

# INDIAN RIVER COUNTY



**BOARD OF COUNTY COMMISSIONERS**

## **Department of Utility Services**

**Roseland Elevated Storage Tank and  
Pump Station**

**Indian River County Bid No: 2019-068**

# INDIAN RIVER COUNTY

## Roseland Elevated Storage Tank and Pump Station

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**ADVERTISEMENT FOR BIDS  
INDIAN RIVER COUNTY**

Sealed bids will be received by Indian River County until **2:00 P.M.** on **Wednesday, August 14, 2019**. Each bid shall be submitted in a sealed envelope and shall bear the name and address of the bidder on the outside and the words "**Roseland Elevated Storage Tank and Pump Station**". Bids should be addressed to Purchasing Division, 1800 27th Street, Vero Beach, Florida 32960. All bids will be opened publicly and read aloud at 2:00 P.M. All bids received after 2:00 P.M., on the day specified above, will not be opened or considered.

All material and equipment furnished and all work performed shall be in strict accordance with the plans, specifications, and contract documents pertaining thereto. Copies of the documents are available at: [www.demandstar.com](http://www.demandstar.com) or by selecting "Current Solicitations" at <http://www.ircgov.com/Departments/Budget/Purchasing>. All other communications concerning this bid shall be directed to IRC Purchasing Division at [purchasing@ircgov.com](mailto:purchasing@ircgov.com).

All bidders shall submit one (1) original and one (1) copy of the Bid Proposal forms provided within the specifications. Please note that the questionnaire must be filled out completely including the financial statement. BID SECURITY must accompany each Bid, and must be in the form of an AIA Document A310 Bid Bond, properly executed by the Bidder and by a qualified surety, or a certified check or a cashier's check, drawn on any bank authorized to do business in the State of Florida. Bid Security must be in the sum of not less than **Five Percent (5%)** of the total amount of the bid, made payable to Indian River County Board of County Commissioners. In the event the Contract is awarded to the Bidder, Bidder will enter in a Contract with the County and furnish the required 100% Public Construction Bond and certificates of insurance within the timeframe set by the County. If Bidder fails to do so, the Bid Security shall be retained by the County as liquidated damages and not as penalty.

The County reserves the right to delay awarding of the Contract for a period of **ninety (90)** days after the bid opening, to waive informalities in any bid, or reject any or all bids in whole or in part with or without cause/or to accept the bid that, in its judgement, will serve the best interest of Indian River County, Florida. The County will not reimburse any Bidder for bid preparation costs.

A ***NON-MANDATORY*** Pre-Bid Conference will be held on **Wednesday, July 24, 2019** at **11:00 A.M.**, on site at 13550 Roseland Road, Sebastian, Florida, 32958. ***ATTENDANCE AT THIS CONFERENCE IS ENCOURAGED.***

INDIAN RIVER COUNTY

By: Jennifer Hyde  
Purchasing Manager

For Release: **July 10, 2019**

**\* \* END OF SECTION \* \***

00020 ADVERTISEMENT

00100 - 1

SECTION 00100  
INSTRUCTIONS TO BIDDERS  
(Based Upon EJCDC No. C-700, 2002 Edition)

**1.01 DEFINED TERMS**

Terms used in these Instructions to Bidders, that are defined in the Standard General Conditions of the Construction Contract (No.C-700, 2002 edition), as may be amended by the Supplementary Conditions, have the meanings assigned to them in the General Conditions. The term "Bidder" means one who submits a bid directly to Owner, as distinct from a sub-bidder, who submits a bid to a Bidder. The term "Successful Bidder" means the lowest, responsible, and responsive Bidder to whom Owner (on the basis of Owner's evaluation as hereinafter provided) makes an award. The term "Bidding Documents" includes the Advertisement for Bids, Instructions to Bidders, Bid Form, Sworn Statement Under the Florida Trench Safety Act, Statement Under Section 105.08 and Certification Regarding Scrutinized Companies, General Information Required of Bidders, and the proposed Agreement.

**1.02 COPIES OF BIDDING DOCUMENTS**

A. Copies of the Bid Documents and specifications containing the necessary contract documents are available at: [www.demandstar.com](http://www.demandstar.com) or by selecting "current solicitations" at <http://www.ircgov.com/Departments/Budget/Purchasing/index.htm>.

B. Complete sets of Bid Documents must be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bid Documents.

C. Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids on the work and do not confer a license or grant for any other use of the Bidding Documents.

**1.03 QUALIFICATIONS OF BIDDERS**

To demonstrate qualifications to perform the work, each Bidder must be prepared to submit, within 5 days of Owner's request, written evidence, such as financial data, previous experience, present commitments, and other such data as may be necessary to prove to the satisfaction of the Owner that the Bidder is qualified by experience to do the work and is prepared to complete the work within the stated time period.

**1.04 EXAMINATION OF CONTRACT DOCUMENTS AND SITE**

A. It is the responsibility of each Bidder, before submitting a bid, to (a) examine the Contract Documents thoroughly, (b) visit the site to become familiar with local conditions that may affect cost, progress, performance, or furnishing of the work, (c) consider federal, state, and local laws and regulations that may affect costs, progress, performance, or furnishing of the work, (d) study and carefully correlate Bidder's observations with the Contract Documents, and (e) notify Engineer of all conflicts, errors, or discrepancies in the Contract Documents. To obtain access to the Roseland Elevated Storage Tank Transmission Main: head east on Roseland Road to 13550 (Fire Station) as indicated on the construction drawings.

- B. Any information or data reflected in the Contract Documents with respect to underground facilities at or contiguous to the site is based upon information or data furnished to Owner and Engineer by owners of such underground facilities or others, Owner does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary Conditions.
- C. Before submitting a Bid, each Bidder will, at Bidder's own expense, make or obtain any examinations, investigations, explorations, tests, and studies, and obtain any additional information and data which pertain to the physical conditions (surface, subsurface and underground facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance, or furnishing of the work and which Bidder deems necessary to determine its Bid for performing and furnishing the work in accordance with the time, price and other terms and conditions of the Contract Documents.
- D. On request in advance, Owner will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes, clean up, and restore the site to its former condition upon completion of such explorations.
- E. The lands upon which the work is to be performed, right-of-way and easements for access thereto and other lands designed for use by the Contractor in performing the work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by and paid for by the Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by the Owner unless otherwise provided in the Contract Documents.
- F. The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of the Instructions to Bidder, that without exception the Bid is premised upon performing and furnishing the work required by the Contract Documents and such means, methods, techniques, sequences or procedures of construction as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the work.

