOLTAGE NON-REVERSING UNLESS OTHERWISE INDICATED (FVR) FULL VOLTAGE REVERSING (RV) REDUCED VOLTAGE (2S,2W) TWO SPEED, TWO WINDING
	LIMIT - PRESSURE - VACUUM SWITCH		600V 3 POLE MOLDED CASE CIRCUIT BREAKER, FRAME & RATING AS SHOWN
	ELECTRICAL OR MECHANICAL ALTERNATOR (SEE WIRING)		SINGLE PHASE, FRACTIONAL HP MOTOR TO LOCATION INDICATED (SEE GEN. NOTE 4)
	OVERLOAD SWITCH OR DEVICE		THREE PHASE LOAD WITH IDENTIFICATION
	TERMINAL BOX		HIGH VOLTAGE FUSE (ABOVE 600 V)
	SOLENOID VALVE		TAG NO. (BALLOON) FOR DEVICE INDICATED
	PHOTOCELL LINE VOLTAGE		FOR POWER (SEE GEN. NOTE 4) 3/4" C/2" C#18 SHLD. CONDUIT AND WIRE RUN FROM DEVICE INDICATED TO LOCATION INDICATED
	ITEM NO. INTERCOM EQUIPMENT		CAPACITOR, 3 PHASE, SIZE AS INDICATED
	INTERCOMMUNICATION SYSTEM AMPLIFIER - WALL STATION - LINE BALANCE		DISCONNECT SWITCH (F) = FUSED (C) = CIRCUIT BREAKER
	INTERCOMMUNICATION DESK SET		MAGNETIC STARTER (BACKGROUND DRAWINGS ONLY)
	INTERCOM. SPEAKER (SURFACE MTD.)		COMBINATION MAGNETIC STARTER FUSED UNLESS NOTED (CIRCUIT BREAKER)
	INTERCOM. SPEAKER (CEILING LAY-IN)		MANUAL STARTER (R) = REVERSING
	TELEPHONE OUTLET OR JUNCTION BOX		CONTROL PANEL
	WELDING RECEPTACLE - NEMA L9-50R 600V, 2P, 3W, SIMPLEX		TEMPERATURE CONTROL PANEL
	INTERCOM HANDSET - SURFACE MOUNTED WITH REMOTE SPEAKER AMPLIFIER		UNIT HEATER, 1/8 HORSEPOWER
	INTERCOM VOLUME CONTROL		600 VOLT FEEDER BUS DUCT (AMPERAGE AS INDICATED)
	INTERCOM SPEAKER - SURFACE MOUNTED		LIGHTNING ARRESTOR
	INTERCOM HANDSET - FLUSH MOUNTED WITH REMOTE SPEAKER AMPLIFIER		LOW VOLTAGE HOME RUNS 120/208 V 120/240 V (SEE GEN. NOTE 4)
	AS NOTED (LIGHTING PANEL, CONTROL PANEL, DISTRIBUTION PANEL ETC.) WALL MOUNTED		WATERTIGHT
	JUNCTION BOX		WATERTIGHT AND CORROSION PROOF
	HEATER		EXPLOSION PROOF - CLASS I, DIVISION I, GROUP D
	TRANSFORMER		EXPLOSION PROOF - CLASS II, DIVISION 1
	CONDUIT WITH CONDUIT SEAL FITTING		KEYLOCK
	CONDUIT EXPOSED		SMOKE DETECTOR
	CONDUIT CONCEALED		EXIT LIGHT
	DIRECT BURIED CONDUIT		FLUORESCENT LUMINAIRE
	DIRECT BURIED CABLE		INCANDESCENT LUMINAIRE
	OVERHEAD LINE		HIGH INTENSITY DISCHARGE LIGHT
	UNDERGROUND DUCT BANK		EMERGENCY BATTERY PACK
	CONCRETE ENCASED DUCT BANK, WITH CABLE LOCATIONS AND SPARE DUCTS AS INDICATED ON DRAWINGS		
	CABLE REEL		

**GENERAL NOTES:**

- ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN LIGHT LINE WEIGHTS ON THE DRAWINGS ARE EXISTING ITEMS TO REMAIN. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN HEAVY LINE WEIGHTS ARE NEW THIS CONTRACT.
- ITEMS SHOWN CROSSHATCHED ON THE DRAWINGS ARE EXISTING ITEMS TO BE REMOVED.
- FOR ITEMS INDICATED AS "FIELD LOCATE" CHECK DRAWINGS OF OTHER TRADES (IN PARTICULAR PIPING AND STRUCTURAL) FOR INTERFERENCE AND FOR LOCATIONS OF MOUNTING FLANGES, CONNECTION POINTS, ETC.
- INSTALL A SINGLE CONDUCTOR INSULATED (XHHW) COPPER GROUND WIRE IN EACH CONDUIT, SIZE AS SHOWN ON DRAWINGS OR AS A MINIMUM PER THE NATIONAL ELECTRICAL CODE. THIS GROUND WIRE SHALL BE CONNECTED AT EACH END TO THE EQUIPMENT GROUND. CONDUIT SHALL BE 3/4" MIN.

CONTROL CIRCUIT & PILOT DEVICE LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	PRESS. ACTUATED SWITCH		SELECTOR SWITCH OPERATOR WITH FUNCTION SHOWN
	FLOAT ACTUATED SWITCH		MOMENTARY PUSHBUTTON OPERATOR-NORMALLY OPEN
	FLOW ACTUATED SWITCH		MOMENTARY PUSHBUTTON OPERATOR-NORMALLY CLOSED
	TEMP. ACTUATED SWITCH		PUSHBUTTON OPERATOR WITH MUSHROOM HEAD
	LIMIT SWITCH-NORMALLY OPEN		FIELD LOCATED STOP BUTTON
	LIMIT SWITCH-NORMALLY CLOSED		MAINTAINED PUSH-PULL OPERATOR
	LIMIT SWITCH-NORMALLY OPEN-HELD CLOSED		MAINTAINED STOP-START PUSHBUTTON OPERATOR
	LATCHING CABLE SWITCH		SOLENOID OR CLUTCH
	TIME-DELAY FUSE		PUSH-TO-TEST INDICATING LIGHT
	CONTROL RELAY COIL		MAINTAINED STOP-MOMENTARY START PUSHBUTTON (JOG)
	CONTROL RELAY CONTACT-NORMALLY OPEN		ZERO SPEED OR ANTI-PLUGGING SWITCH
	CONTROL RELAY CONTACT-NORMALLY CLOSED		LOCAL TERMINALS WITH EXTERNAL WIRING
	TWO COIL LATCHING RELAY		ELAPSED TIME INDICATOR
	TIMING RELAY COIL		TIMING RELAY INSTANTANEOUS CONTACTS
	TIMED CLOSED CONTACT ON ENERGIZATION		
	TIMED OPEN CONTACT ON ENERGIZATION		
	TIMED OPEN CONTACT ON DE-ENERGIZATION		
	TIMED CLOSED CONTACT ON DE-ENERGIZATION		
	120 VAC TRANSFORMER		

WIRING DEVICE SCHEDULE		
SYMBOL	DESCRIPTION	NEMA TYPE
	125V, 2P, SIMPLEX, CLOCK HANGER	1-15 R
	125V, 2P, SIMPLEX, 3W	5-20 R
	125V, 2P, DUPLEX, 3W	5-20 R
	125/250V, 3P, SIMPLEX, 3W, RANGE TYPE	10-50 R
	20A, 120/277 V SWITCH	SPST
	20A, 120/277 V SWITCH	2PDT
	20A, 120/277 V SWITCH	3 WAY
	20A, 120/277 V SWITCH	4 WAY
	20A, 120/277 V DIMMER SWITCH	
	250V, 2P, SIMPLEX, 3W, 50A	6-50R
	125V, 2P, MULTI-RECEPTACLE	5-15R
	250V, 2P, SIMPLEX, 3W, 20A	6-20R
	600V, 2P, 3W, SIMPLEX WELDING	L9-50R
	208V, 3P, SIMPLEX, 4W, LOCKING	L14-20R
	277V, 2P, DUPLEX, 3W	7-15R

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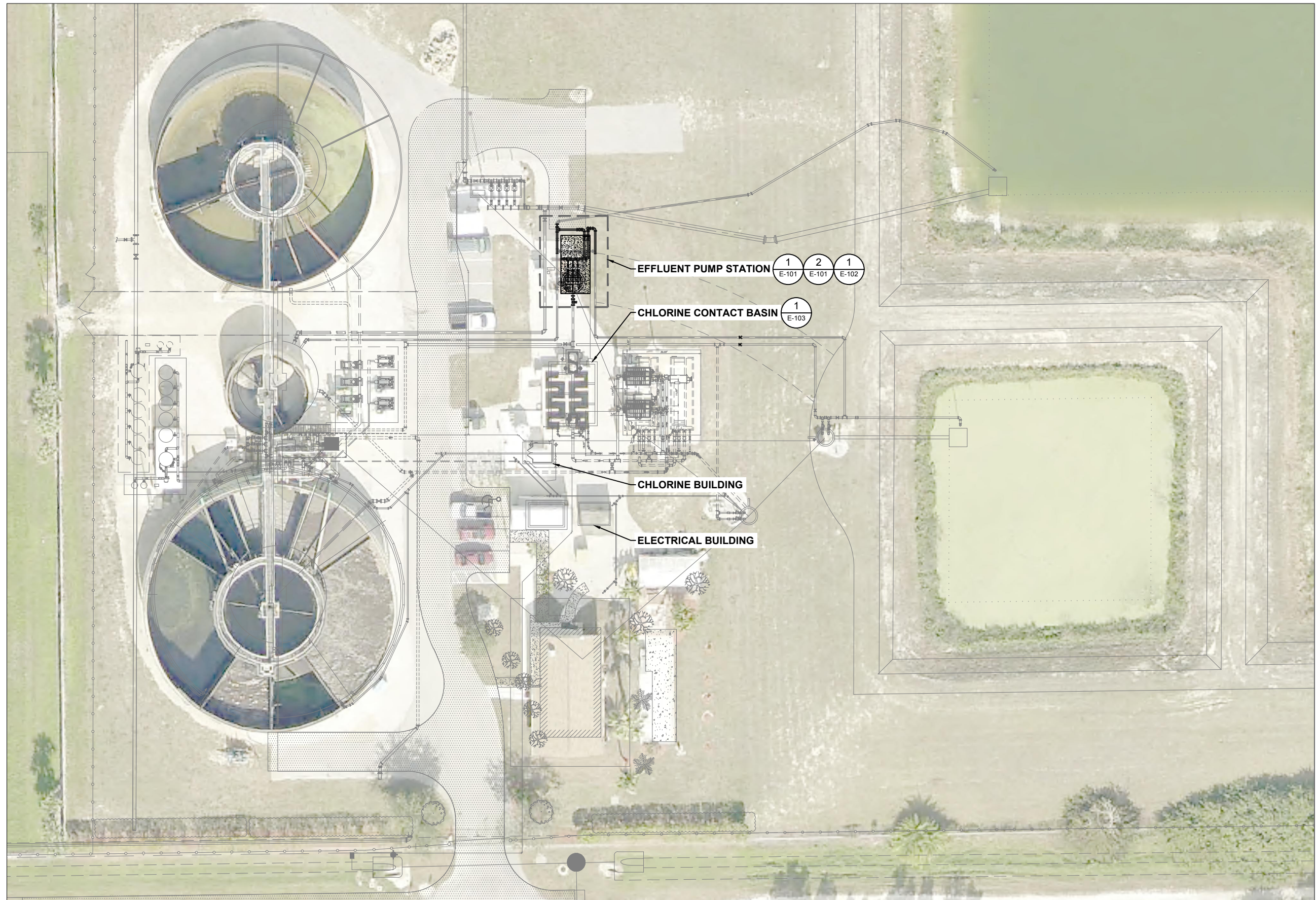
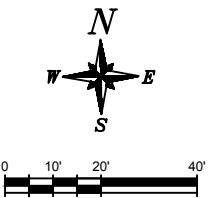
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PINE ISLAND WASTEWATER TREATMENT PLANT  
 EFFLUENT PUMP STATION REPLACEMENT  
 ELECTRICAL LEGEND

SHEET  
 E-001  
 of  
 37  
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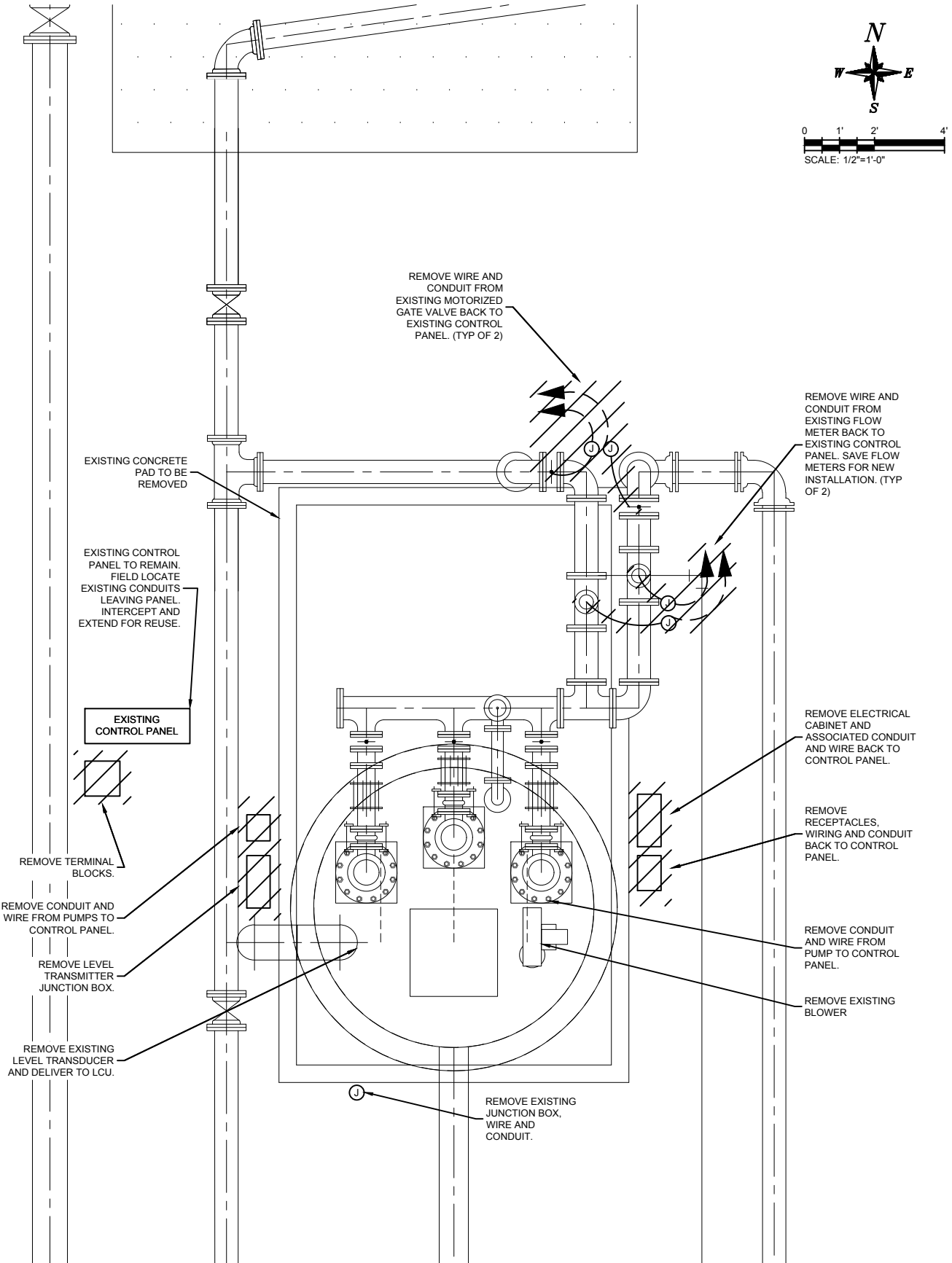

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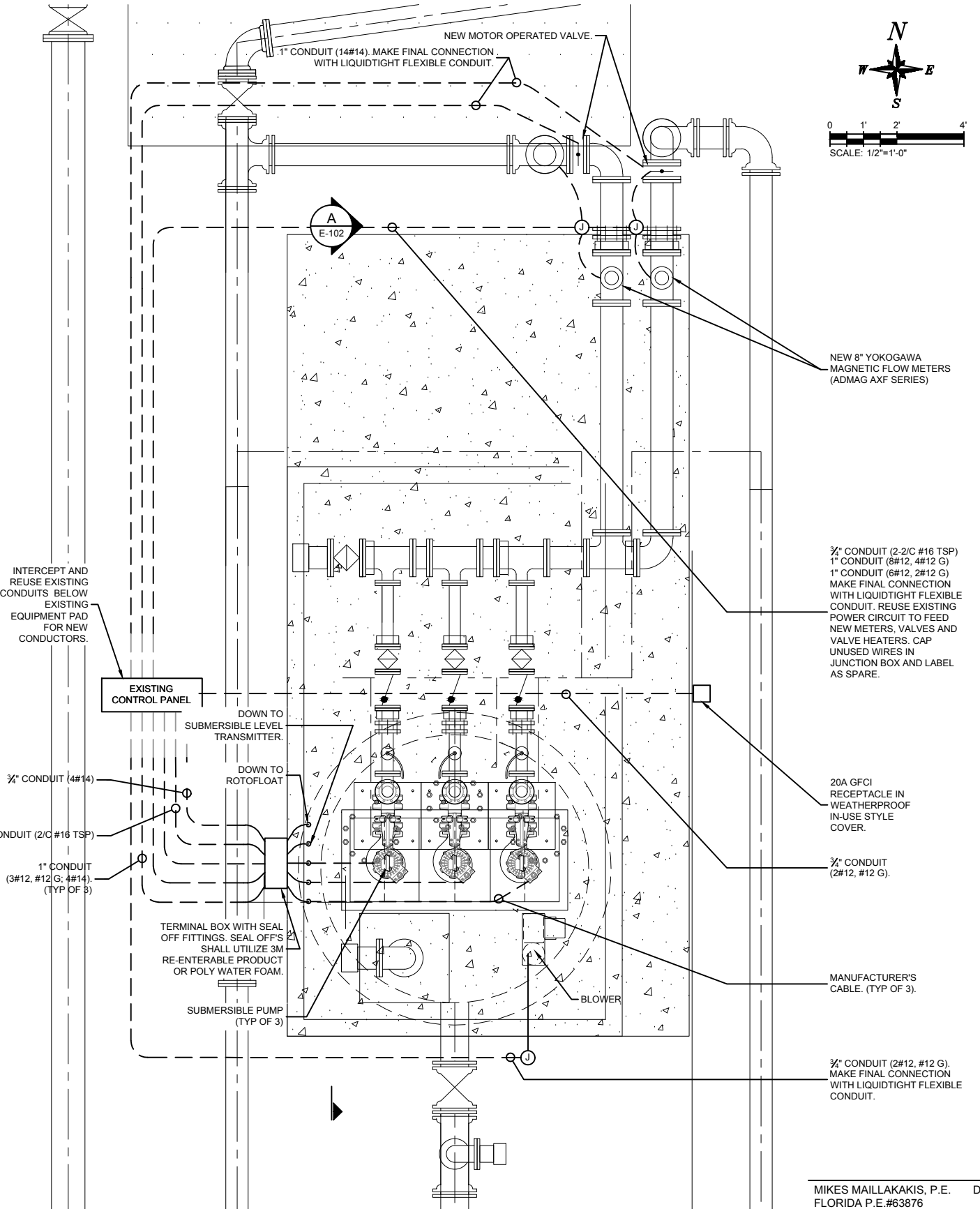
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**EFFLUENT PUMP STATION REPLACEMENT**  