#### **1.05 PRE-BID CONFERENCE**

The date, time, and location for a Pre-Bid conference, if any, are specified in the Advertisement for Bids. Representatives of OWNER and ENGINEER will be present to discuss the Project. Bidders are strongly encouraged to attend and participate in the conference and highly recommended to attend subsequent site visit. OWNER will transmit to all prospective Bidders of record such Addenda as ENGINEER considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

#### **1.06 INTERPRETATIONS AND ADDENDA**

- A. **All questions about the meanings or intent of the Contract Documents are to be directed in writing to the Purchasing Department** by email to [purchasing@ircgov.com](mailto:purchasing@ircgov.com). Interpretation or clarifications considered necessary by Owner in response to such questions will be issued by Addenda uploaded to Demandstar. Questions received less than **ten (10) days** prior to the date for the

opening of Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will not be binding and will be without legal effect.

- B. Addenda may also be issued to modify the Bidding Documents as deemed advisable by Owner or Engineer. Only the interpretation or correction issued by Owner or Engineer by Addendum shall be binding. Prospective Bidders are advised that no other source is authorized to give information concerning the documents or to explain or interpret the documents.
- C. All Bidders will acknowledge in the space provided for in Section 00310 BID FORM, the receipt of all Addenda and will confirm that the Addenda have been considered in the preparations of their proposal.

#### **1.07 BID SECURITY**

- A. Each Bid must be accompanied by Bid Security made payable to Owner in an amount of five percent of the Bidder's maximum base bid price and in the form of a certified check; cashiers check; or an AIA Document A310 Bid Bond issued by a surety meeting the requirements of Paragraph 5.01B of the General Conditions.
- B. The Bid Security of the Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required Public Construction Bond, and Insurance Certificates whereupon the Bid Security will be returned. If the Successful Bidder fails to execute and deliver the Agreement and furnish the required Public Construction Bond and required insurance certificates within fifteen calendar days after the Notice of Award, Owner may annul the Notice of Award, and the Bid Security of that Bidder will be retained by the County.
- C. The Bid Security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by the Owner until the earlier of the seventh (7<sup>th</sup>) day after the effective date of the Agreement or the sixty-first (61<sup>st</sup>) day after the Bid opening, whereupon Bid security furnished by such Bidders will be returned. Bid security with bids which are not competitive may be returned before the end of the sixty-day (60) period.

#### **1.08 CONTRACT TIME**

The number of days within which, or dates by which, the work is to be substantially completed and also complete and ready for final payment (the Contract Time) are set forth in the Agreement (Section 00530).

#### **1.09 LIQUIDATED DAMAGES**

Provisions for liquidated damages are set forth in the Agreement (Section 00530).

#### **1.10 SUBSTITUTE OR "OR EQUAL" ITEMS**

The Agreement, if awarded, will be on the basis of materials and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or equal" items. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or equal" item of material or equipment may be furnished or used by Bidder if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement. The procedure for submission of



any such application by Bidder and consideration by Engineer is set forth in Paragraph 6.05 of the General Conditions and may be supplemented in the Supplementary Conditions.

### **1.11 BID FORM**

- A. The Bid Form is included with the Bidding Documents.
- B. All blanks on the Bid Form must be completed in ink or by typewriter.
- C. Bids by corporations must be executed in the corporate name by the president or a vice president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature. All names must be typed or printed below the signature.
- D. The Bid shall contain an acknowledgment of receipt of all Addenda (the number of which must be filled in on the Bid Form).
- E. Bids by partnership must be executed in the partnership name and signed by a partner, whose title must appear under the signature, and official address of the partnership must be shown below the signature.
- F. All names must be typed or printed below the signature.
- G. The address and telephone number for communications regarding the Bid must be shown.
- H. Additional forms to be submitted with Bid Form include: Section 00410 – “AIA Document A310 Bid Bond”; Section 00452 – “Disclosure of Relationships”; Section 00456 – “General Information Required of Bidders”; Section 00454 - “Trench Safety Act Compliance Statement”; Section 00431 - Schedule of Subcontractors; and Section 00432- “Certification Regarding Prohibition against Contracting with Scrutinized Companies.”

### **1.12 SUBMISSION OF BIDS**

- A. All Bids shall be submitted at the time and place indicated in the Advertisement for Bids and shall be enclosed in an opaque sealed envelope, clearly marked on the outside with the following information: Project Name/Title; Bid Number; and the name and address of the Bidder. If the Bid is sent through the mail, overnight delivery system, or courier, the sealed envelope, marked as set forth above, shall be enclosed in a separate outer envelope with the notation "BID ENCLOSED" on the outside.
- B. The Bidder shall submit the Bid in triplicate (one original and two copies) on the Bid Forms, or an exact copy of the Bid Forms, furnished herewith. The blank spaces on the Bid Form shall be filled in correctly for each Bid Item for which a Bid is submitted. All Bids shall be accompanied by the Bid Security and other required documents.

### **1.13 MODIFICATION AND WITHDRAWAL OF BIDS**

- A. Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

- B. If, within two business days after Bids are opened, any Bidder files a duly signed, written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid and the Bid security will be returned. Thereafter, that Bidder will be disqualified from further bidding on the work to be provided under the Contract Documents.

#### **1.14 OPENING OF BIDS**

Bids will be opened and (unless obviously non-responsive) read aloud publicly. An abstract of the amounts of base Bids and major alternates (if any) will be made available after the opening of Bids.

#### **1.15 BIDS TO REMAIN SUBJECT OF ACCEPTANCE**

All Bids will remain subject to acceptance for sixty days after the day of the Bid opening, but the Owner may, in its sole discretion, release any Bid and return the Bid security prior to that date.

#### **1.16 AWARD OF CONTRACT**

- A. Owner reserves the right: to reject any and all Bids in whole or in part with or without cause; to waive any and all technicalities and informalities not involving price, time, or changes in the work; to negotiate contract terms with the Successful Bidder; to disregard all non-conforming, non-responsive, unbalanced, or conditional Bids; and to accept the bid that, in its judgment, will serve the best interest of Indian River County. Discrepancies in the multiplication of units of work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Owner reserves the right to cancel the award of any Agreement at any time before the execution of such Agreement by all parties without any liability to the Owner. For and in consideration of the Owner considering Bids submitted, the Bidder, by submitting its Bid, expressly waives any claim to damages, of any kind whatsoever, in the event the Owner exercises its right to cancel the award in accordance herewith.
- B. In evaluating Bids, Owner will consider the qualifications of the Bidder, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form prior to the Notice of Award.
- C. Owner may consider the qualifications and experience of subcontractors listed on the Schedule of Subcontractors (Section 00431), together with the qualifications and experience of other subcontractors, suppliers, and other persons and organizations proposed for the work that are required to be identified as provided in the Supplementary Conditions. Owner may consider the operating costs, maintenance requirements, performance data and guarantees of major items of materials and equipment proposed for incorporation in the work when such data is required to be submitted prior to the Notice of Award.
- D. Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any Bid and establish the responsibility, qualifications, and financial ability of Bidders, proposed subcontractors, suppliers, and other persons and

organizations to perform and furnish the work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