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**EXISTING ELECTRICAL SITE PLAN**



**1**  
E-101  
EFFLUENT PUMP STATION  
DEMOLITION PLAN - ELECTRICAL  
SCALE: 1/2"=1'-0"




**2**  
E-101  
EFFLUENT PUMP STATION  
SITE PLAN - ELECTRICAL  
SCALE: 1/2"=1'-0"

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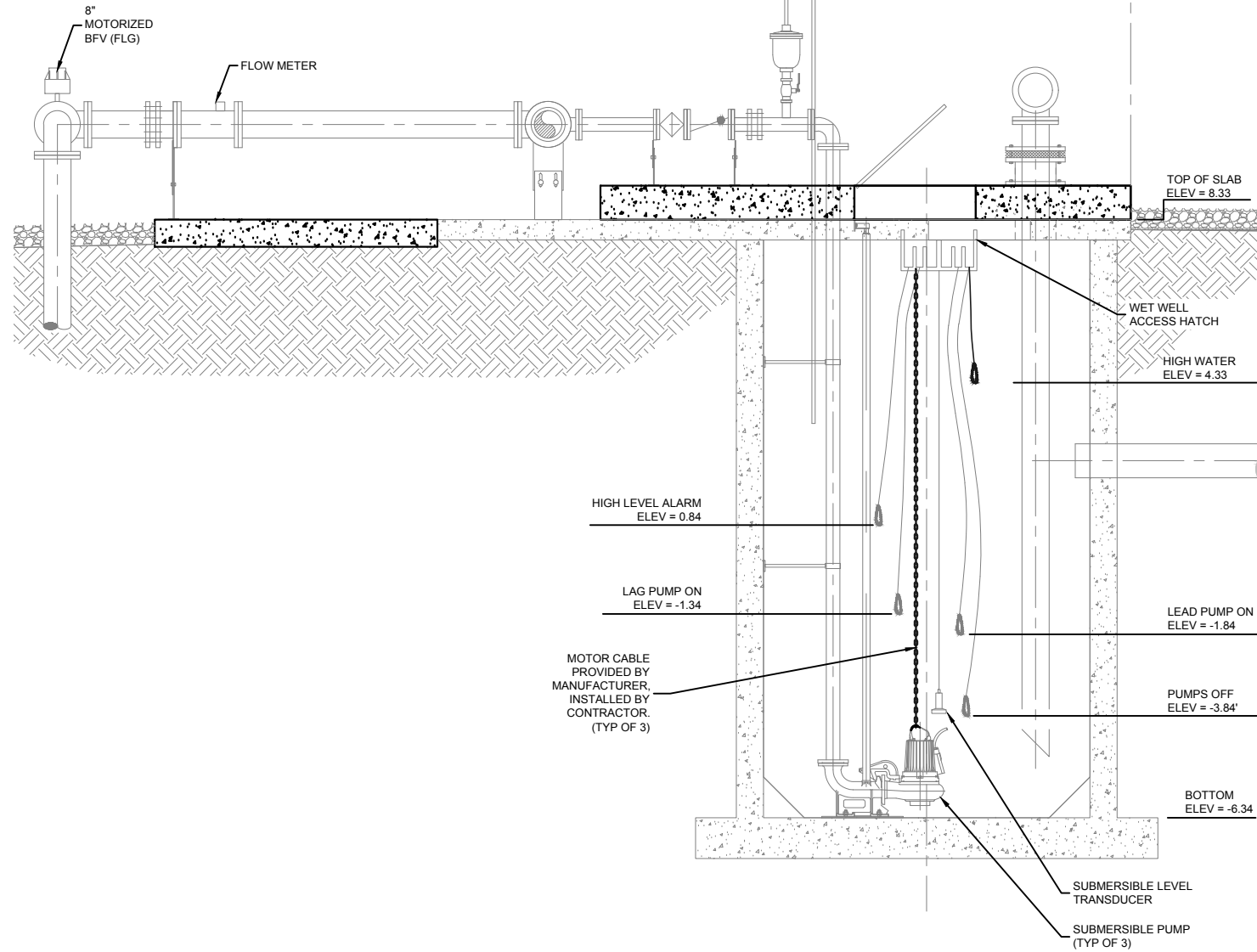
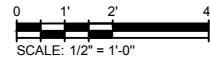

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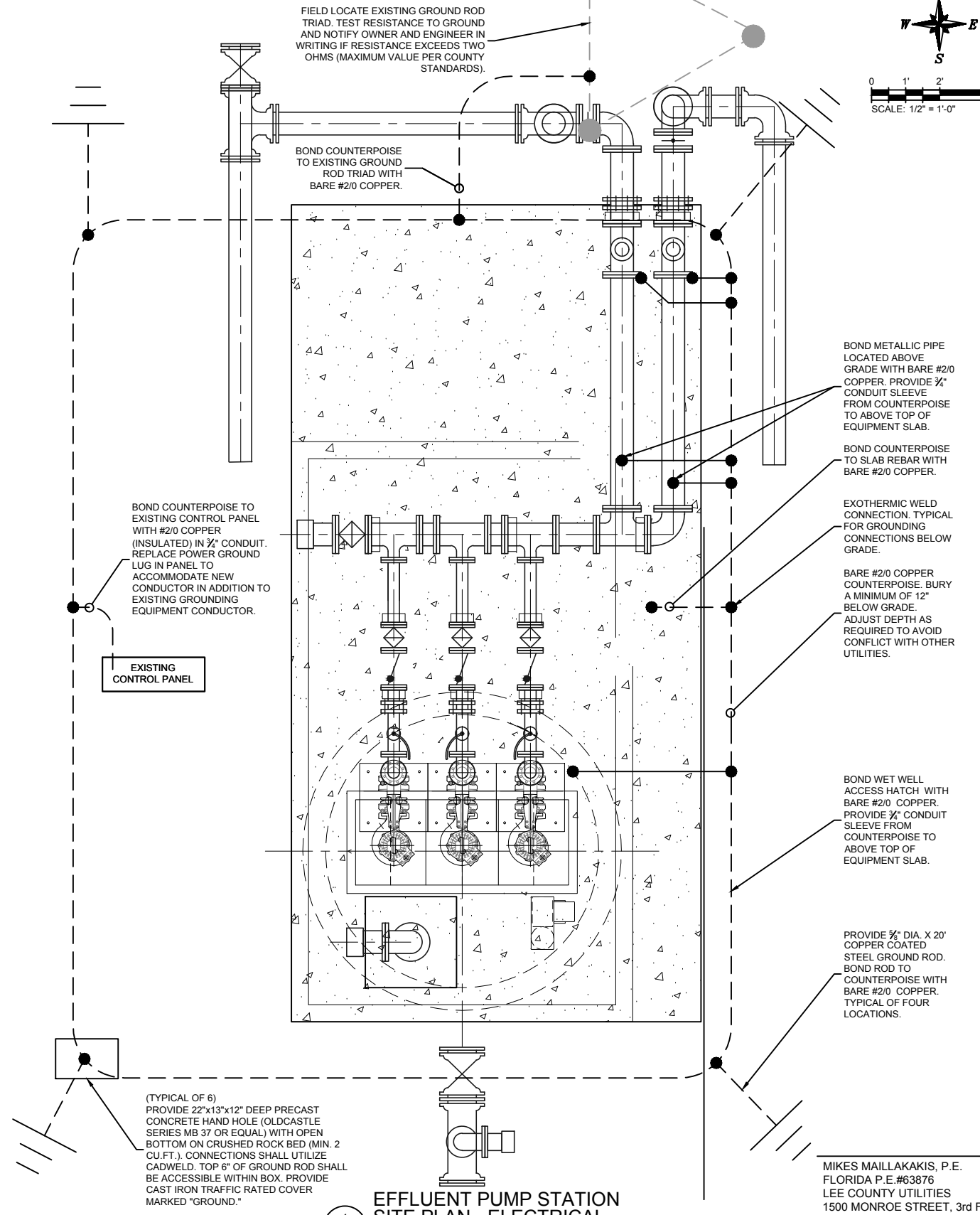
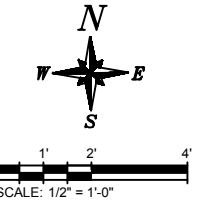
**PINE ISLAND WASTEWATER TREATMENT PLANT**  
**EFFLUENT PUMP STATION REPLACEMENT**  
**PUMP STATION ELECTRICAL DEMO AND RENOVATION PLAN**

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**A SECTION**  
E-101 SCALE: 1/2"=1'-0"



**1 E-102**  
SCALE: 1/2"=1'-0"

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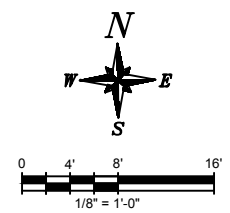
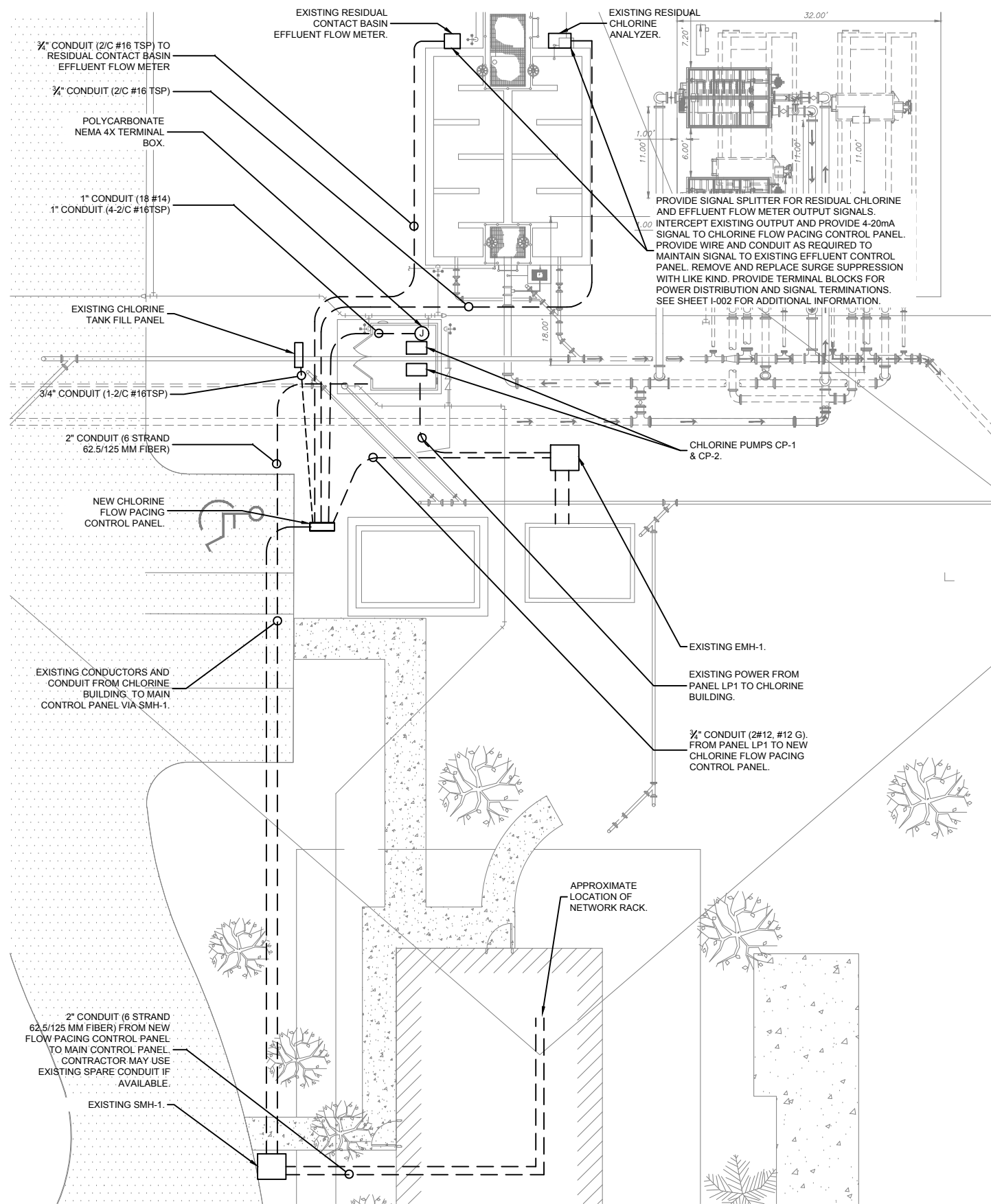
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**PINE ISLAND WASTEWATER TREATMENT PLANT**  
**EFFLUENT PUMP STATION REPLACEMENT**  
**EFFLUENT PUMP STATION DEMOLITION SITE PLAN**



**1**  
E-103  
SCALE: 1/8"=1'-0"

**CHLORINE CONTACT BASIN  
SITE PLAN - ELECTRICAL**

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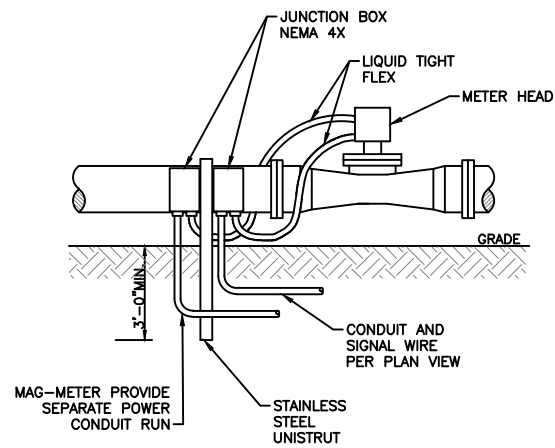
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**PINE ISLAND WASTEWATER TREATMENT PLANT**  
**EFFLUENT PUMP STATION REPLACEMENT**  
**CHLORINE FLOW PACE MODIFICATIONS**

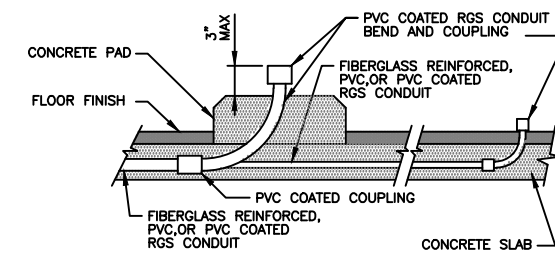
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of  
**37**  
SHEETS

NOT USED

JUNCTION BOX INSTALLATION DETAIL

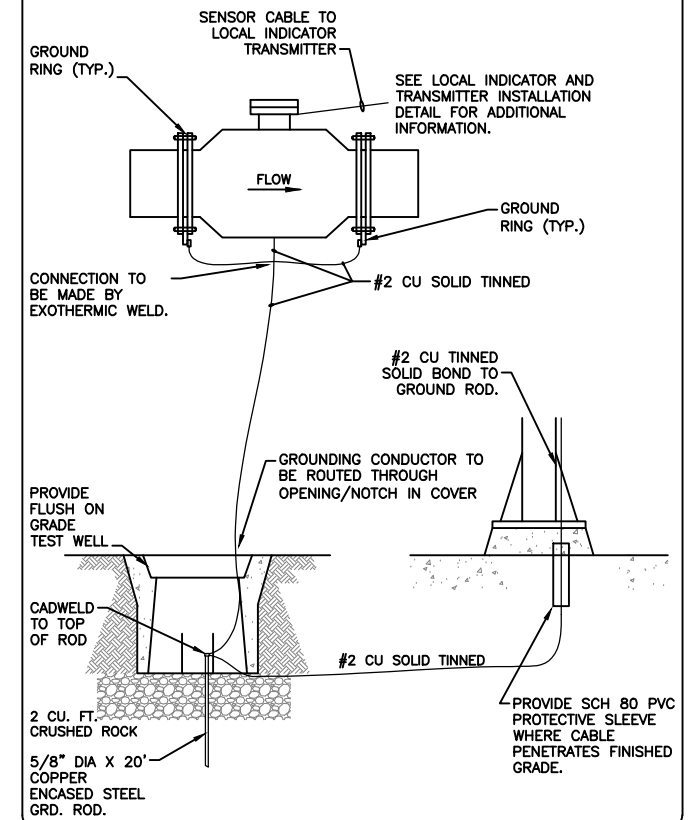


CONDUIT STUB UP DETAIL



NOTE: PVC COATED CONDUIT BENDS AND FITTINGS SHALL BE USED WHERE CONCEALED CONDUIT RUNS ARE STUBBED UP FROM THE SLAB.

GROUNDING OF MAGNETIC FLOW METER (NTS)



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EFFLUENT PUMP STATION REPLACEMENT

ELECTRICAL DETAILS

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GRAPHIC SYMBOL FOR INSTRUMENTATION ITEMS

	DEVICE MOUNTED ON PANEL		CONTROL RELAY CONTACT-NORMALLY OPEN
	BOARD OR PANEL MOUNTED DEVICE- DEVICE MOUNTED INSIDE PANEL		CONTROL RELAY CONTACT-NORMALLY CLOSED
	FIELD OR LOCALLY MOUNTED DEVICE		LIGHTNING ARRESTOR
	PROGRAMMED FUNCTION NOT NORMALLY ACCESSIBLE TO OPERATOR		ELAPSED TIME INDICATOR
	PROGRAMMED FUNCTION ACCESSIBLE THROUGH OPERATOR'S INTERFACE DEVICE		TIMING RELAY COIL
	COMPUTER SYSTEM INPUT OR OUTPUT POINT		TIMED RELAY COIL (OFF-DELAY)
	INTERLOCKING		INDICATING LIGHT
	EXCLUSIVE OR		PUSH-TO-TEST INDICATING LIGHT
	ALTERNATOR		BATTERY
	OR		SECONDARY TRANSFORMER
	AND		VARIABLE RESISTOR
	MOTOR STARTER		RESISTOR
	PURGE		MOLDED CASE CIRCUIT BREAKER
	COMPLEX LOGIC		SPEED SWITCH
	COMPUTER LOGIC SYSTEM		MOMENTARY PUSHBUTTON OPERATOR- NORMALLY CLOSED
	TERMINAL OR TRANSITION POINT		MOMENTARY PUSHBUTTON OPERATOR- NORMALLY OPEN
	SEAL		SELECTOR SWITCH-NORMALLY OPEN
	OFF PAGE CONNECTOR		PUSHBUTTON OPERATOR WITH MUSHROOM HEAD
	IN-LINE FLOW ELEMENT (MAGNETIC TYPE)		THERMAL OVERLOAD
	IN-LINE FLOW ELEMENT (ULTRA SONIC)		A-C SURGE PROTECTOR
	FLOW ORIFICE		HORN
	TURBIDIMETER		FIELD LOCATED
	PUMP		TERMINAL POINT
	GENERAL USE DISCONNECTING SWITCH		TERMINAL POINT ARROW
	TIMED CLOSED CONTACT ON ENERGIZATION		LOW VOLTAGE FUSE
	TIMED OPEN CONTACT ON ENERGIZATION		CONTROL POWER TRANSFORMER
	TIMED OPEN CONTACT ON DE-ENERGIZATION		RECEPTACLE
	TIMED CLOSED CONTACT ON DE-ENERGIZATION		TWO COIL LATCHING RELAY
	FLOW ACTUATED SWITCH-NO		SELECTOR SWITCH OPERATOR WITH FUNCTION SHOWN
	FLOW ACTUATED SWITCH-NC		LIMIT SWITCH - NORMALLY CLOSED - HELD OPEN
	TEMPERATURE SWITCH-NO		LIMIT SWITCH - NORMALLY CLOSED
	TEMPERATURE SWITCH-NC		
	LIMIT SWITCH - NORMALLY OPEN		
	LIMIT SWITCH - NORMALLY OPEN - HELD CLOSED		

GRAPHIC SYMBOLS FOR VALVES

SYMBOL	DESCRIPTION
	STROKE OR POSITION ACTUATOR CYLINDER (OPEN-SHUT)
	STROKE OR POSITION ACTUATOR CYLINDER (THROTTLING)
	PNEUMATIC DIAPHRAGM OR POSITIONER (OPEN-SHUT)
	PNEUMATIC DIAPHRAGM OR POSITIONER (THROTTLING)
	MOTOR OPERATED (THROTTLING)
	MOTOR OPERATED (OPEN-SHUT)
	SLIDE-STOP GATE
	SLUICE GATE
	AIR SET ASSEMBLY
	BALL VALVE
	GLOBE VALVE
	GATE VALVE OR KNIFE GATE
	CHECK VALVE
	PLUG VALVE
	BUTTERFLY VALVE, DAMPER OR LOUVER
	TWO-WAY SOLENOID VALVE OPERATOR
	ELECTRONICALLY CONTROLLED CHECK VALVE
	TWO-WAY SOLENOID VALVE OPERATOR-DETENTED
	THREE-WAY SOLENOID VALVE OPERATOR
	FOUR-WAY SOLENOID VALVE OPERATOR

I.S.A. STANDARD LETTER FUNCTIONS

SYMBOL	FIRST LETTER	SUCCEEDING LETTERS
A	ANALYSIS , ANALOG	ALARM
C	CONDUCTIVITY , COMMAND	CONTROL (FEEDBACK TYPE)
D	DENSITY , SPECIFIC GRAVITY	
E	VOLTAGE	PRIMARY ELEMENT
F	FLOW RATE	RATIO
G	GAGING	GLASS
H	HAND , MANUAL	HIGH
I	CURRENT	INDICATE
J	POWER	SCAN
K	TIME , TIME SCHEDULE	CONTROL (NO FEEDBACK)
L	LEVEL , LIGHT	LOW
M	MOISTURE , HUMIDITY	MIDDLE , MODULATE
P	PRESSURE , VACUUM	POINT
Q	QUANTITY	TOTALIZE , INTEGRATE
R	RADIOACTIVITY	RECORD , PRINT , RECEIVE
S	SPEED , FREQUENCY , SOLENOID	SWITCH
T	TEMPERATURE , TURBIDITY	TRANSMIT , TRANSFORM
U	MULTIVARIABLE	MULTIFUNCTION
V	VIBRATION , VISCOSITY	VALVE , DAMPER , LOUVER
W	WEIGHT , FORCE	
Y		RELAY , COMPUTE
Z	POSITION	DRIVE , ACTUATE

INSTRUMENTATION LINE SYMBOLS

SYMBOL	DESCRIPTION
	ELECTRICAL SIGNAL
	AIR LINE
	HYDRAULIC SIGNAL
	ELECTROMAGNETIC OR SONIC SIGNAL
	SOFTWARE SIGNAL
	CONNECTION TO PROCESS, OR MECHANICAL LINK

ABBREVIATIONS

SYMBOL	DESCRIPTION
R	RESET
T	TRIP
AS	AIR SUPPLY
DO	DISSOLVED OXYGEN
GS	GAS SUPPLY
HS	HYDRAULIC SUPPLY
NS	NITROGEN SUPPLY
ORP	OXYGEN REDUCTION POTENTIAL
SS	STEAM SUPPLY
SP	SET POINT
WS	WATER SUPPLY
PV	PROCESS VARIABLE
F.O.	FAIL OPEN
F.C.	FAIL CLOSE
%	GAIN OR PROPORTIONAL CONTROL
/	INTEGRAL OR RESET CONTROL
D	DERIVATIVE OR RATE CONTROL
V	VELOCITY ALGORITHM
1-0	ON-OFF CONTROL
+T	SQUARE ROOT EXTRACTOR
+	ADD OR TOTALIZE
-	SUBTRACT OR DIFFERENCE
>	HIGHEST MEASURED VARIABLE
<	LOWEST MEASURED VARIABLE
E/I , I/P	CONVERT ONE TO ANOTHER
X , +	MULTIPLY , DIVIDE
e	BIAS OR REVERSING
f(x)	CHARACTERIZE - (EQUATION / /D%/ETC.)

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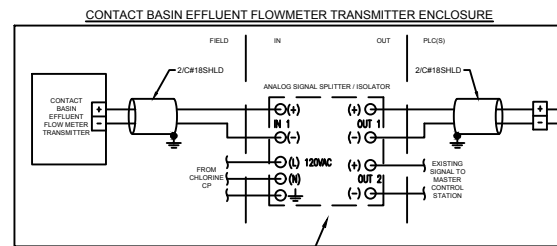
PINE ISLAND WASTEWATER TREATMENT PLANT  
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INSTRUMENTATION LEGEND

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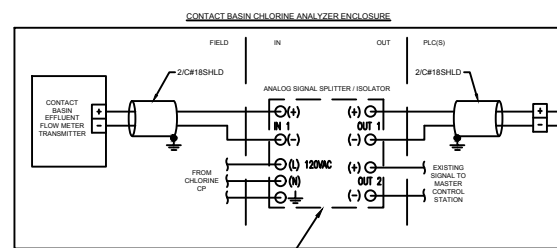
**EXISTING EFFLUENT FLOWMETER ENCLOSURE**  
NO SCALE



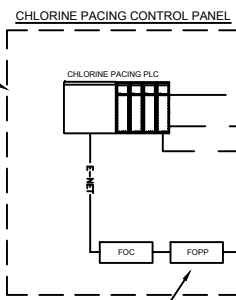
REMOVE EXISTING INCOMING LINE AND ANALOG SIGNAL SURGE PROTECTION DEVICES AND REPLACE WITH LIKE KIND. INSTALL TERMINAL BLOCKS FOR POWER DISTRIBUTION AND INSTRUMENTATION SIGNALS.



**EXISTING CHLORINE ANALYZER ENCLOSURE**  
NO SCALE

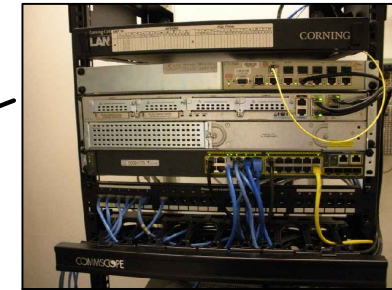
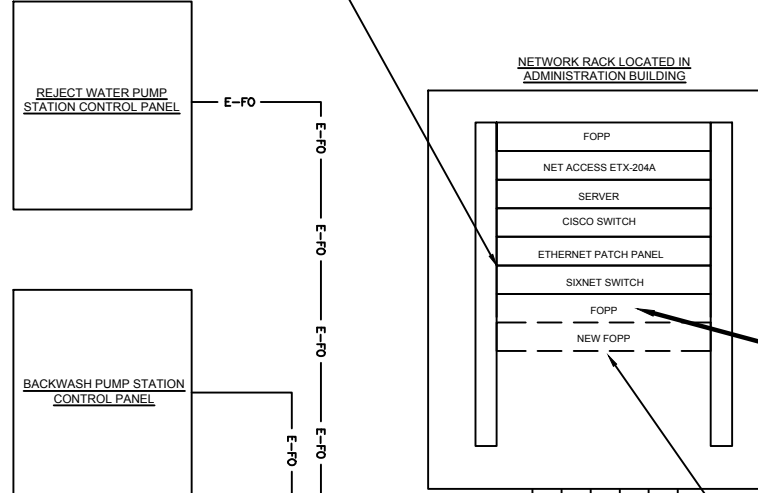


SEE NOTE 4



SEE NOTE 3

PROVIDE SFP PORT FOR SIXNET SWITCH FOR CHLORINE PACING CP CONNECTION WHICH MATCHES THE SPEED OF THE EXISTING SFP(S).



**NETWORK RACK**  
NO SCALE



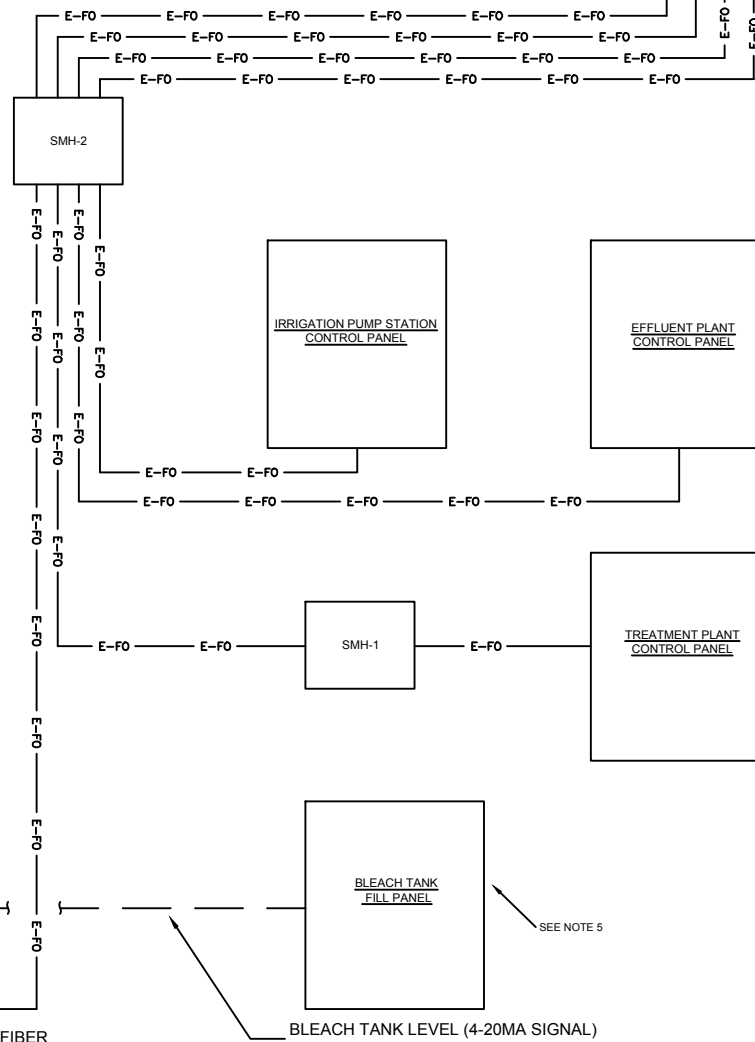
**FIBER PATCH PANEL**  
NO SCALE

INSTALL NEW FIBER PATCH PANEL IN 19" RACK WITH A MINIMUM OF 3 ADAPTER PLATES. EACH ADAPTER PLATE SHALL HAVE 6 ST CONNECTORS. PROVIDE 62.5/125 MM ST-LC FIBER PATCH CABLE TO CONNECT BETWEEN FIBER PATCH PANEL AND SIXNET SWITCH.

CROSS HATCHING INDICATES DEMOLITION

**NOTES:**

- EXISTING CONTACT CHAMBER EFFLUENT FLOWMETER BOX TO BE REPLACED WITH NEMA 4X, STAINLESS STEEL, POWDER COATED WHITE ENCLOSURE TO PROVIDE SUFFICIENT SPACE FOR NEW HARDWARE.
- EXISTING SURGE PROTECTION DEVICE AND TERMINATIONS TO BE REPLACED WITH NEW COMPONENTS AND PROVIDE ADDITIONAL TERMINATIONS FOR NEW HARDWARE.
- ST FIBER TERMINATIONS TO BE SUPPLIED FOR THE FIBER PATCH PANEL AND FIBER PATCH CABLE WITHIN THE CHLORINE PACING CONTROL PANEL
- PROVIDE YOKOGAWA VJH7-026-AAA0 ANALOG SIGNAL SPLITTER. USE EXISTING 120VAC SUPPLY POWER FOR SIGNAL SPLITTER AND EXISTING INSTRUMENTS. PROVIDE SURGE SUPPRESSION ON INCOMING LINE.
- BLEACH TANK LEVEL SIGNAL FROM FILL PANEL TO BE CONNECTED IN ORDER TO PROVIDE BLEACH TANK LEVEL AT SCADA HMI.



SEE NOTE 2

SEE SHEET I-201 FOR ADDITIONAL PANEL INFORMATION AND DETAILS

SEE NOTE 5

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**PINE ISLAND WASTEWATER TREATMENT PLANT**  
**EFFLUENT PUMP STATION REPLACEMENT**  


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**SYSTEM ARCHITECTURE**

BOND COUNTERPOISE TO EXISTING CONTROL PANEL WITH #2/0 COPPER (INSULATED) IN 3/4" CONDUIT. REPLACE POWER GROUND LUG IN PANEL TO ACCOMMODATE NEW CONDUCTOR IN ADDITION TO EXISTING GROUNDING EQUIPMENT CONDUCTOR.

**GENERAL NOTES**

1. THE LOCATION OF ALL EXISTING UTILITIES AND STORM DRAINAGE SHOWN ON THE PLANS HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE AND ARE GIVEN FOR THE CONVENIENCE OF THE CONTRACTOR. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE INACCURACY OR INCOMPLETENESS OF SUCH INFORMATION. PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY VERIFY EXISTING CONDITIONS. DISCREPANCIES THAT INTERFERE WITH THE PROPOSED CONSTRUCTION SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER. ANY DELAY OR INCONVENIENCE CAUSED TO THE CONTRACTOR SHALL BE INCIDENTAL TO THE CONTRACT AND NO EXTRA COMPENSATION WILL BE ALLOWED.
2. EXISTING SYSTEMS SERVED FROM THE EFFLUENT PUMP STATION CONTROL PANEL THAT ARE NOT DIRECTLY AFFECTED BY CONSTRUCTION ACTIVITIES SHALL REMAIN IN SERVICE THROUGHOUT THE PROJECT. ANY INTERRUPTION TO EXISTING SYSTEMS SHALL BE APPROVED BY THE COUNTY IN WRITING PRIOR TO COMMENCING WORK.

WIRING TO LEVEL SENSOR SHALL BE REPLACED. UTILIZE SPARE TERMINALS AS REQUIRED FOR ADDITIONAL WIRING.

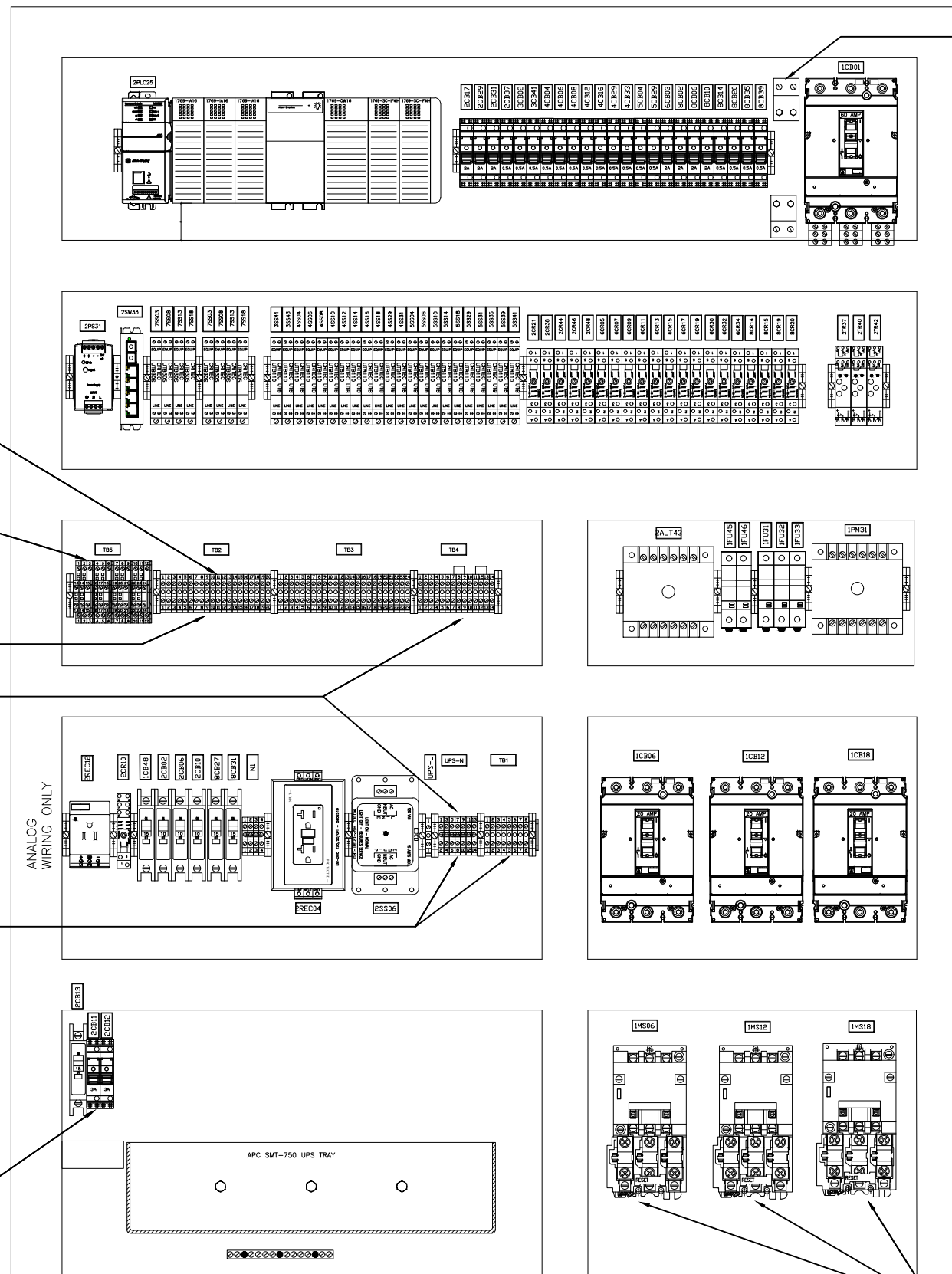
WIRING TO LEVEL TRANSMITTER AND FLOW METERS SHALL BE REPLACED.