- E. If the Agreement is to be awarded, it will be awarded to the lowest, responsive, responsible Bidder whose evaluation by Owner indicates to Owner that the award will be in the best interests of the Owner.
- F. If the Agreement is to be awarded, Owner will give the Successful Bidder a Notice of Award within sixty days after the day of the Bid opening.
- G. More than one Bid from an individual, firm, partnership, corporation, or association under the same or different names will not be considered. Reasonable grounds for believing that one Bidder is financially interested in more than one bid for the same work will cause the rejection of all Bids in which such Bidders are believed to be interested. Any or all Bids will be rejected if there is reason to believe that collusion exists among the Bidders, and no participants in such collusion will be considered in future Bids for the same work.
- H. Within fifteen (15) calendar days of the date of the Notice of Award of the Contract, the Bidder to whom the Contract is awarded shall execute and deliver two (2) original Contracts to the Owner and all required insurance certificates and public construction bond, before the Contract will be executed by the Owner.
- I. Failure upon the part of the Bidder to whom the Contract has been awarded to execute and deliver the required Public Construction Bond and insurance in the manner and within the time provided shall be just cause for cancellation of the award. It is understood and agreed by said Bidder, that if the award is cancelled for the above persons, the certified check or Bid Bond shall become the property of the Owner, not as a penalty, but as liquidated damages.

#### **1.17 PUBLIC CONSTRUCTION BONDS**

The successful Bidder as Contractor shall furnish the County immediately upon execution of the Contract a Public Construction Bond in an amount equal to 100-percent of the contract price. The Surety shall be authorized to issue surety bonds in Florida and be included in the most recent United States Department of Treasury List of Acceptable Sureties. The successful Bidder shall require the attorney-in-fact, who executed the Public Construction Bond, to affix to each a current certified copy of their Power of Attorney, reflecting such person's authority as Power of Attorney in the State of Florida. Further, at the time of execution of the Contract, the successful Bidder shall provide a copy of the Surety's current valid Certificate of Authority issued by the United States Department of the Treasury under 31 United States Code sections 9304-9308.

#### **1.18 PUBLIC DISCLOSURE STATEMENT**

Any entity entering into a contract with Indian River County as Owner shall disclose any relationship that may exist between the contracting entity and an Indian River County Commissioner or Indian River County employee. The relationship with either must be disclosed as follows: Father, mother, son, daughter, brother, sister, uncle, aunt, first cousin, nephew, niece, husband, wife, father-in-law, mother-in-law, daughter-in-law, son-in-law, brother-in-law, sister-in-law, stepfather, stepmother, stepson, stepdaughter, stepbrother, half brother, half sister, grandparent, or grandchild. The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of the entity.

### **1.19 FLORIDA PRODUCED LUMBER**

The selected Bidder as Contractor agrees to comply with the provisions of Section 255.20, Florida Statutes, as such statute may be amended from time to time, wherein Indian River County as Owner must specify lumber, timber and other forest products produced and manufactured in Florida whenever such products are available and their price, fitness and quality are equal.

### **1.20 TRENCH SAFETY**

Florida Statutes Section 553.60 through 553.64, known as the "Trench Safety Act" requires all contractors engaged by Indian River County, Florida to comply with Occupational Safety and Health Administration's excavation safety standard, found in 29 C.F.R. s. 1926.650 Subpart P. All prospective subcontractors are required to sign a Trench Safety Act Compliance Statement and provide compliance cost information where indicated. The costs for complying with the Trench Safety Act must be incorporated into the Bid.

### **1.21 PUBLIC ENTITY CRIME STATEMENT**

Pursuant to Florida Statutes Section 287.133(2)(a), all Bidders are hereby notified that a person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid, proposal, or reply on a contract to provide any goods or services to a public entity (defined as the State of Florida, any of its departments or agencies, or any political subdivision); may not submit a bid, proposal, or reply on a contract with a public entity for the construction or repair of a public building or public work; may not submit bids, proposals, or replies on leases of real property to a public entity; may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity; and may not transact business with any public entity in excess of the threshold amount provided in Florida Statutes Section 287.017 for CATEGORY TWO [currently \$35,000] for a period of 36 months from the date of being placed on the convicted vendor list. A "public entity crime" means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or with the United States, including, but not limited to, any bid, proposal, reply, or contract for goods or services, any lease for real property, or any contract for the construction or repair of a public building or public work, involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.

### **1.22 CERTIFICATION REGARDING SCRUTINIZED COMPANIES**

"Contractor certifies that it and those related entities of respondent as defined above by Florida law above are not on the Scrutinized Companies that Boycott Israel List, created pursuant to s. 215.4725 of the Florida Statutes, and are not engaged in a boycott of Israel. In addition, if this agreement is for goods or services of one million dollars or more, Contractor certifies that it and those related entities of respondent as defined above by Florida law are not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, created pursuant to Section 215.473 of the Florida Statutes and are not engaged in business operations in Cuba or Syria.

County may terminate this Contract if Company is found to have submitted a false certification as provided under section 287.135(5), Florida Statutes, been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with

Activities in the Iran Petroleum Energy Sector List, or been engaged in business operations in Cuba or Syria, as defined by section 287.135, Florida Statutes.

County may terminate this Contract if Company, including all wholly owned subsidiaries, majority-owned subsidiaries, and parent companies, that exist for the purpose of making profit, is found to have been placed on the Scrutinized Companies that Boycott Israel List or is engaged in a boycott of Israel as set forth in section 215.4725, Florida Statutes.

Accordingly, firms responding to this solicitation shall return with their response an executed copy of the attached "Certification Regarding Prohibition Against Contracting with Scrutinized Companies." Failure to return this executed form with submitted bid/proposal/statement of qualifications will result in the response being deemed non-responsive and eliminated from consideration."

### **1.23 PERMITS, IMPACT, AND INSPECTION FEES.**

In accordance with Florida Statutes Section 218.80, the "Public Bid Disclosure Act", Indian River County as OWNER is obligated to disclose all license, permit, impact, or inspection fees that are payable to Indian River County in connection with the construction of the Work by the accepted bidder. ALL PERMIT, IMPACT, OR INSPECTION FEES PAYABLE TO INDIAN RIVER COUNTY IN CONNECTION WITH THE WORK ON THIS COUNTY PROJECT WILL BE PAID BY INDIAN RIVER COUNTY, WITH THE EXCEPTION OF RE-INSPECTION FEES AS SET FORTH IN THE CONTRACT. The Bidder shall not include ANY PERMIT, IMPACT, NOR INSPECTION FEES payable to Indian River County in the bid.

### **1.24 NON-DISCRIMINATION**

Indian River County will not knowingly do business with vendors or contractors who discriminate on the basis of race, color or national origin, sex, sexual orientation, gender identity, age and/or disability. Through the course of providing services to the County, Contractors shall affirmatively comply with all applicable provisions of Title VI of the Civil Rights Act of 1964, the Civil Rights Restoration Act of 1987 and the Florida Civil Rights Act of 1992, as well as all other applicable regulations, guidelines and standards. Any person who believes their rights have been violated should report such discrimination to the County's Title VI/Nondiscrimination Coordinator through the office of the County Attorney.