MOTORIZED VALVE STATUS FEEDBACK WIRING SHALL BE REPLACED.

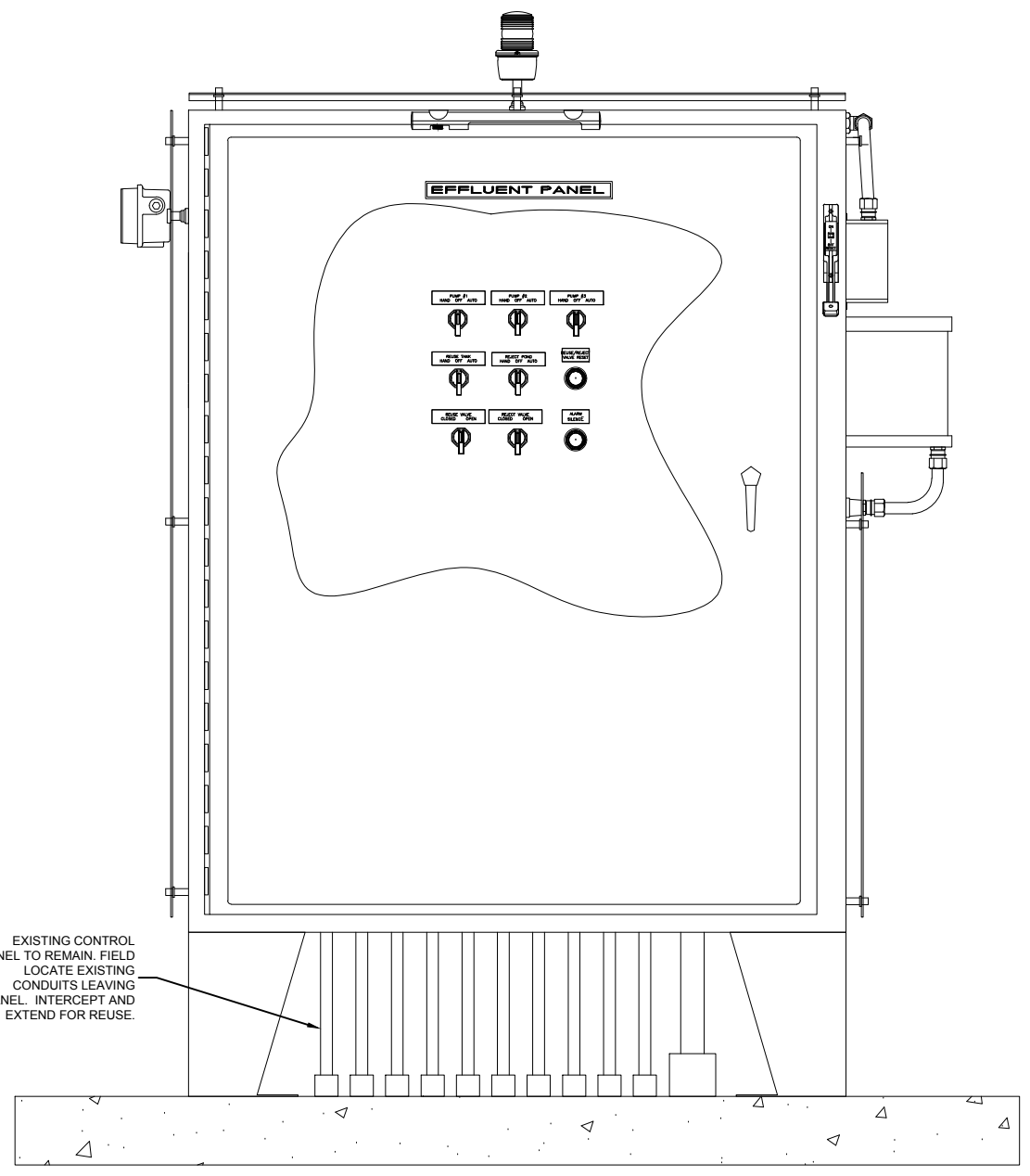
MOTORIZED VALVE CONTROL WIRING SHALL BE REPLACED.

POWER WIRING TO FLOW METERS SHALL BE REPLACED.

POWER WIRING TO BLOWER AND VALVE HEATER SHALL BE REPLACED.



**1**  
I-100 NOT TO SCALE  
**EXISTING EFFLUENT PUMP STATION CONTROL PANEL LAYOUT**



EXISTING CONTROL PANEL TO REMAIN. FIELD LOCATE EXISTING CONDUITS LEAVING PANEL. INTERCEPT AND EXTEND FOR REUSE.

**1**  
I-100 NOT TO SCALE  
**EXISTING EFFLUENT PUMP STATION CONTROL PANEL FRONT ELEVATION**

POWER WIRING FROM STARTER TO PUMPS SHALL BE REPLACED.

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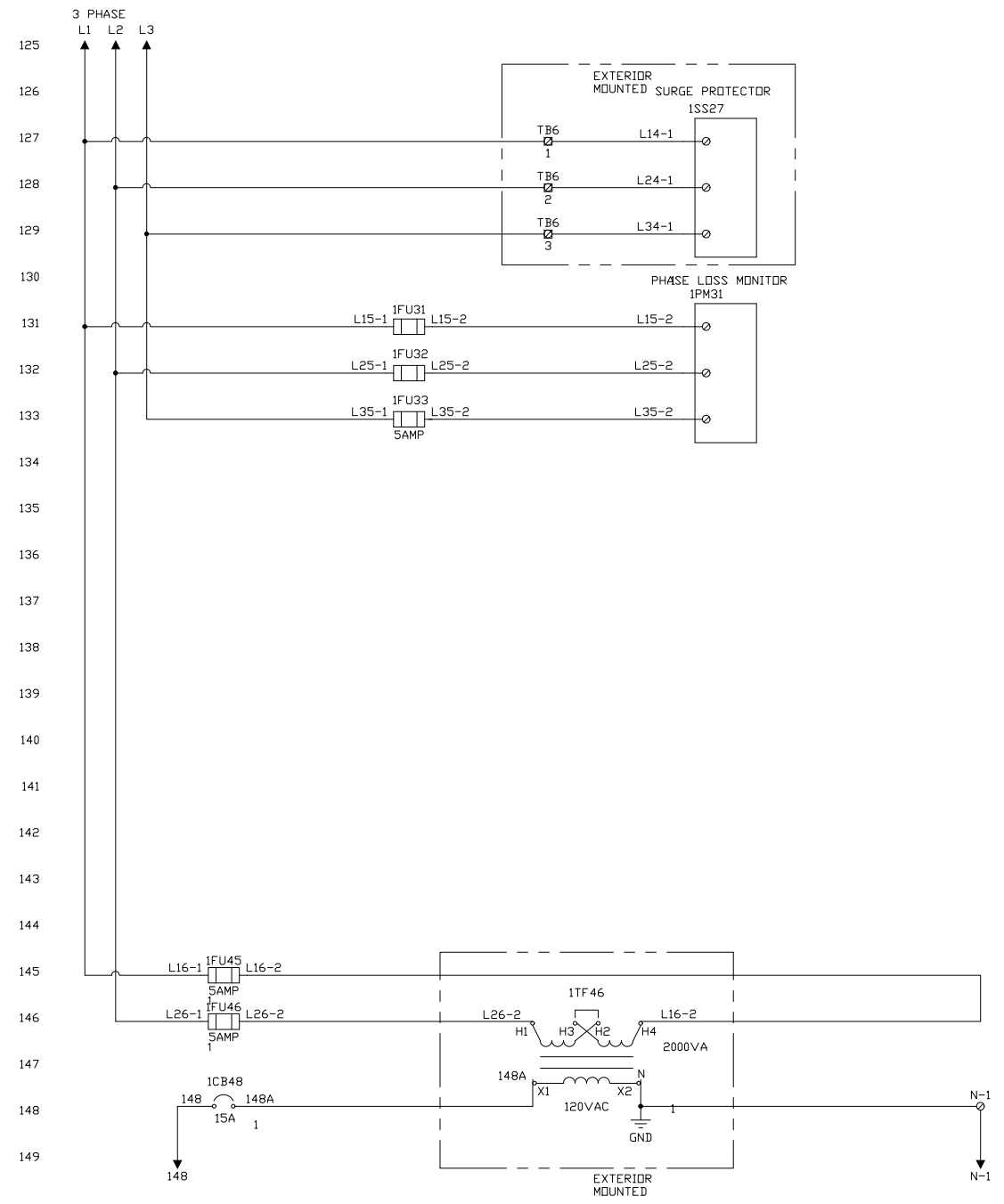
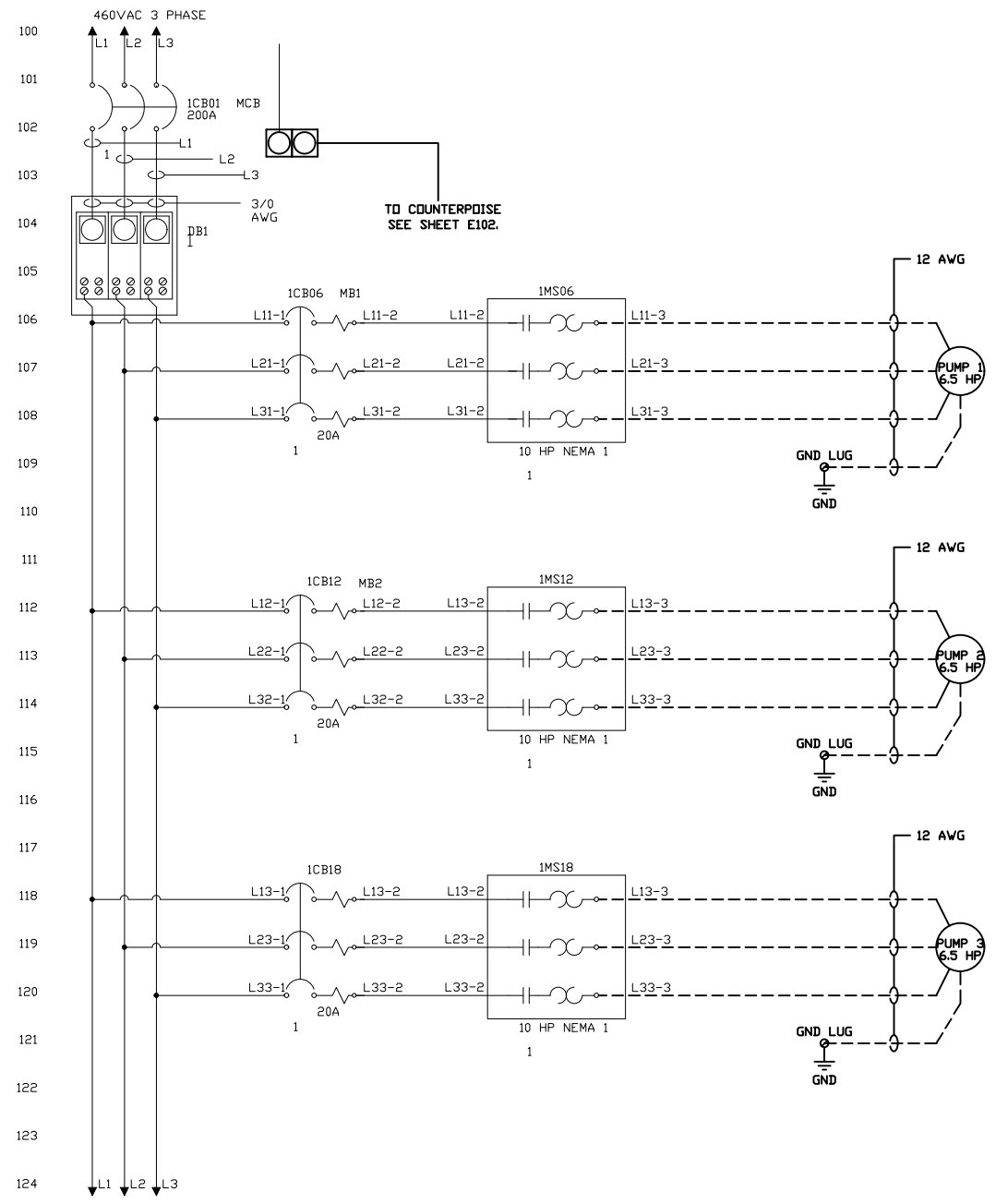
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**EFFLUENT PUMP STATION REPLACEMENT**  
**EXISTING EFFLUENT CONTROL PANEL**