**1.25** OWNER has no local ordinance or preferences, as set forth in FS 255.0991 (2) in place, therefore no preference prohibited by that section will be considered in the acceptance, review or award of this bid.

### **1.26 PROTEST PROCEDURE**

Any actual or prospective bidder who is aggrieved in connection with a competitive selection process may protest to the Purchasing Manager. The protest shall be submitted to the Purchasing Manager in writing within seven (7) calendar days after the bidder knows or should have known of the facts giving rise to the protest. If the protest is not resolved by mutual agreement, the Purchasing Manager shall promptly issue a decision in writing, after consulting the applicable Department and the Office of the County Attorney.

## **1.27 CONE OF SILENCE**

Potential bidders/respondents and their agents must not communicate in any way with the Board of County Commissioners, County Administrator, Engineer(s) or any County staff other than Purchasing personnel in reference or relation to this solicitation. This restriction is effective from the time of bid advertisement until the Board of County Commissioners meets to authorize award. Such communication may result in disqualification.

**END OF SECTION**

**SECTION 00310  
BID FORM  
Roseland Elevated Storage Tank and Pump Station  
Bid 2019-068**

**THIS BID IS SUBMITTED TO:            Purchasing Division  
   1800 27<sup>th</sup> Street  
   Vero Beach, FL 32960**

1.     The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with Owner in the form included in the Contract Documents to perform and furnish all work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in the Contract Documents and in accordance with the other terms and conditions of the Contract Documents.
2.     Bidder accepts all of the terms and conditions of the Advertisement for Bids and Instructions to Bidders. This Bid will remain subject to acceptance for **sixty (60) days** after the day of Bid opening. Bidder will sign and submit the Agreement with the insurance and other documents required by the Owner within fifteen (15) days after the date of Owner's Notice of Award.
3.     In submitting this Bid, Bidder represents, as more fully set forth in the Agreement, that:
  - (a)    Bidder has examined copies of all the Bidding Documents and of the following Addenda (receipt of all which is hereby acknowledged):

Date	Number
_____	_____
_____	_____
_____	_____

- (b)    Bidder has familiarized itself with the nature and extent of the Contract Documents, the work, locality, and all local conditions and laws and regulations that in any manner may affect cost, progress, performance or finishing of the work.
  - (c)    Bidder acknowledges and agrees that it is bidding on construction of a transmission main. Please refer to the construction drawings labeled: Roseland Elevated Storage Tank Water Transmission Main.
  - (d)    Bidders are notified that the estimates of the quantities of the various items of Work and materials as set forth in the Bid Proposal (Schedule of Bid Items) are approximate only and are given solely to be used as a uniform basis for the comparison of Bids. The quantities actually required to complete the Project and Work may be less or more than so estimated, and, if so, no action for damages or for loss of profits shall accrue to the CONTRACTOR by reason thereof.
  - (e)    This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or

corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

4. Bidder will complete and include with the bid the Bid Proposal (Schedule of Bid Items) attached to this Bid Form. The quantities shown on the Bid Proposal Schedule of Bid Items) are approximate quantities. The actual quantities may vary.
5. The following documents are attached to and made a part of this Bid:
  - (a) Bid Form (Section 00310);
  - (b) Statement of No Bid (Section 00030);
  - (c) Bidder Information Form (Section 00040);
  - (d) Schedule of Subcontractors (Section 00431);
  - (e) Certification Regarding Prohibition Against Contracting with Scrutinized Companies (Section 00432)
  - (f) Disclosure of Relationships (Section 00452);
  - (g) Sworn Statement Under the Florida Trench Safety Act (Section 00454);
  - (h) General Information Required of Bidders (Section 00456);
  - (i) A current certificate of insurance evidencing coverages and limits in the amounts required by the Contract Documents.



SECTION 00310-3

SCHEDULE OF BID ITEMS

Roseland EST Pump Station

BID NUMBER 2019-068

INDIAN RIVER COUNTY DEPARTMENT OF UTILITY SERVICES

THIS BID IS SUBMITTED TO:  
INDIAN RIVER COUNTY PURCHASING DIVISION  
1800 27th STREET  
VERO BEACH, FLORIDA 32960

By:

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

BID FORM

ITEM	QUANTITY	UNIT COST	UNIT	COST
MOBILIZATION AND DEMOBILIZATION	1		LS	
BONDS AND INSURANCE	1		LS	
SITE PREPARATION/RESTORATION	1		LS	
PUMP STATION AND PIPING	1		LS	
ELECTRICAL, BUILDING, EQUIPMENT, INSTRUMENTATION, AND CONTROLS				
<b>CONSTRUCTION SUB-TOTAL</b>				
FORCE ACCOUNT	1		LS	\$50,000.00
<b>TOTAL</b>				

TOTAL BID PRICE IN WORDS:

The undersigned hereby certifies that they have read and understand the contents of this solicitation and agrees to furnish at the prices shown any or all of the items above, subject to all instructions, conditions, specifications and attachments hereto. Failure to have read all the provisions of this solicitation shall not be cause to: 1) alter any resulting contract; or 2) request additional compensation.

Respectfully Submitted,

\_\_\_\_\_  
Name of Firm

\_\_\_\_\_  
Address

\_\_\_\_\_  
Authorized Signature

\_\_\_\_\_  
City, State, Zip Code

\_\_\_\_\_  
Title

(\_\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_  
Phone

\_\_\_\_\_  
Date Signed

(Corporate Seal)

E-mail: \_\_\_\_\_

Business Tax Receipt No. \_\_\_\_\_

FEIN Number: \_\_\_\_\_

SECTION 00410

**AIA DOCUMENT A310 BID BOND**

The Contractor shall use the document form entitled "AIA Document A310 Bid Bond".

END OF SECTION

SECTION 00431

SCHEDULE OF SUBCONTRACTORS

PLEASE LIST ALL SUBCONTRACTORS ANTICIPATED TO RECEIVE \$10,000 (TEN THOUSAND DOLLARS) OR MORE OF WORK UNDER THIS PROJECT, INCLUDING NAME; ADDRESS; SPECIALTY; AND LICENSE TYPE AND NUMBER. The following are the subcontractors to be used if the undersigned is awarded the contract for this project.

NAME & ADDRESS

TYPE OF WORK

LICENSE #

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Total dollar amount that will be awarded to Sub-contractors AND INCLUDED IN THE TOTAL AMOUNT OF THE BID      \$ \_\_\_\_\_

NOTE: The above Schedule of Subcontractors must be submitted with the Bid Form and will become a part of the Contract Documents.