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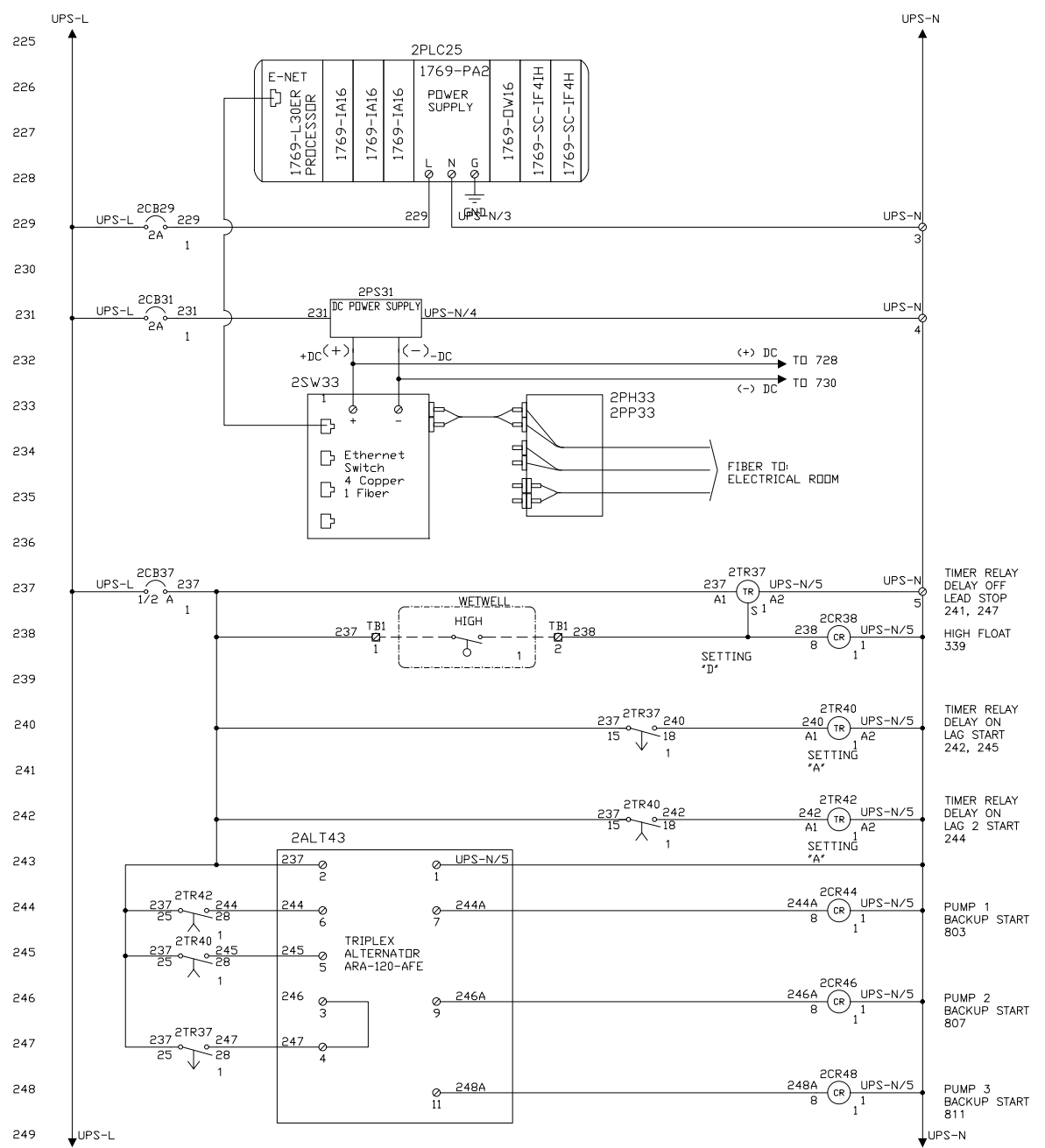
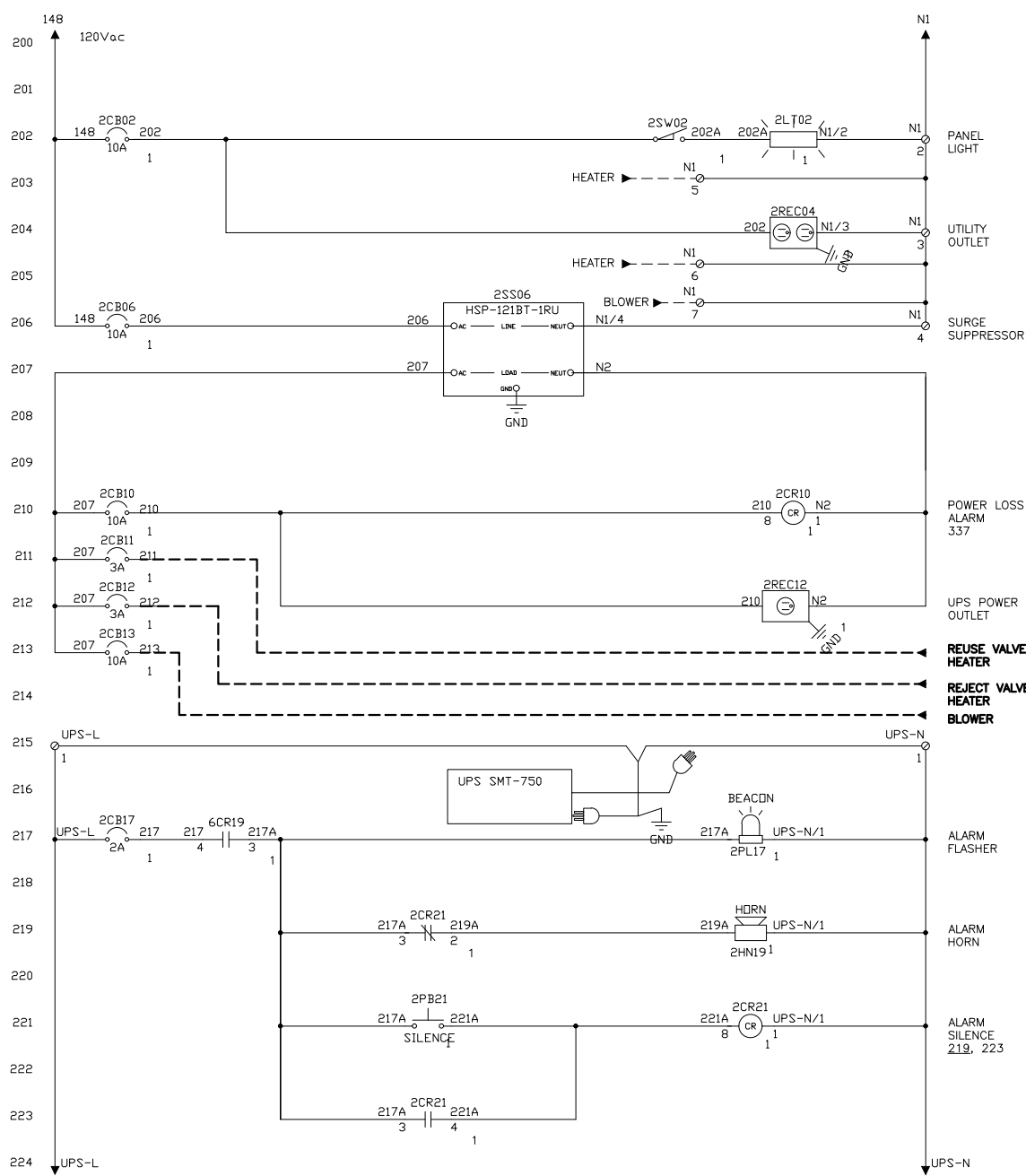
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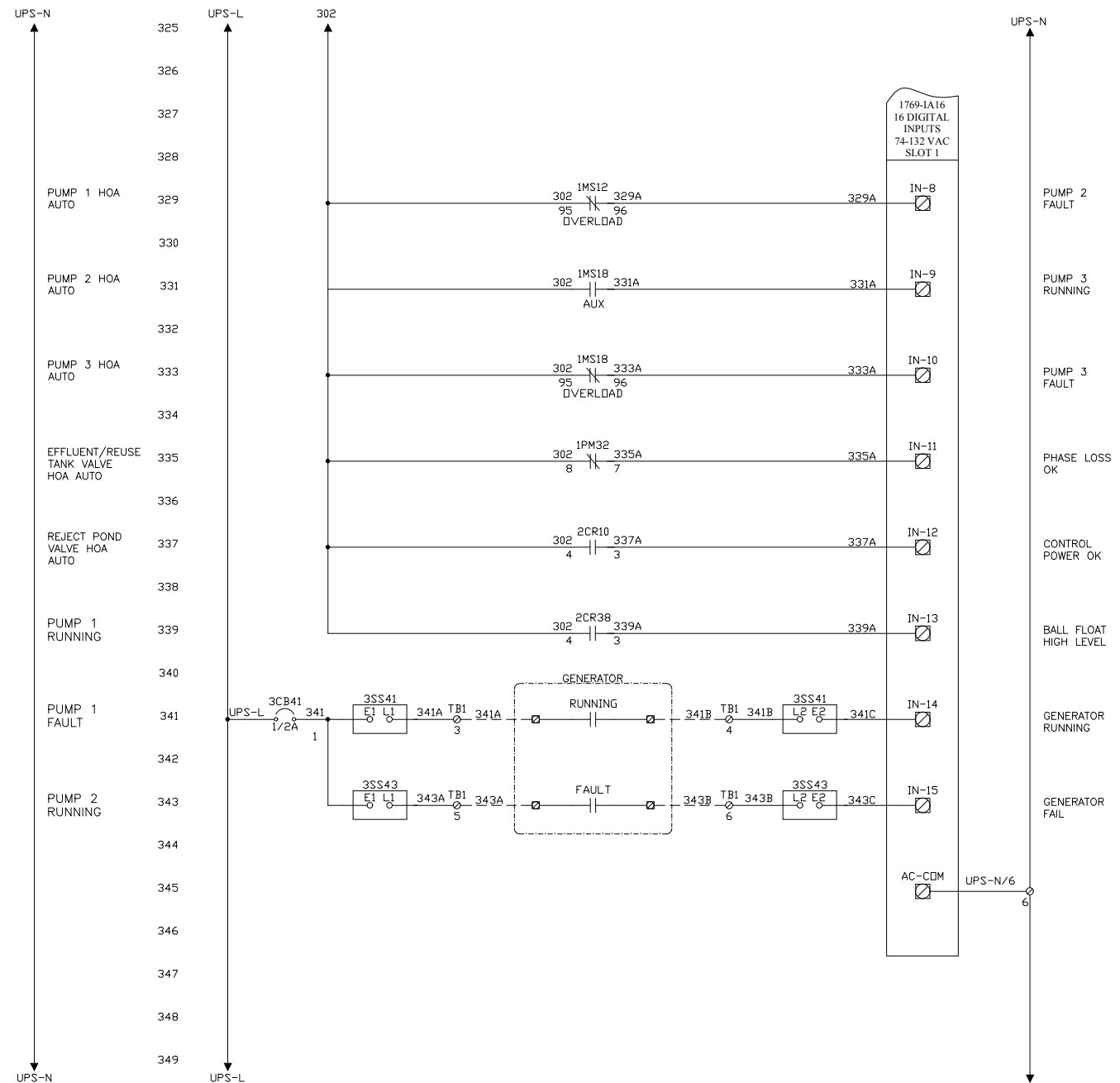
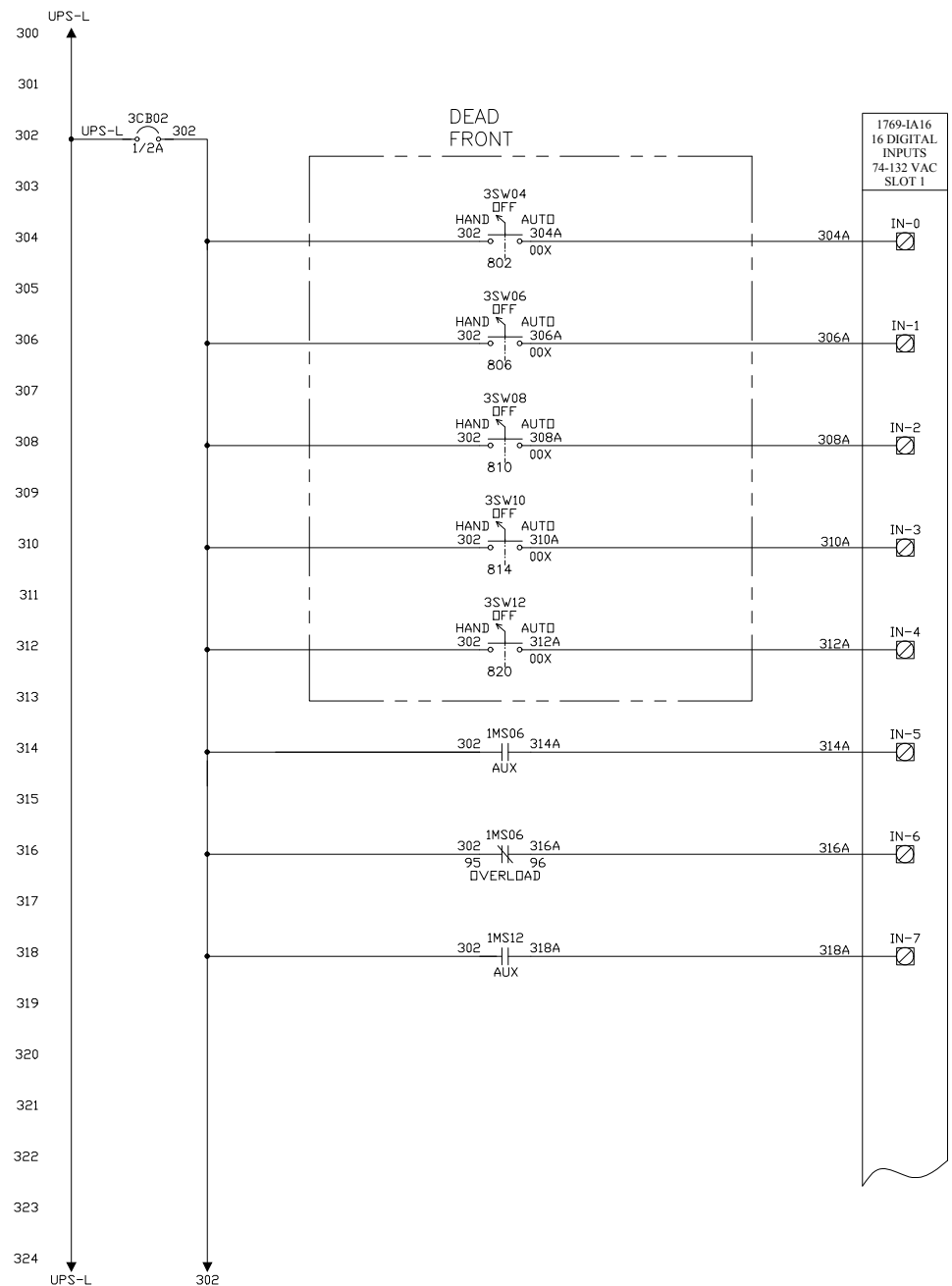
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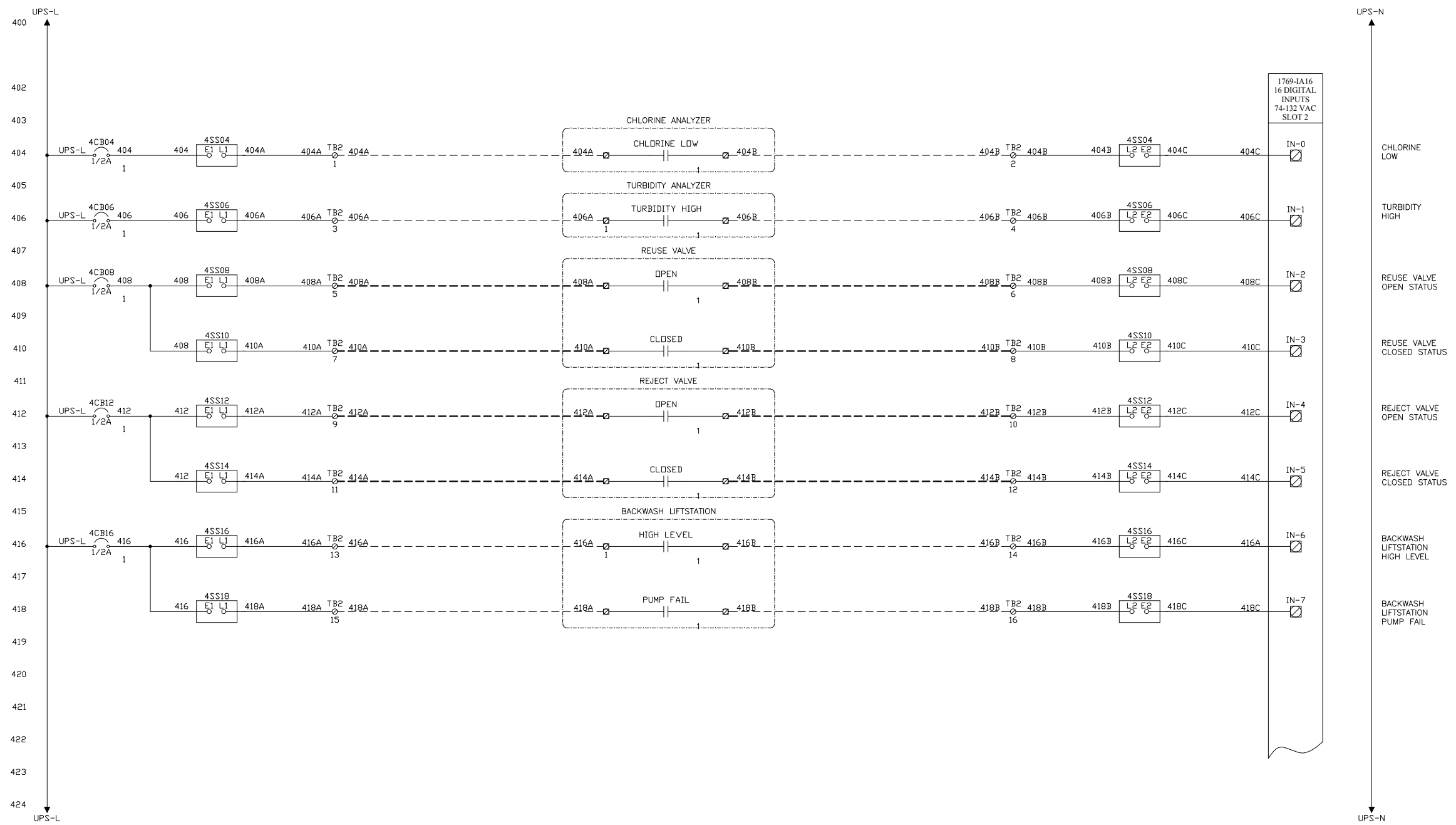
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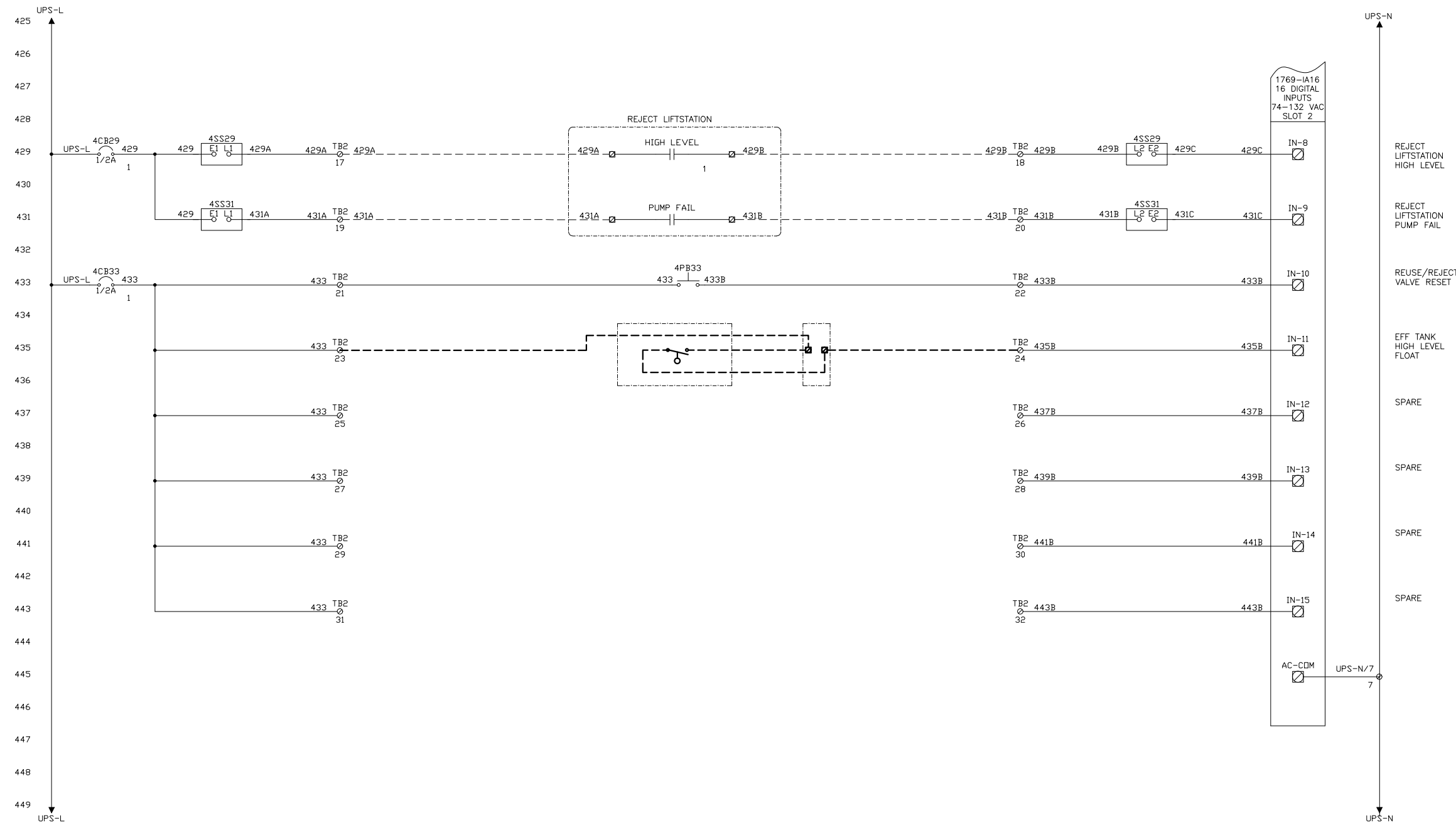
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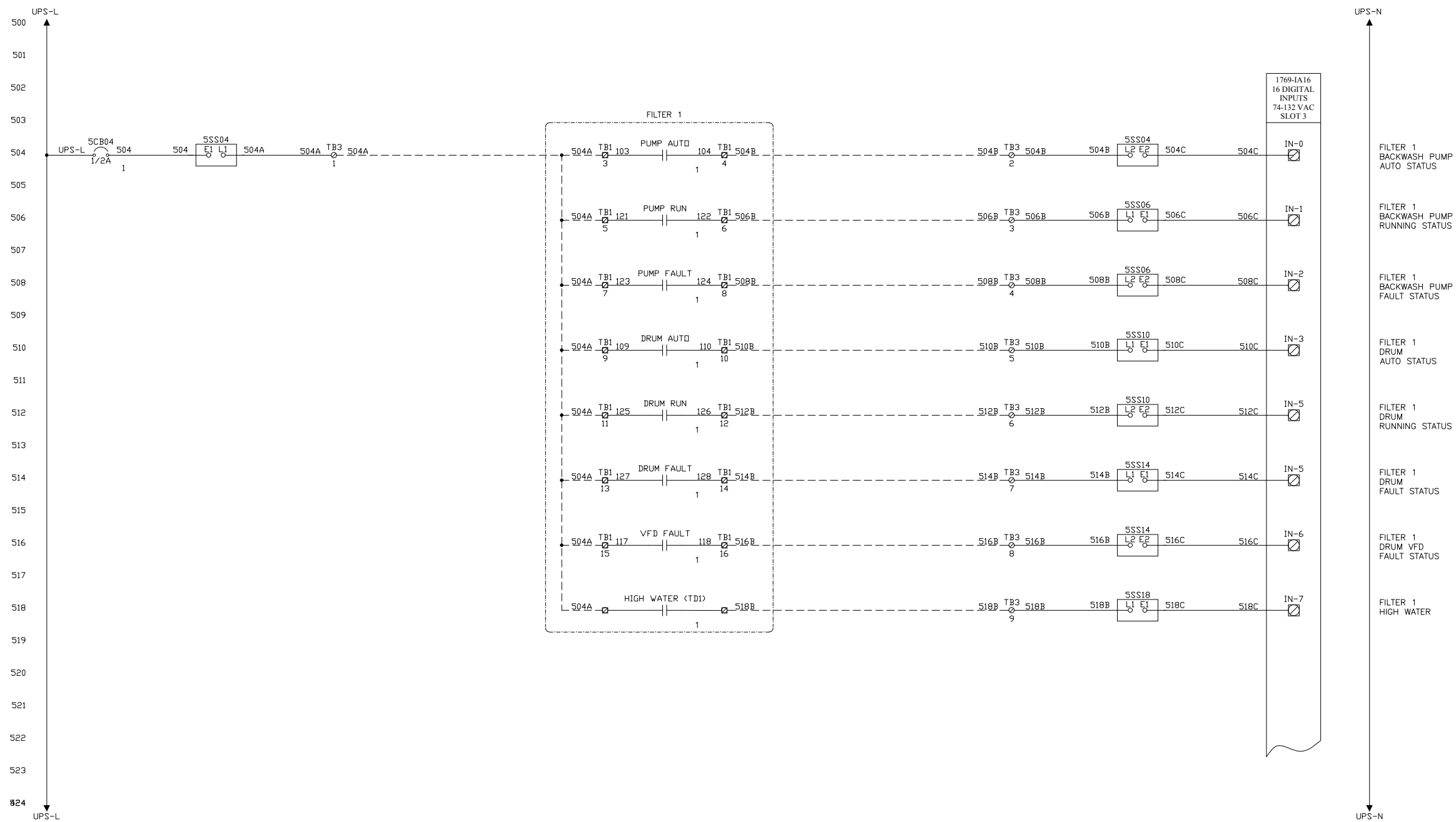
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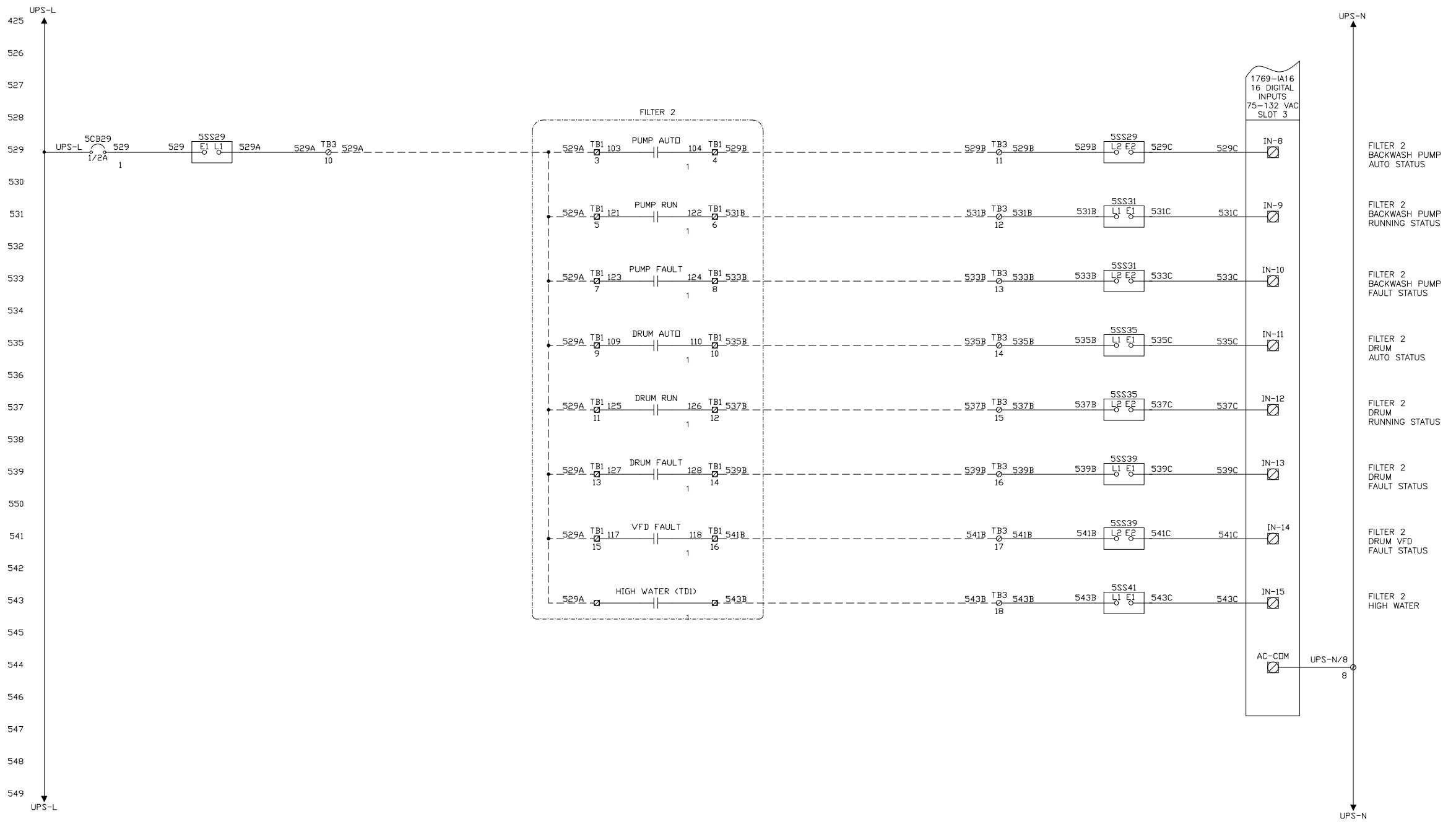


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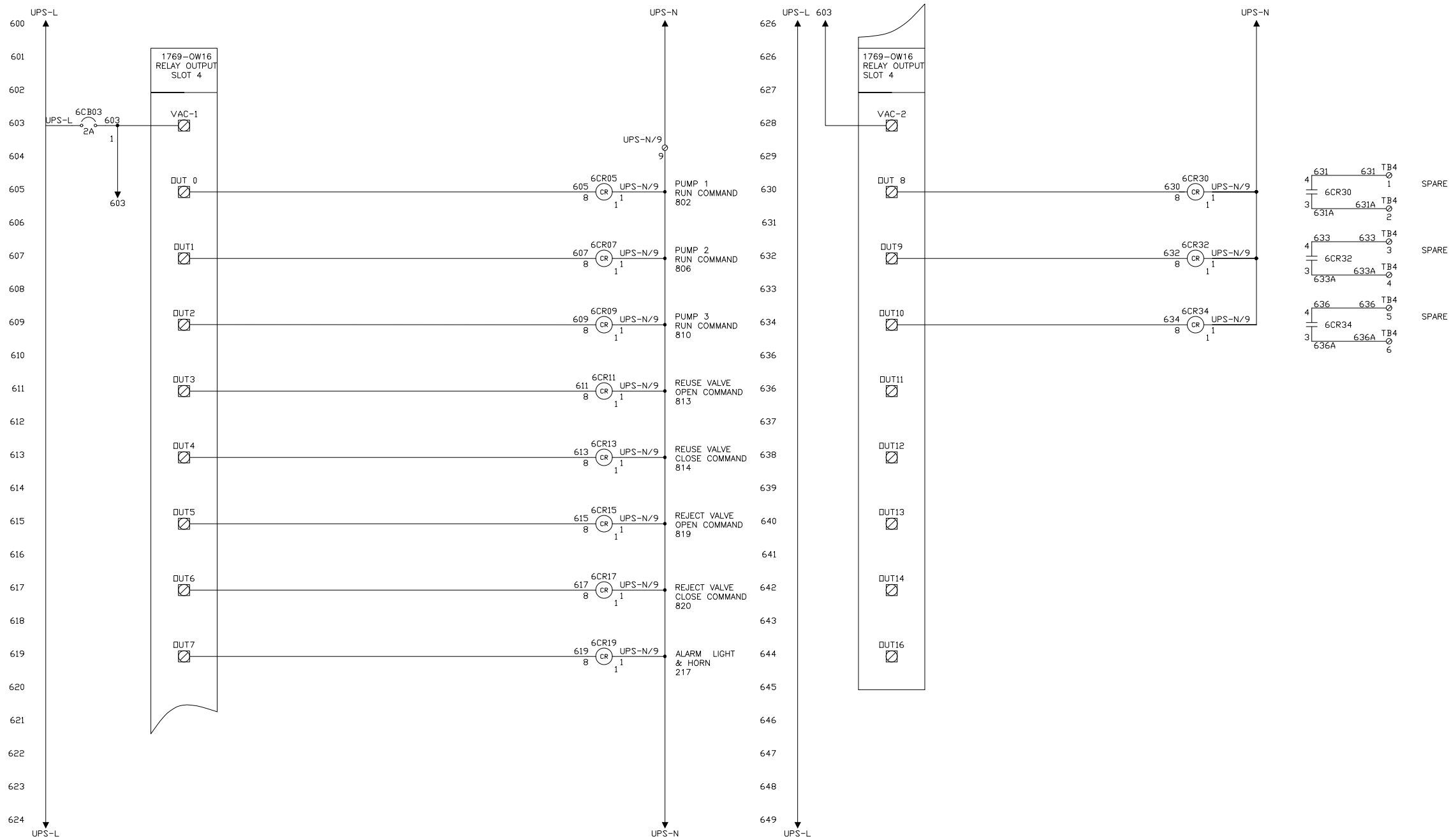

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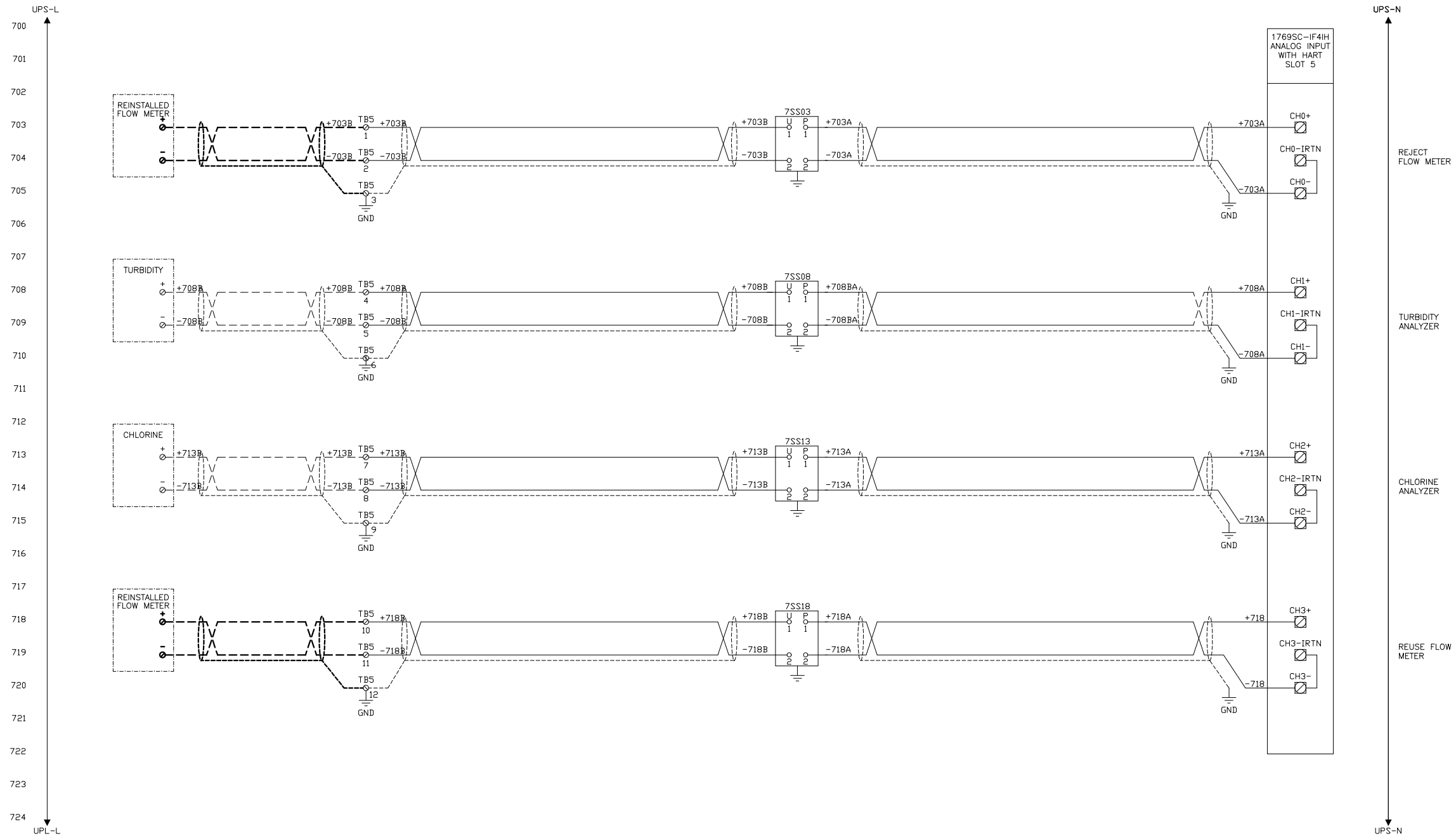
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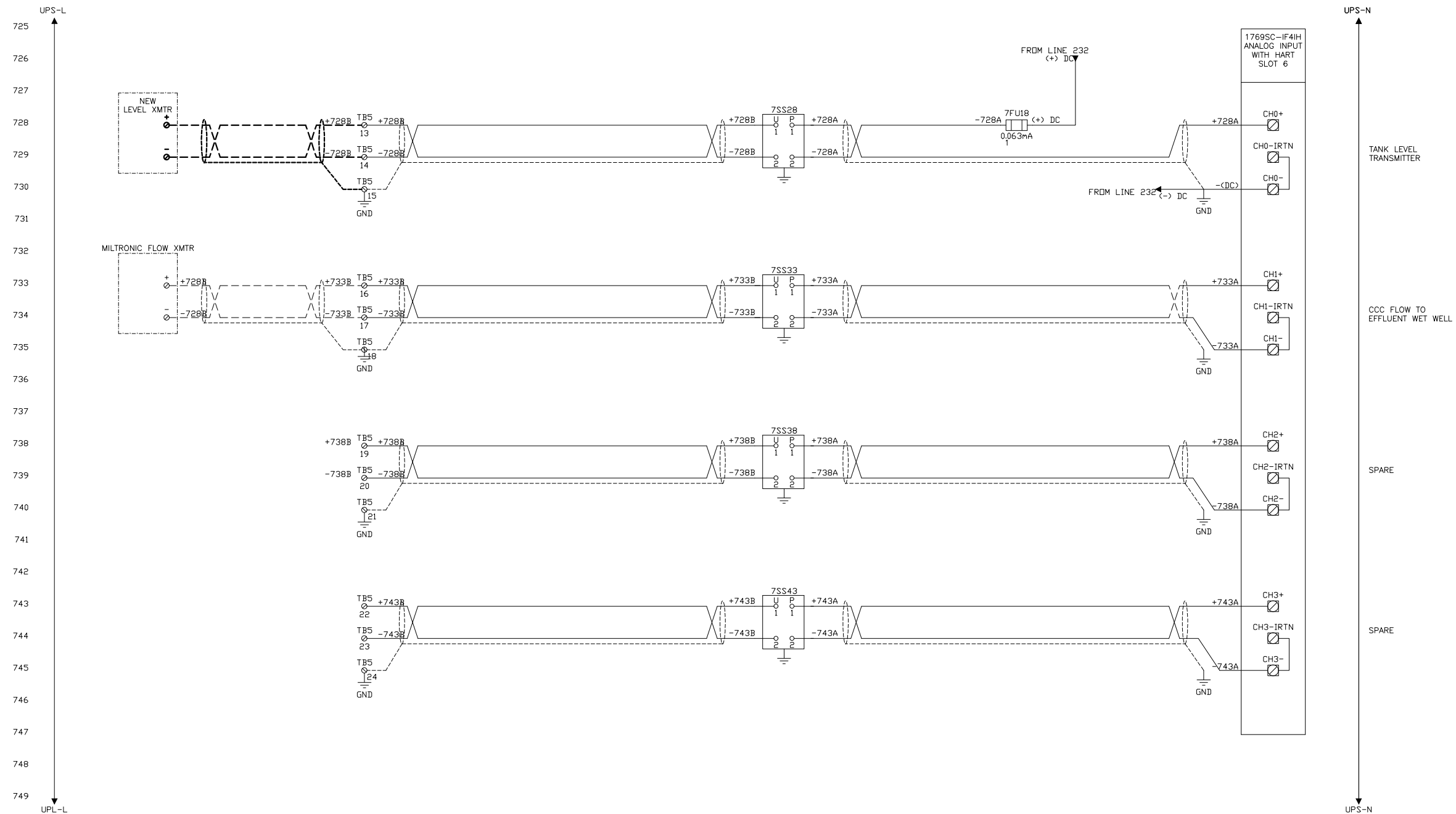

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**EXISTING EFFLUENT CONTROL PANEL**