END OF SECTION

**SECTION 00432**

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**CERTIFICATION REGARDING PROHIBITION AGAINST CONTRACTING  
WITH SCRUTINIZED COMPANIES**

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I hereby certify that neither the undersigned entity, nor any of its wholly owned subsidiaries, majority-owned subsidiaries, parent companies, or affiliates of such entities or business associations, that exists for the purpose of making profit have been placed on the Scrutinized Companies that Boycott Israel List created pursuant to s. 215.4725 of the Florida Statutes, or are engaged in a boycott of Israel.

In addition, if this solicitation is for a contract for goods or services of one million dollars or more, I hereby certify that neither the undersigned entity, nor any of its wholly owned subsidiaries, majority-owned subsidiaries, parent companies, or affiliates of such entities or business associations, that exists for the purpose of making profit are on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, created pursuant to s. 215.473 of the Florida Statutes, or are engaged in business operations in Cuba or Syria as defined in said statute.

I understand and agree that the County may immediately terminate any contract resulting from this solicitation upon written notice if the undersigned entity (or any of those related entities of respondent as defined above by Florida law) are found to have submitted a false certification or any of the following occur with respect to the company or a related entity: (i) it has been placed on the Scrutinized Companies that Boycott Israel List, or is engaged in a boycott of Israel, or (ii) for any contract for goods or services of one million dollars or more, it 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, or it is found to have been engaged in business operations in Cuba or Syria.

Name of Respondent: \_\_\_\_\_

By: \_\_\_\_\_  
(Authorized Signature)

Title: \_\_\_\_\_

Date: \_\_\_\_\_

SECTION 00452

SWORN STATEMENT UNDER SECTION 105.08, INDIAN RIVER COUNTY CODE, ON DISCLOSURE OF RELATIONSHIPS

THIS FORM MUST BE SIGNED IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICER AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement MUST be submitted with Bid No. 2019-068

for **Roseland Elevated Storage Tank and Pump Station**

This sworn statement is submitted by: \_\_\_\_\_

\_\_\_\_\_

(Name of entity submitting Statement)

whose business address is:

\_\_\_\_\_

3. My name is \_\_\_\_\_  
(Please print name of individual signing)

and my relationship to the entity named above is \_\_\_\_\_

4. I understand that an "affiliate" as defined in Section 105.08, Indian River County Code, means:

The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of the entity.

5. I understand that the relationship with a County Commissioner or County employee that must be disclosed as follows:

Father, mother, son, daughter, brother, sister, uncle, aunt, first cousin, nephew, niece, husband, wife, father-in-law, mother-in-law, daughter-in-law, son-in-law, brother-in-law, sister-in-law, stepfather, stepmother, stepson, stepdaughter, stepbrother, stepsister, half brother, half sister, grandparent, or grandchild.

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

\_\_\_\_\_ Neither the entity submitting this sworn statement, nor any officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, have any relationships as defined in section 105.08, Indian River County Code, with any County Commissioner or County employee.

\_\_\_\_\_ The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, members, or agents, who are active in management of the entity have the following relationships with a County Commissioner or County employee:

Name of Affiliate  
or entity

Name of County Commissioner  
or employee

Relationship

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

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

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

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

The foregoing instrument was acknowledged before me this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by \_\_\_\_\_, who is personally known to me or who has produced \_\_\_\_\_ as identification.

NOTARY PUBLIC

SIGN: \_\_\_\_\_

PRINT: \_\_\_\_\_

Notary Public, State at large  
My Commission Expires:

(Seal)

**SECTION 00454 - Sworn Statement Under the Florida Trench Safety Act**

**THIS FORM MUST BE SIGNED BY THE BIDDER WHO WILL BE RESPONSIBLE FOR THE EXCAVATION WORK ("BIDDER"), OR ITS AUTHORIZED REPRESENTATIVE, IN THE PRESENCE OF A NOTARY PUBLIC AUTHORIZED TO ADMINISTER OATHS.**

1. This Sworn Statement is submitted with Bid No. 2019-068 for

**Roseland Elevated Storage Tank and Pump Station**

(Name of Project)

2. This Sworn Statement is submitted by \_\_\_\_\_  
(Legal Name of Entity Submitting Sworn Statement)  
\_\_\_\_\_, hereinafter

"BIDDER". The BIDDER's address is \_\_\_\_\_  
\_\_\_\_\_.

BIDDER's Federal Employer Identification Number (FEIN) is \_\_\_\_\_.

3. My name is \_\_\_\_\_ and my relationship to the BIDDER  
(Print Name of Individual Signing)  
is \_\_\_\_\_  
(Position or Title)

I certify, through my signature at the end of this Sworn Statement, that I am an authorized representative of the BIDDER.

4. The Trench Safety Standards that will be in effect during the construction of this Project are contained within the Trench Safety Act, Section 553.60 et.seq. Florida Statutes and refer to the applicable Florida Statute(s) and/or OSHA Regulation(s) and include the "effective date" in the citation(s). Reference to and compliance with the applicable Florida Statute(s) and OSHA Regulation(s) is the complete and sole responsibility of the BIDDER. Such reference will not be checked by OWNER or ENGINEER and they shall have no responsibility to review or check the BIDDER's compliance with the Trench Safety Standards.

5. The BIDDER assures the OWNER that it will comply with the applicable Trench Safety Standards.

6. The BIDDER has allocated and included in its bid the total amount of \_\_\_\_\_, based on the linear feet of trench to be excavated over five (5) feet deep, for compliance with the applicable Trench Safety Standards, and intends to comply with said standards by instituting the following specific method(s) of compliance on this Project:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.

The determination of the appropriate method(s) of compliance is the complete and sole responsibility of the BIDDER. Such methods will not be checked by the OWNER or ENGINEER for accuracy, completeness, or any other purpose. The OWNER and ENGINEER shall have no responsibility to review or check the BIDDER's compliance with the Trench Safety Standards.



7. The BIDDER has allocated and included in its bid the total amount of \$\_\_\_\_\_ based on the square feet of shoring to be used for compliance with shoring safety requirements and intends to comply with said shoring requirements by instituting the following specific method(s) of compliance on this Project: \_\_\_\_\_.

The determination of the appropriate method(s) of compliance is the complete and sole responsibility of the BIDDER. Such methods will not be checked by the OWNER or ENGINEER for accuracy, completeness or any other purpose. The OWNER and ENGINEER shall have no responsibility to review or check the BIDDER's compliance with the Trench Safety Standards.

8. The BIDDER, in submitting this bid, represents that it has obtained and considered all available geotechnical information, has utilized said geotechnical information and that, based on such information and the BIDDER's own information, the BIDDER has sufficient knowledge of the Project's surface and subsurface site conditions and characteristics to assure BIDDER's compliance with the applicable Trench Safety Standards in designing the trench safety system(s) for the Project.

BIDDER: \_\_\_\_\_

By: \_\_\_\_\_

Position or Title: \_\_\_\_\_

Date: \_\_\_\_\_

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

Personally appeared before me, the undersigned authority, \_\_\_\_\_  
who after first being sworn by me, affixed his/her signature in the space provided above on this  
\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Public, State at Large  
My Commission Expires:

**\*\* END OF SECTION \*\***

SECTION 00456

GENERAL INFORMATION REQUIRED OF BIDDERS

The undersigned Bidder guarantees the truth and accuracy of all statements and answers herein contained. Failure to comply with these requirements may be considered sufficient justification to disqualify a Bidder. Additional sheets shall be attached as required.

Documentation Submitted with Indian River County Bid No: 2019-068 for the **Roseland Elevated Storage Tank and Pump Station**

1. How many years has your organization been in business as a General Contractor?

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2. Describe and give the date and owner of the last project that you have completed similar in type, size, and nature as the one proposed?

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

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4. Provide the name, title, and contact information, including email address and phone numbers, of three individuals or corporations for which you have performed similar work that Indian River County may contact for a reference:

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5. Name of person who inspected site or proposed work for your firm:

Name: \_\_\_\_\_ Date of Inspections: \_\_\_\_\_

Describe any anticipated problems with the site and your proposed solutions:

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6. Will you Subcontract any part of this Work? If so, describe which portions:

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7. Please list the names and addresses of the subcontractors to be used for the portions of the work listed below. Additional information will be required in accordance with the Instruction to Bidders (Section 00100).

PAVING: \_\_\_\_\_

SURVEYING: \_\_\_\_\_

TESTING LAB: \_\_\_\_\_

8. What equipment do you own that is available for the work?

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9. What equipment will you purchase for the work?

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10. What equipment will you rent for the work?

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11. Florida General Contractor's License No: \_\_\_\_\_

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12. The following is given as a summary of the Financial Statement of the undersigned: (List Assets and Liabilities and use insert sheet if necessary.)

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13. List the names and titles of **ALL** officers of Contractor's firm:

_____	_____
_____	_____
_____	_____
_____	_____

14. State the true and exact, correct, and complete name under which you do business. BIDDER is:

\_\_\_\_\_

15. State your total bonding capacity:

\_\_\_\_\_

16. State your bonding capacity per job.

\_\_\_\_\_

17. Please provide name, address, telephone number, and contact person of your bonding company.

\_\_\_\_\_

**NOTE: To demonstrate qualifications to perform the work, each Bidder must be prepared to submit, within 5 days of Owner's request, written evidence, such as financial data, previous experience, present commitments, and other such data as may be necessary to prove to the satisfaction of the Owner that the Bidder is qualified by experience to do the work and is prepared to complete the work within the stated time period.**

**END OF SECTION**

SECTION 00530 – EJCDC STANDARD FORM OF AGREEMENT  
BETWEEN OWNER AND CONTRACTOR ON THE BASIS OF A STIPULATED PRICE  
**Roseland Elevated Storage Tank and Pump Station**

THIS AGREEMENT (“Agreement” or “Contract”), dated the \_\_\_\_\_ day of \_\_\_\_\_ in the year 2019 by and between Indian River County, a political subdivision of the State of Florida (hereinafter called OWNER) and \_\_\_\_\_.(hereinafter called CONTRACTOR).

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

**ARTICLE 1 WORK**

CONTRACTOR as an independent contractor and not as an employee shall furnish and complete all of the necessary labor, material, and equipment to perform the work as specified or indicated in the Contract Documents and per FDEP, Indian County Department of Utility Services (IRCDUS) standards. The work is generally described as follows:

Construction of the Roseland Elevated Storage Tank (EST) Pump Station. Work includes, but is not limited to, three (3) single stage, horizontal split case pumping units and motors, piping, fittings, valves, instrumentation, piping support, variable frequency drives (VFD), FPL electrical service, control panels, supporting systems for communications with IRCU SCADA system, motor disconnects, conduit, site work, concrete and all appurtenances necessary to make a fully functional and complete working system.

The Contractor shall submit a Traffic Control Plan to the County Traffic Engineering Division a minimum of 72 hours prior to construction and notify County Traffic Engineering a minimum of 24 hours before any lane closures. A temporary access plan shall be provided indicating how local traffic will be maintained if the existing road is removed and reconstructed. Stand mounted Advance Construction signing shall be installed in accordance with FDOT Index 602. One lane closures shall be in accordance with FDOT Index 603. When any work encroaches the area between the centerline and two (2) feet outside the edge of pavement, traffic shall be restricted to a single lane.

**ARTICLE 2 ENGINEER**

The Roseland Elevated Storage Tank and Pump Station has been designed by Kimley-Horn and Associates, hereinafter called ENGINEER, and who is to act as OWNER'S representative, assume all duties and responsibilities and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the work in accordance with the Contract Documents.

**ARTICLE 3 CONTRACT TIME**

3.1 The CONTRACTOR shall be substantially completed with the following timeframe

- (a) Within 30 calendar days from effective date of Notice to Proceed, Contractor shall complete the following tasks:
  - 1. Obtain all necessary permits.
  - 2. Receive approved shop drawings for all materials and equipment to be

utilized on the job.

3. Perform all photographic recording and documentation of conditions prior to construction.
4. Locate all existing utilities in the area of work.
5. Submit and secure approval of shop drawings.
6. Mobilize all labor, equipment, and materials.
7. Deliver and store all equipment and materials to the job site.
8. Notify all utilities and other affected parties prior to initiating construction.

(b) From 31 calendar days to 300 calendar days from the effective date of Notice to Proceed, the CONTRACTOR shall complete the following tasks:

1. Install pump station and appurtenant items.
2. Perform all testing.
3. Restore all disturbed areas to their pre-construction condition.
4. Correct all deficiencies noted by Engineer.

Completion of all tasks outlined above (i.e., Subparagraphs a) and b) constitutes Substantial Completion.

(c) From 301 calendar days to 350 calendar days from the effective date of Notice to Proceed, the CONTRACTOR shall complete the following tasks:

1. Clean up project area.
2. Remove all equipment and material from project site.
3. Perform contract closeout procedures.

3.2 Completion of all tasks outlined above (i.e., Subparagraphs a, b, and c) constitute Final Completion.

3.3 Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the work is not completed within the times specified in Paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal proceeding the actual loss suffered by OWNER if the work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER four-hundred and fifty dollars (\$450.00) for each day that expires after the time specified in Paragraph 3.1 for Substantial Completion, if CONTRACTOR shall neglect, refuse or fail to complete the remaining work within the Contract Time or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER four-hundred and fifty dollars (\$450.00) for each day that expires after the time specified in Paragraphs 3.1 and 3.2 for completion and readiness for final payment.