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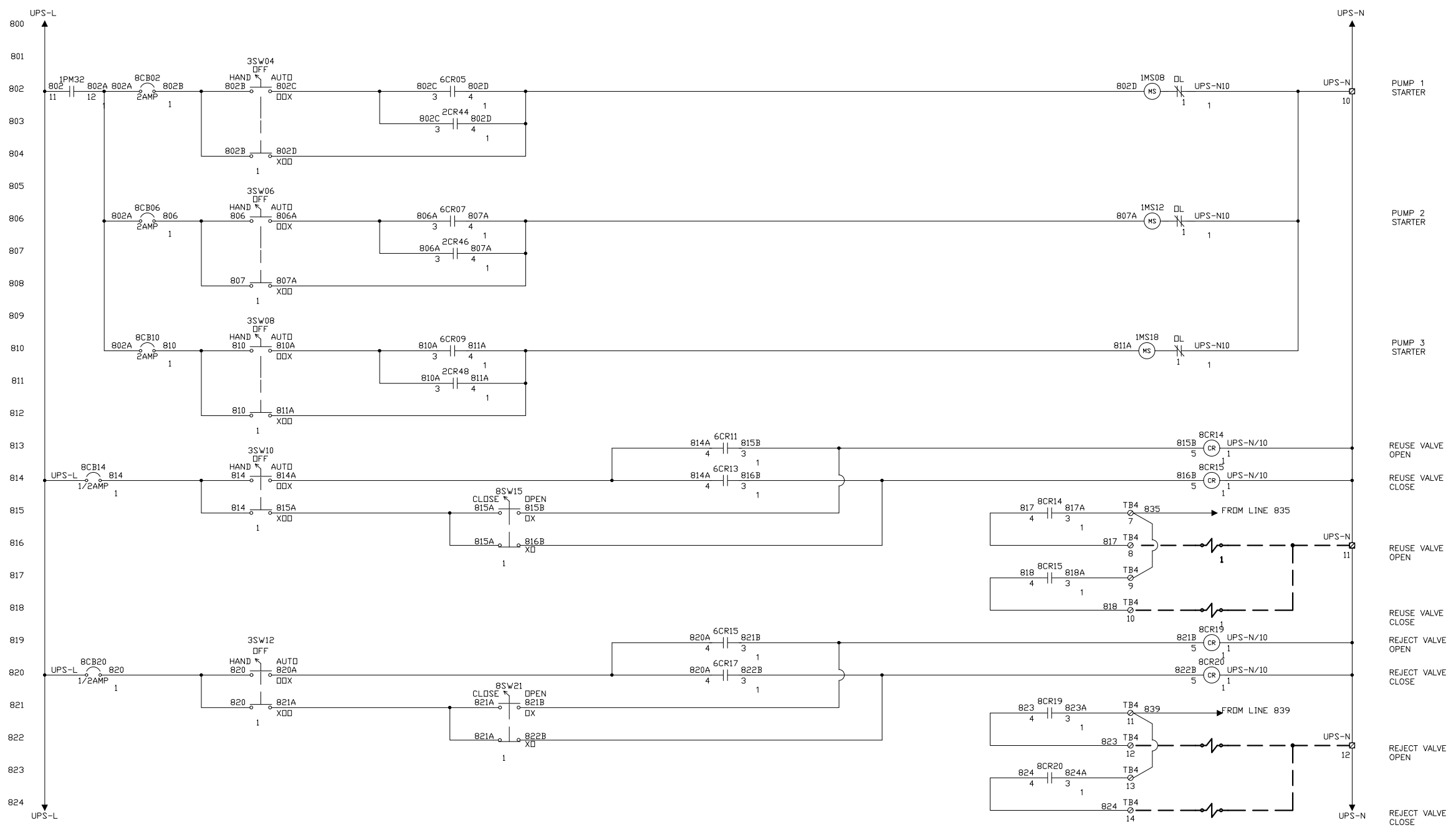
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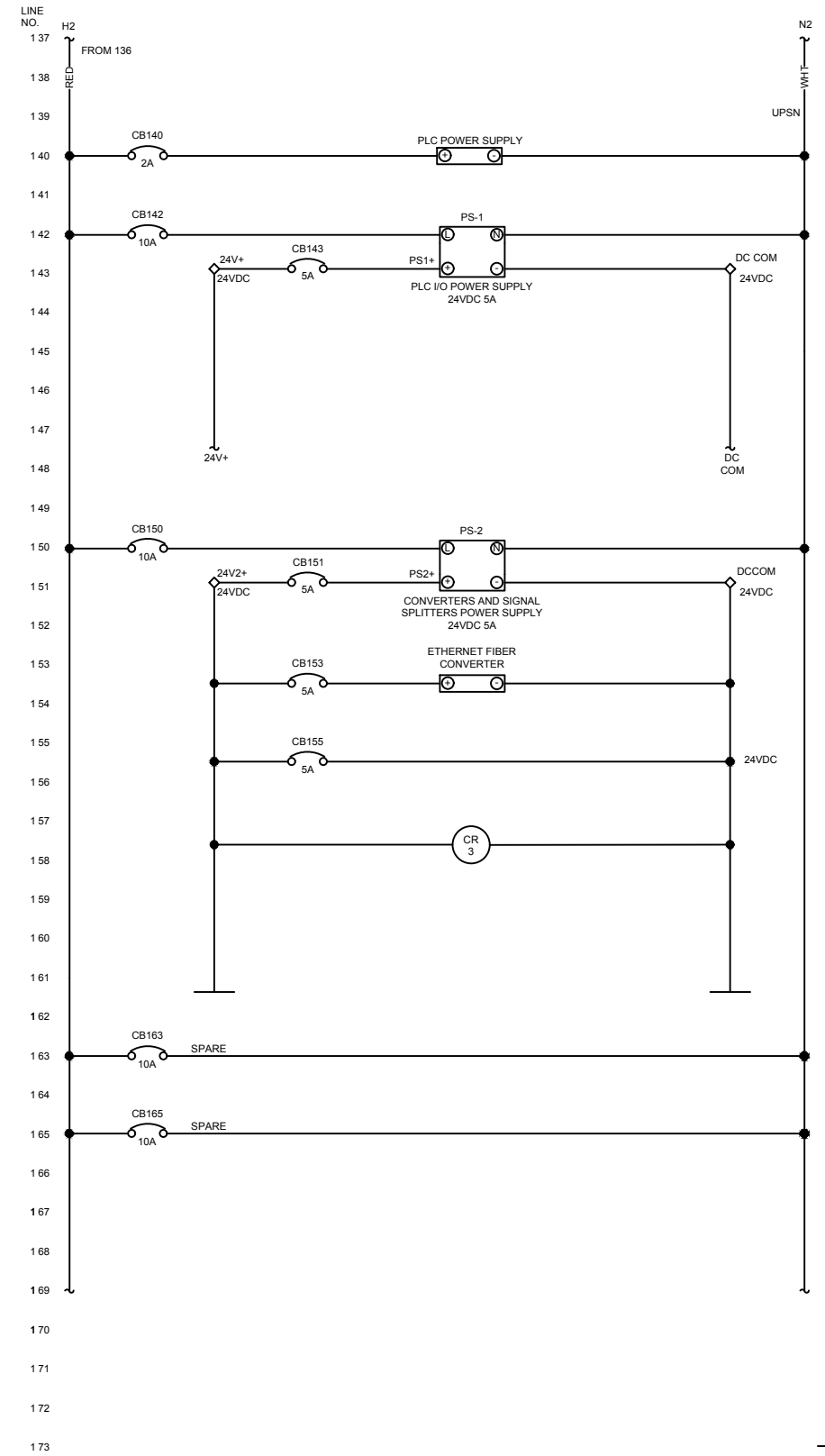
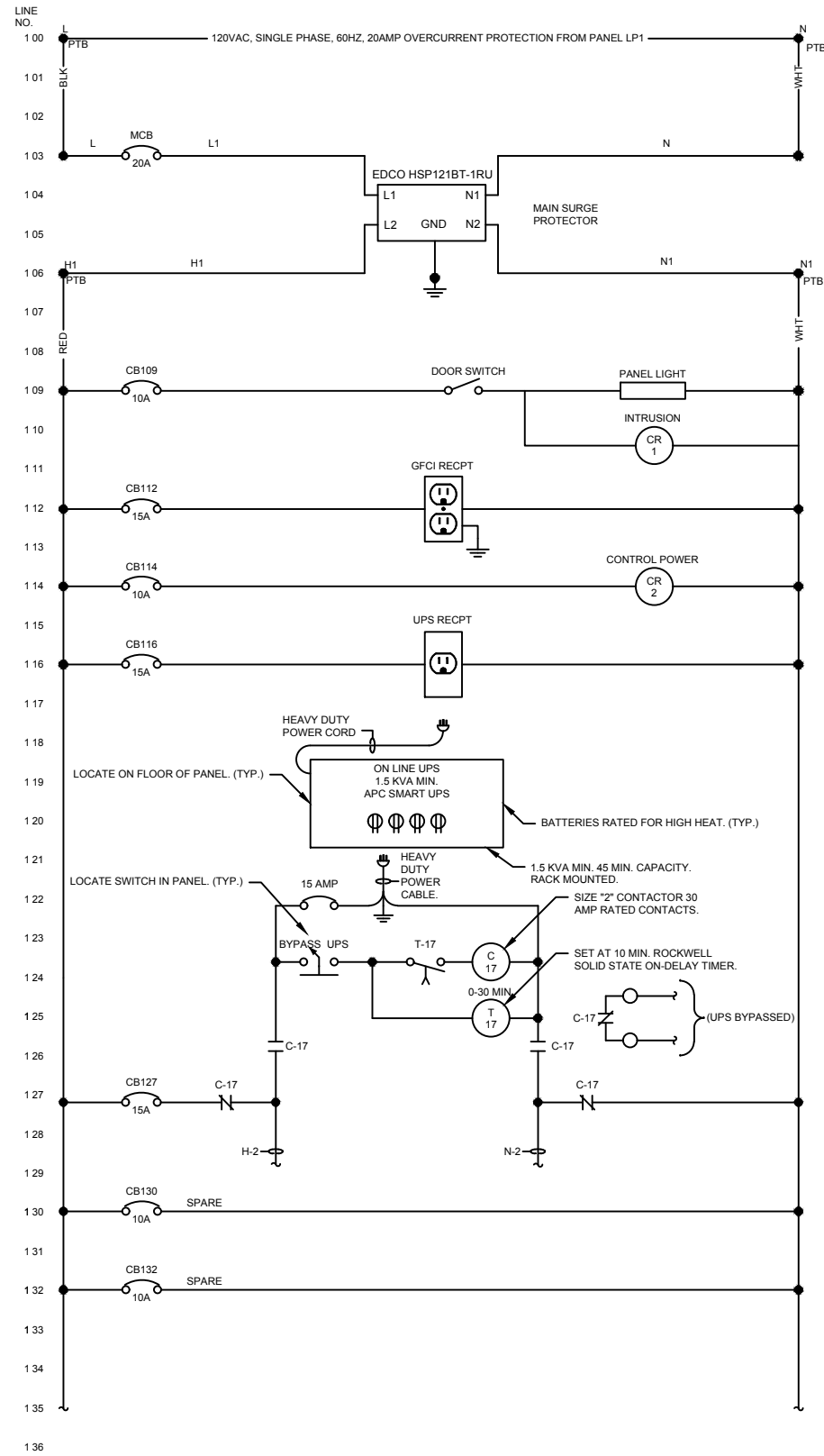
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**PINE ISLAND WASTEWATER TREATMENT PLANT**  
**EFFLUENT PUMP STATION REPLACEMENT**  


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**EXISTING EFFLUENT CONTROL PANEL**





MIKES MAILLAKAKIS, P.E. DATE  
 FLORIDA P.E. #63876  
 LEE COUNTY UTILITIES  
 1500 MONROE STREET, 3rd FL  
 FT. MYERS, FL 33901

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NO.	DATE	BY	REVISIONS - DESCRIPTION

DESIGNED:	E.C.	DATE:	02/23/18
DRAWN:	V.G.	DATE:	01/31/18
CHECKED:	M.M.	DATE:	02/23/18
PROJ NO.:	OPER	SCALE:	AS NOTED

APPROVED BY:	MIKES MAILLAKAKIS
PROFESSIONAL ENGINEER	FLORIDA PE NO. 63876
DATE:	02/23/18


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**FLORIDA**  
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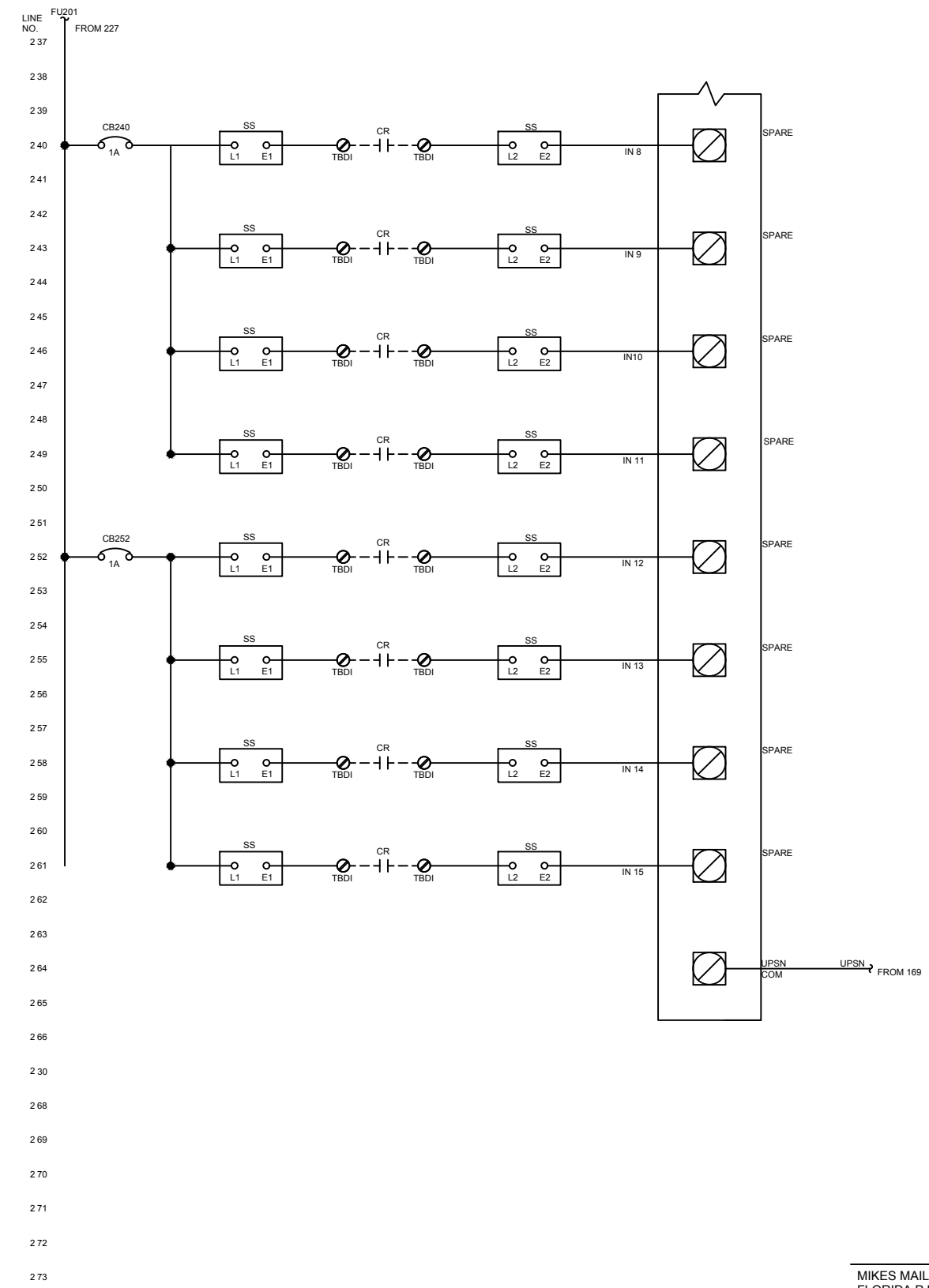
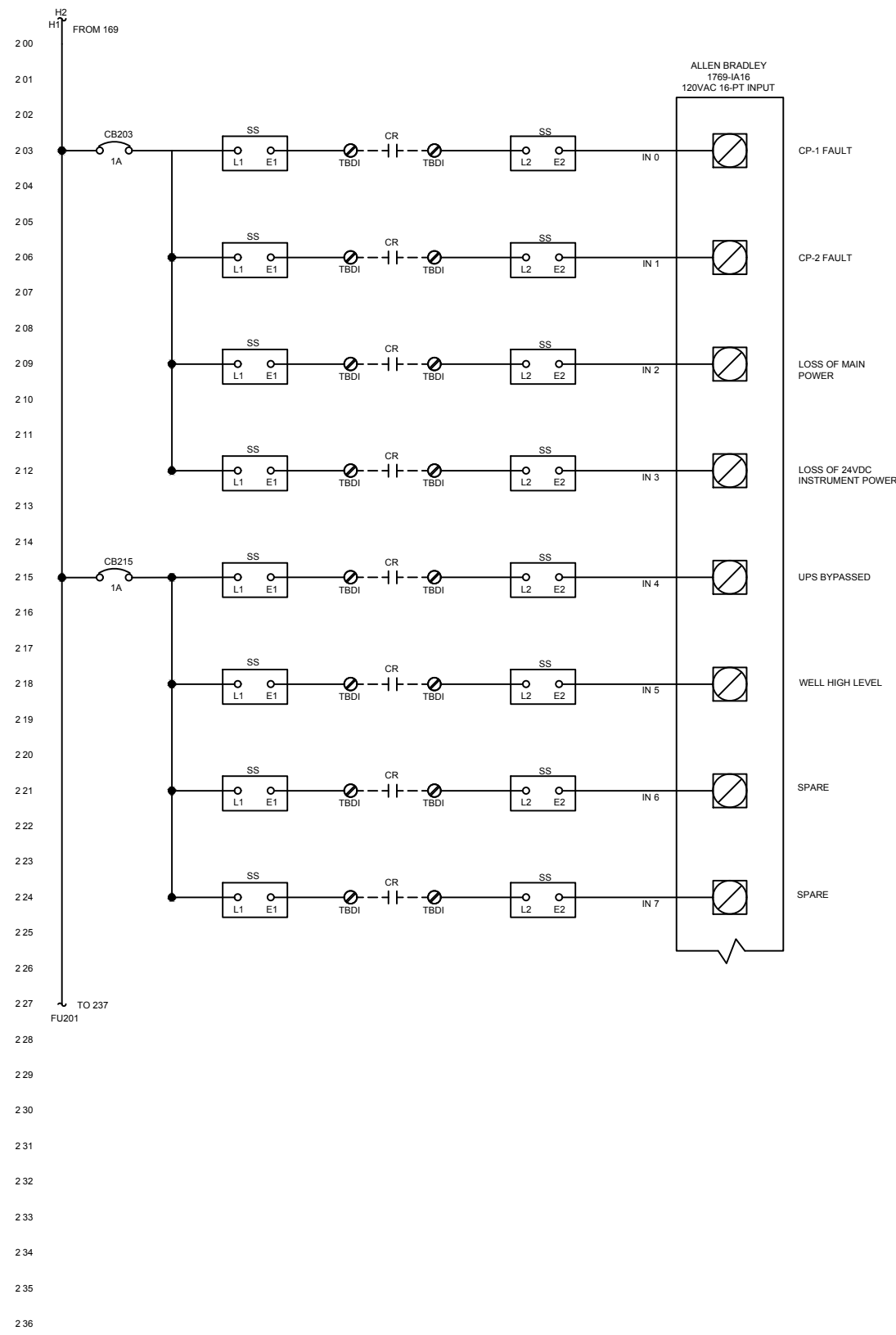
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**ENGINEERING**  
 FORT MYERS, FLORIDA 33901