3.3.1 The CONTRACTOR and OWNER agree that OWNER is authorized to deduct all or any portion of the above-stated liquidated damages due to the Owner from payments due to the Contractor; or, in the alternative, all or any portion of the above-stated liquidated damages may be collected from the Contractor or its Surety or Sureties. These provisions for liquidated damages shall not prevent the OWNER, in case of the CONTRACTOR's default, from terminating the Contractor's right to proceed as provided in this AGREEMENT.

- 3.3.2 In addition to the above-stated liquidated damages, the CONTRACTOR shall be responsible for reimbursing OWNER to third party consultants in administering the Project beyond the Final Completion date specified in this Agreement, or beyond an approved extension of time granted to CONTRACTOR, whichever date is later.

#### ARTICLE 4 CONTRACT PRICE

- 4.1 OWNER shall pay CONTRACTOR for completion of the work in accordance with the Contract Documents in current funds in the amount of \$\_\_\_\_\_.

#### ARTICLE 5 PAYMENT PROCEDURES

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by ENGINEER as provided in the General Conditions and the Contract Documents.

- 5.1 Progress Payments. The OWNER shall make progress payments to the CONTRACTOR on the basis of the approved partial payment request as recommended by ENGINEER in accordance with the provisions of the Local Government Prompt Payment Act, Florida Statutes section 218.70 ET. seq. The OWNER shall retain ten percent (10%) of the payment amounts due to the CONTRACTOR until fifty percent (50%) completion of the work. After fifty percent (50%) completion of the work is attained as certified to OWNER by ENGINEER in writing, OWNER shall retain five percent (5%) of the payment amount due to CONTRACTOR until final completion and acceptance of all work to be performed by CONTRACTOR under the Contract Documents. Pursuant to Florida Statutes section 218.735(8) (b), fifty percent (50%) completion means the point at which the County as OWNER has expended fifty percent (50%) of the total cost of the construction services work purchased under the Contract Documents, together with all costs associated with existing change orders and other additions or modifications to the construction services work provided under the Contract Documents.
- 5.2 Pay Requests. Each request for a progress payment shall be submitted on the application for payment form supplied by OWNER and the application for payment shall contain the CONTRACTOR's certification. All progress payments will be on the basis of progress of the work measured by the schedule of values established, or in the case of unit price work based on the number of units completed. After fifty percent (50%) completion, and pursuant to Florida Statutes section 218.735(8)(d), the CONTRACTOR may submit a pay request to the County as OWNER for up to one half (1/2) of the retainage held by the County as OWNER, and the County as OWNER shall promptly make payment to the CONTRACTOR unless such amounts are the subject of a good faith dispute; the subject of a claim pursuant to Florida Statutes section 255.05; or otherwise the subject of a claim or demand by the County as OWNER or the CONTRACTOR. The CONTRACTOR acknowledges that where such retainage is attributable to the labor, services, or materials supplied by one or more subcontractors or suppliers, the Contractor shall timely remit payment of such retainage to those subcontractors and suppliers. Pursuant to Florida Statutes section 218.735(8) (c) , CONTRACTOR further acknowledges and agrees that: 1) the County as OWNER shall receive immediate written notice of all decisions made by CONTRACTOR to withhold retainage on any subcontractor at greater than five percent (5%) after fifty percent (50%) completion; and 2) CONTRACTOR will not seek release from the County as OWNER of the withheld retainage until the final pay request.

- 5.3 Paragraphs 5.1 and 5.2 do not apply to construction services work purchased by the County as OWNER which are paid for, in whole or in part, with federal funds and are subject to federal grantor laws and regulations or requirements that are contrary to any provision of the Local Government Prompt Payment Act. In such event, payment and retainage provisions shall be governed by the applicable grant requirements and guidelines.
- 5.4 ACCEPTANCE AND FINAL PAYMENT: Upon receipt of written notice that the work is ready for final inspection and acceptance, the ENGINEER will promptly make such inspection and when the ENGINEER finds the work acceptable under the terms of the Contract and the Contract fully performed, the ENGINEER will promptly issue a final completion certificate stating that the work provided for in this Contract has been completed, and acceptance by the OWNER under the terms and the conditions thereof is recommended and the entire balance found to be due the CONTRACTOR, will be paid to the CONTRACTOR by the OWNER following County Commission approval of the final Contract payment.
- 5.5 Acceptance of Final Payment as Release. The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER from all claims and all liability to the CONTRACTOR other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in connection with the work under this Contract and for every act and neglect of the OWNER and others relating to or arising out of the work. Any payment, however, final or otherwise, shall not release the CONTRACTOR or its sureties from any obligations under the Contract Documents or the Payment and Performance Bonds.

#### ARTICLE 6 INTEREST

Not Applicable.

#### ARTICLE 7 CONTRACTOR'S REPRESENTATIONS

In order to induce OWNER to enter into this Agreement, CONTRACTOR makes the following representations:

- 7.1 CONTRACTOR has familiarized itself with the nature and extent of the Contract Documents, work, site, locality, and all local conditions and laws and regulations that in any manner may affect cost, progress, performance or furnishing of the work.
- 7.2 CONTRACTOR has studied carefully all reports of explorations and tests of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions, and accepts the determination set forth in Paragraph SC-4.02 of the Supplementary Conditions of the extent of the technical data contained in such reports and drawings upon which CONTRACTOR is entitled to rely.
- 7.3 CONTRACTOR has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, reports and studies (in addition to or to supplement those referred to in Paragraph 7.2 above) which pertain to the subsurface or physical conditions at or contiguous to the site or otherwise may affect the cost, progress, performance or furnishing of the work as CONTRACTOR considers necessary for the performance of furnishing of the work at the Contract Price, within the Contract Time and in



accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Paragraph 4.02 of the General Conditions; and no additional examinations, investigations, explorations, tests, reports, studies or similar information or data are or will be required by CONTRACTOR for such purposes.

- 7.4 CONTRACTOR has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing underground facilities at or contiguous to the site and assumes responsibility for the accurate location of said underground facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said underground facilities are or will be required by CONTRACTOR in order to perform and furnish the work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Paragraph 4.04 of the General Conditions.
- 7.5 CONTRACTOR has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.
- 7.6 CONTRACTOR has given ENGINEER written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

#### ARTICLE 8 CONTRACT DOCUMENTS.

The Contract Documents which comprise the entire agreement between OWNER and CONTRACTOR concerning the work consist of the following:

- 8.1 This Agreement (Section 00530).
- 8.2 Schedule of Subcontractors (Section 00431).
- 8.3 Certification Regarding Prohibition Against Contracting with Scrutinized Companies (Section 00432).
- 8.4 Disclosure of Relationships (Section 00452).
- 8.5 Sworn Statement under the Florida Trench Safety Act (Section 00454).
- 8.6 General Information Required of Bidders (Section 00456).
- 8.7 Public Construction Bond (Section 00600).
- 8.8 Notice of Award and Notice to Proceed (examples in Section 00800).
- 8.9 General Conditions (Section 00700).
- 8.10 Supplementary Conditions (Section 00800).
- 8.11 Documents/Specifications bearing the title **“Roseland Elevated Storage Tank and Pump Station / Bid No 2019-068”**
- 8.12 Addenda numbers \_\_\_\_\_ to \_\_\_\_\_, inclusive.
- 8.13 CONTRACTOR'S Bid (Section 00310).
- 8.14 Specifications bearing the title **“Roseland Elevated Storage Tank and Pump Station”**
- 8.15 The following, which may be delivered or issued after the effective date of the Agreement and are not attached hereto: All written amendments and other documents amending, modifying, or supplementing the Contract Documents pursuant to Paragraphs 3.04 of the General Conditions.