**PINE ISLAND WASTEWATER TREATMENT PLANT**  
**EFFLUENT PUMP STATION REPLACEMENT**  


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**CHLORINE FLOW PACE CONTROL PANEL LAYOUT POWER**

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 of  
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MIKES MAILLAKAKIS, P.E. DATE  
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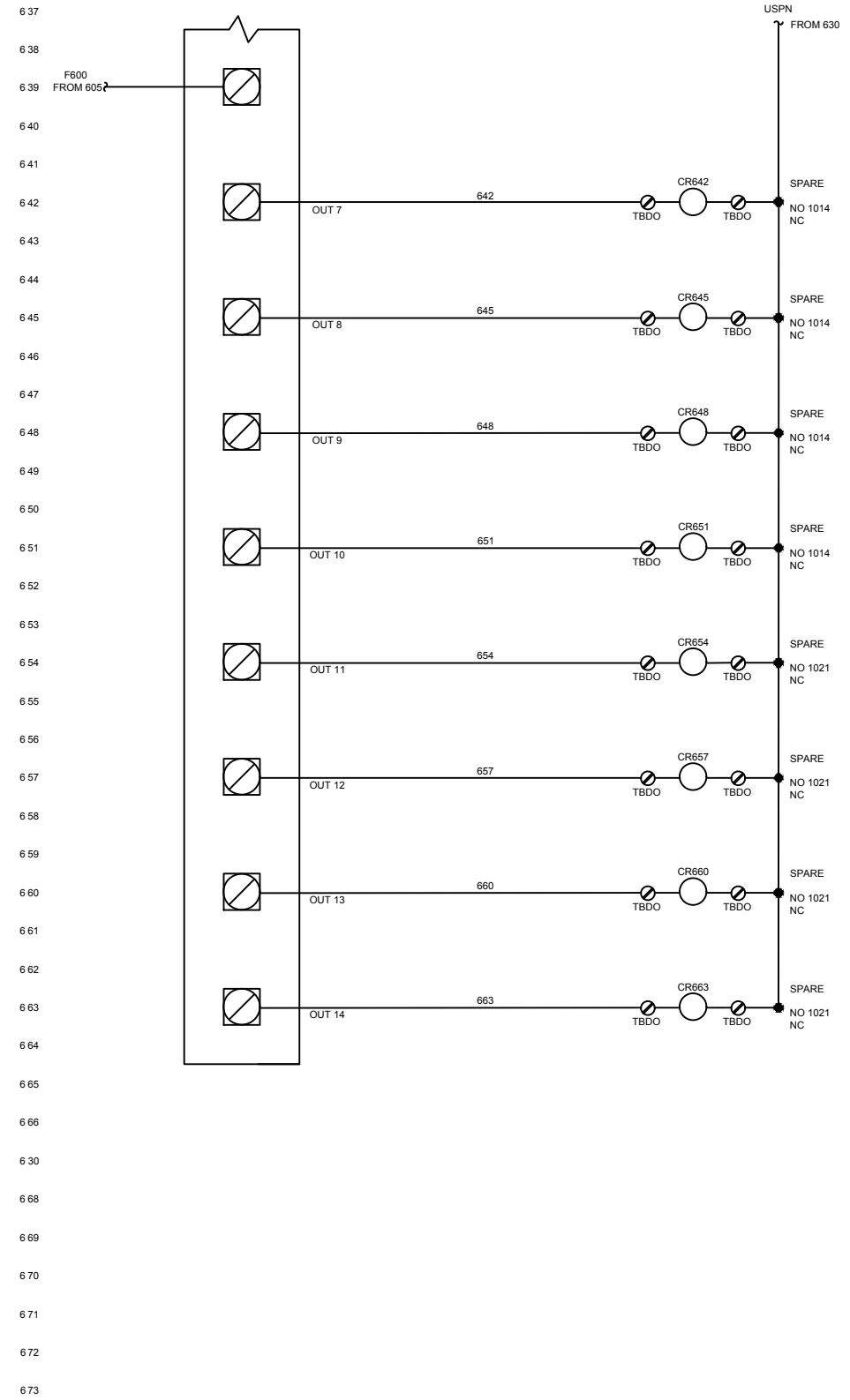
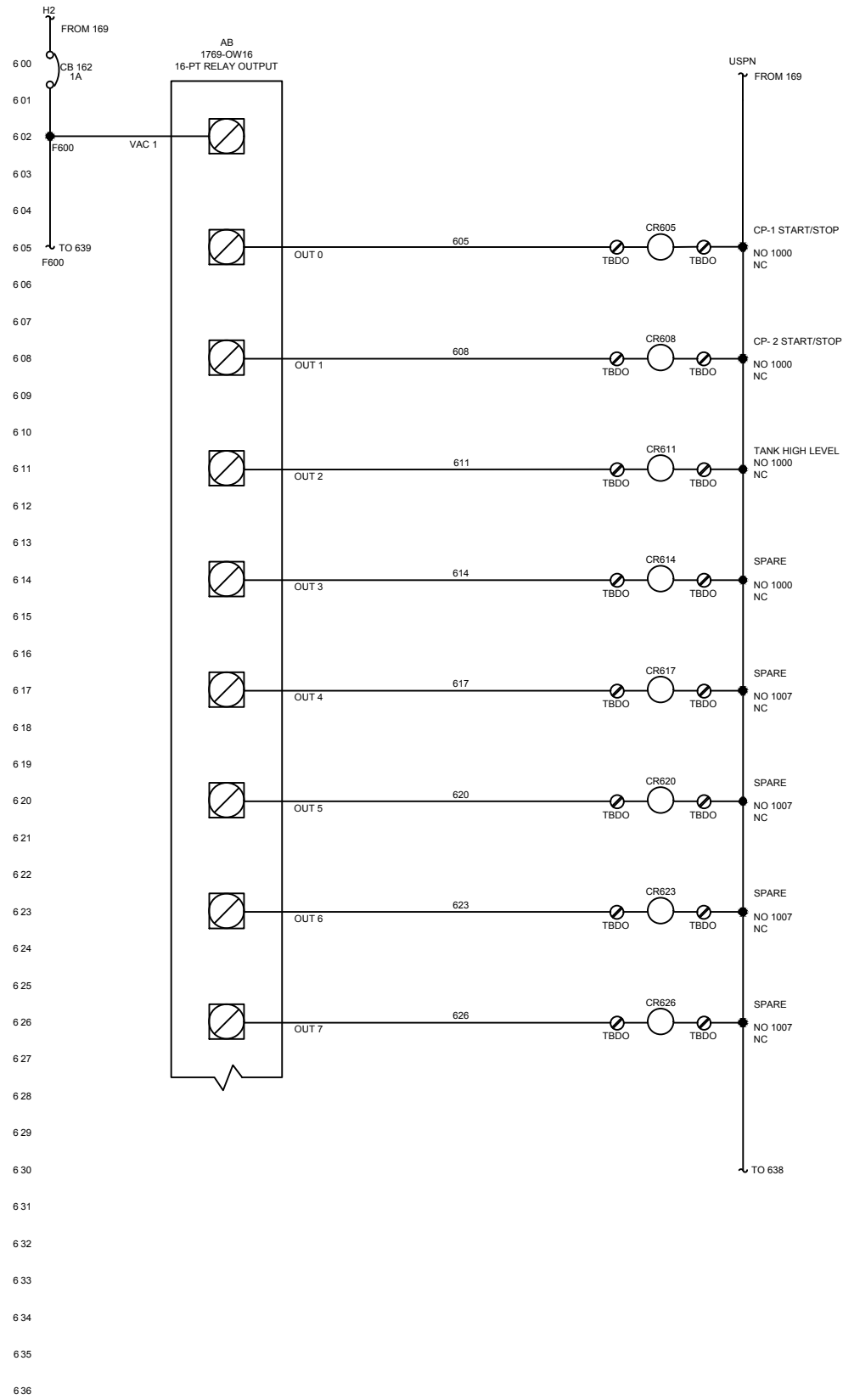
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**PINE ISLAND WASTEWATER TREATMENT PLANT**  
**EFFLUENT PUMP STATION REPLACEMENT**  
 CHLORINE FLOW PACE CONTROL PANEL LAYOUT DIGITAL INPUTS

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MIKES MAILLAKAKIS, P.E. DATE  
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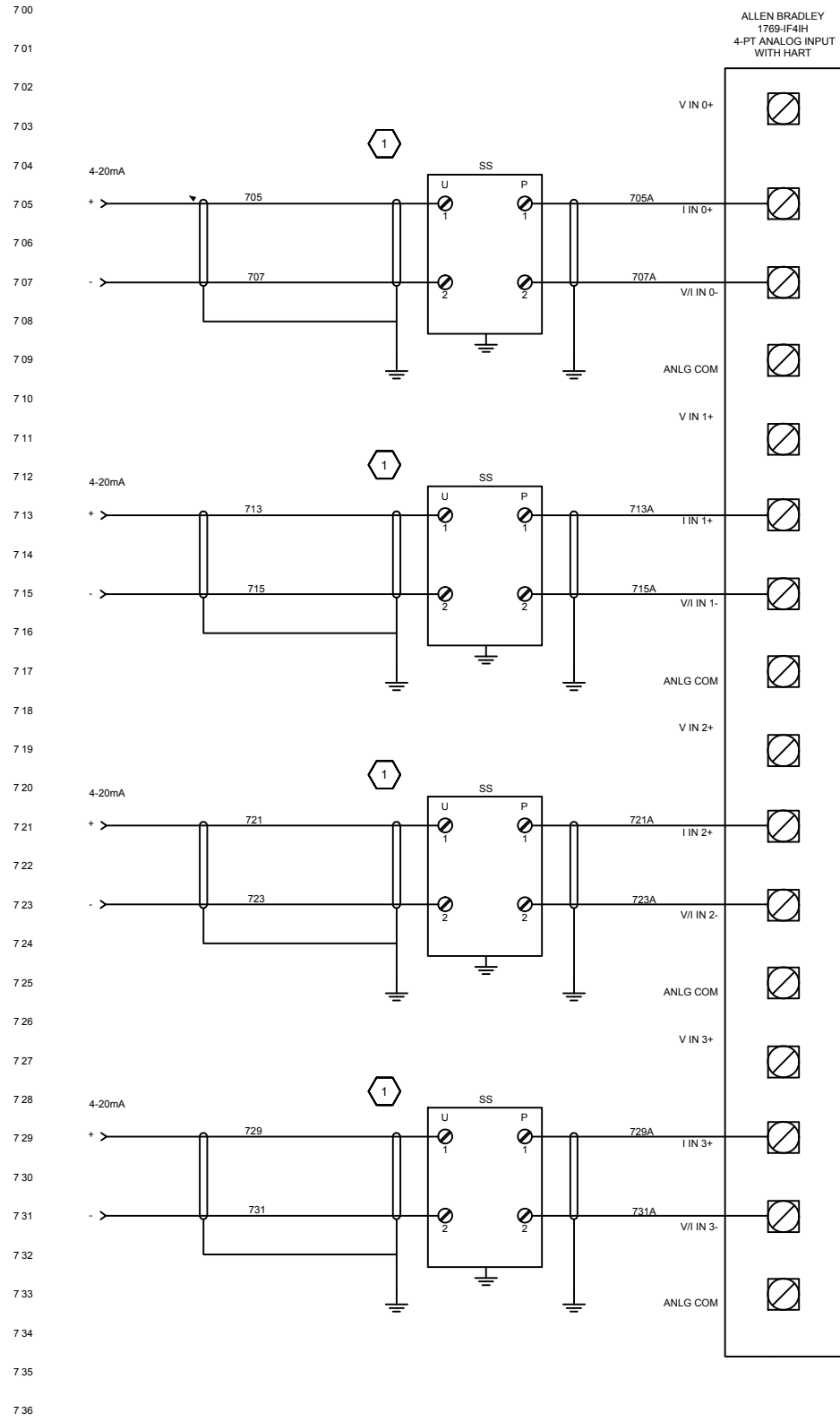
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LEE COUNTY UTILITIES ENGINEERING  
 1500 MONROE STREET FORT MYERS, FLORIDA 33901

**PINE ISLAND WASTEWATER TREATMENT PLANT  
 EFFLUENT PUMP STATION REPLACEMENT**

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CHLORINE FLOW PACE CONTROL PANEL LAYOUT DIGITAL OUTPUTS

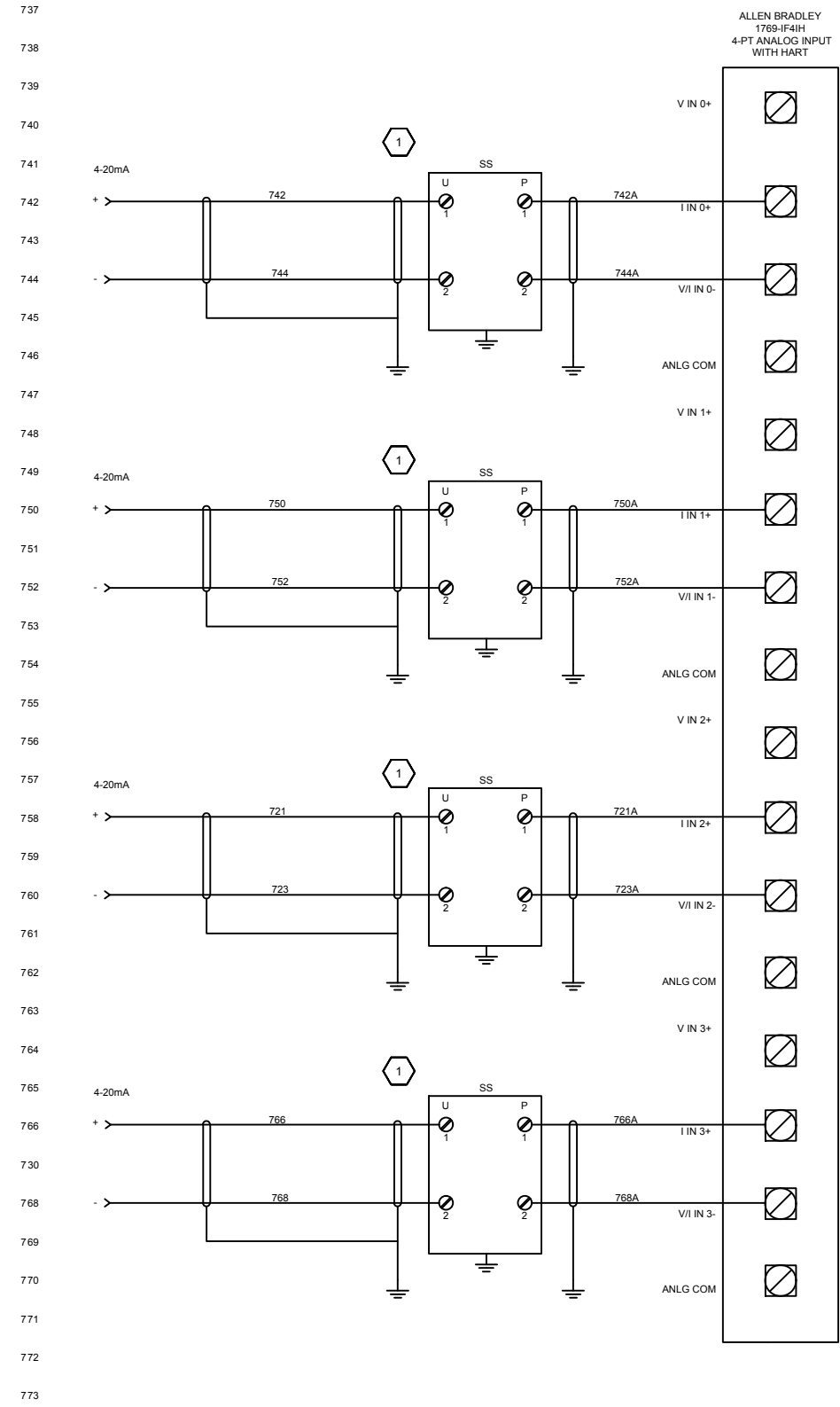


CP-1 SPEED FEEDBACK

CP-2 SPEED FEEDBACK

RESIDUAL CHLORINE

CONTACT BASIN EFFLUENT FLOW METER



EFFLUENT PUMP WELL LEVEL

BLEACH TANK LEVEL

SPARE

SPARE

NOTES:

1 ALL INSTRUMENT SHIELDS SHALL BE GROUNDED AT TERMINAL BLOCKS WITHIN CONTROL PANEL.

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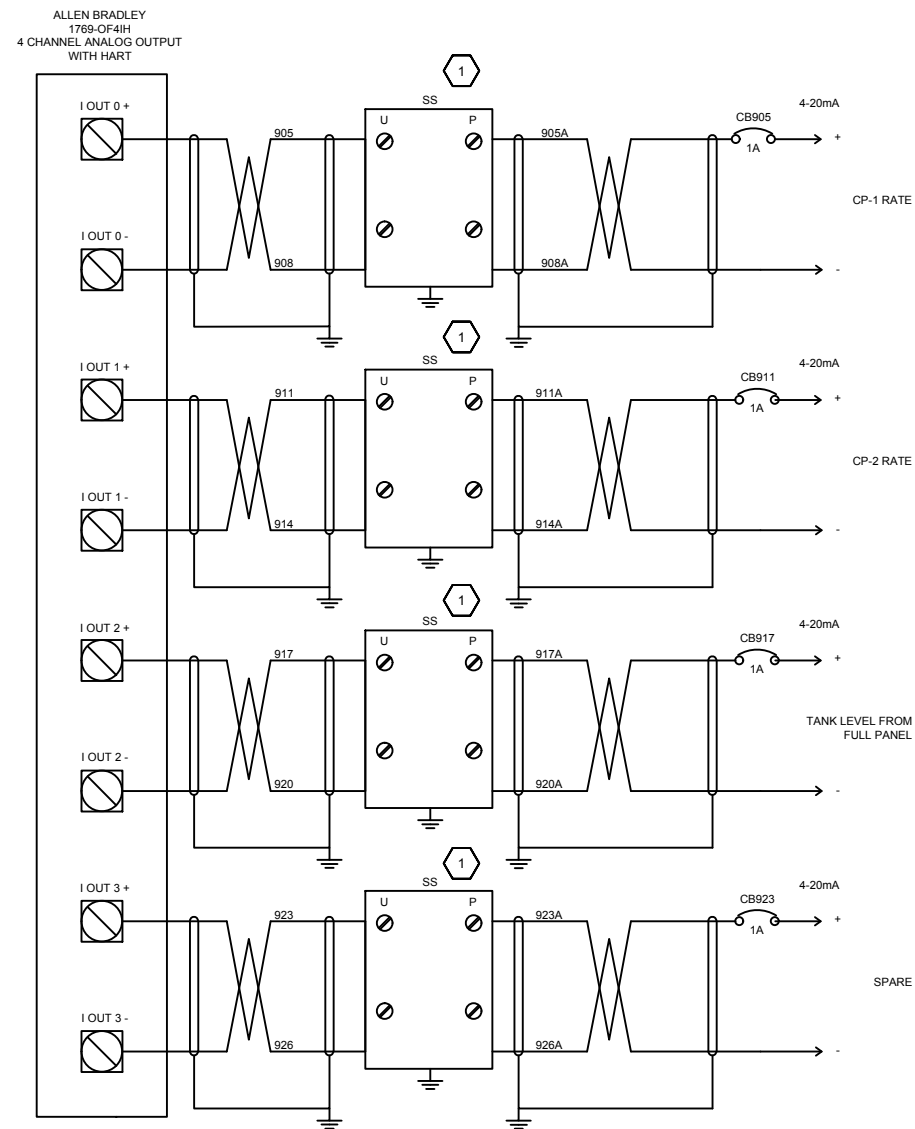
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 FLORIDA PE NO. 63876  
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LEE COUNTY  
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PINE ISLAND WASTEWATER TREATMENT PLANT  
 EFFLUENT PUMP STATION REPLACEMENT  
 CHLORINE FLOW PACE CONTROL PANEL LAYOUT ANALOG INPUTS

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EFFLUENT PUMP STATION REPLACEMENT  
CHLORINE FLOW PACE CONTROL PANEL LAYOUT ANALOG OUTPUTS

SHEET  
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of  
37  
SHEETS