There are no Contract Documents other than those listed above in this Article 8. The Contract Documents may only be amended, modified or supplemented as provided in Paragraphs 3.04 of the General Conditions.

## ARTICLE 9 MISCELLANEOUS

- 9.1 Terms used in this Agreement which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.
- 9.2 It is agreed that the CONTRACTOR shall not assign, transfer, convey, or otherwise dispose of the contract or its right, title, or interest in or to the same or any part thereof, or allow legal action to be brought in its name for the benefit of others, without previous consent of the OWNER and concurred to by the sureties. Any attempted assignment shall be void and may, at the option of the OWNER be deemed an event of default hereunder. Nothing herein shall be construed as creating any personal liability on the part of any officer or agent of the OWNER who may be a party hereto.
- 9.3 OWNER and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents.
- 9.4 The CONTRACTOR shall be properly licensed to practice its trade or trades which are involved in the completion of this Agreement and the work thereunder.
- 9.5 This Agreement shall be governed by the laws of the State of Florida. Venue for any lawsuit brought by either party against the other party or otherwise arising out of this agreement shall be in Indian River County, Florida, or, in the event of federal jurisdiction, in the United States District Court for the Southern District of Florida.
- 9.6 The CONTRACTOR shall indemnify and hold harmless the County, and its officers and employees, from liabilities, damages, losses and costs, including, but not limited to, reasonable attorney's fees, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of the CONTRACTOR and persons employed or utilized by the CONTRACTOR in the performance of the construction contract.
- 9.7 Pledge of Credit. The CONTRACTOR shall not pledge the OWNER'S credit or make it a guarantor of payment or surety for any Agreement, debt, obligation, judgment, lien or any form of indebtedness. The CONTRACTOR further warrants and represents that it has no obligation of indebtedness that would impair its ability to fulfill the terms of this Agreement.
- 9.8. Counterparts. This Agreement may be executed in one or more counterparts, but all such counterparts, when duly executed, shall constitute one and the same Agreement.
- 9.9. Public Records. Indian River County is a public agency subject to Chapter 119, Florida Statutes. The Contractor shall comply with Florida's Public Records Law. Specifically, the Contractor shall:
- A. Keep and maintain public records required by the County to perform the service.
  - B. 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 in Chapter 119 or as otherwise provided by law.
  - C. 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.

- D. 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 Custodian of Public Records, in a format that is compatible with the information technology systems of the County.
- E. **IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT:  
(772) 226-1424  
[publicrecords@ircgov.com](mailto:publicrecords@ircgov.com)  
Indian River County Office of the County Attorney  
1801 27th Street  
Vero Beach, FL 32960**
- F. Failure of the Contractor to comply with these requirements shall be a material breach of this Agreement.

This Agreement will be effective on \_\_\_\_\_, 2019 (the date the Contract is approved by the Indian River County Board of County Commissioners, which is the Effective Date of the Agreement).

**OWNER:**

INDIAN RIVER COUNTY \_\_\_\_\_

By: \_\_\_\_\_, Chairman

By: \_\_\_\_\_  
Jason E. Brown, County Administrator

APPROVED AS TO FORM AND LEGAL SUFFICIENCY:

By: \_\_\_\_\_  
Dylan Reingold, County Attorney

Jeffrey R. Smith, Clerk of Court and Comptroller

Attest: \_\_\_\_\_  
Clerk of Court and Comptroller  
(SEAL)

Designated Representative:  
Name:  
Title:  
Contact Info:

**CONTRACTOR:**

\_\_\_\_\_

By: \_\_\_\_\_  
(Contractor)

(CORPORATE SEAL)

Attest \_\_\_\_\_

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

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

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

Designated Representative:  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Address: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
Phone: \_\_\_\_\_  
Facsimile: \_\_\_\_\_

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

SECTION 00600  
PUBLIC CONSTRUCTION BOND

INSTRUCTION FOR PUBLIC CONSTRUCTION BOND

The front or cover page to the required public construction payment and performance bond shall contain the information required by Fla. Stat. 255.05(1)(a), and be substantially in the format shown on the first page following this instruction.

The Public Construction Bond shall be in the form suggested by Fla. Stat. 255.05(3) as shown on the second page following this instruction.

A Power of Attorney from a surety insurer authorized to do business in Florida, authorizing the signature of the Attorney in Fact who executes the Public Construction Bond shall accompany that Bond.

**Public Work  
F.S. Chapter 255.05 (1)(a)  
Cover Page**

**THIS BOND IS GIVEN TO COMPLY WITH SECTION 255.05 OR SECTION 713.23 FLORIDA STATUTES, AND ANY ACTION INSTITUTED BY A CLAIMANT UNDER THIS BOND FOR PAYMENT MUST BE IN ACCORDANCE WITH THE NOTICE AND TIME LIMITATION PROVISIONS IN SECTION 255.05(2) OR SECTION 713.23 FLORIDA STATUTES.**

**BOND NO:** \_\_\_\_\_

**CONTRACTOR NAME:** \_\_\_\_\_

**CONTRACTOR ADDRESS:** \_\_\_\_\_

**CONTRACTOR PHONE NO:** \_\_\_\_\_

**SURETY COMPANY NAME:** \_\_\_\_\_

**SURETY PRINCIPAL  
BUSINESS ADDRESS:** \_\_\_\_\_

**SURETY PHONE NO:** \_\_\_\_\_

**OWNER NAME:** \_\_\_\_\_

**OWNER ADDRESS:** \_\_\_\_\_

**OWNER PHONE NO:** \_\_\_\_\_

**OBLIGEE NAME:** \_\_\_\_\_  
(If contracting entity is different from  
the owner, the contracting public entity)

**OBLIGEE ADDRESS:** \_\_\_\_\_

**OBLIGEE PHONE NO:** \_\_\_\_\_

**BOND AMOUNT:** \_\_\_\_\_

**CONTRACT NO:** \_\_\_\_\_  
(If applicable)

**DESCRIPTION OF WORK:** \_\_\_\_\_

**PROJECT LOCATION:** \_\_\_\_\_

**LEGAL DESCRIPTION:** \_\_\_\_\_  
(If applicable)

**FRONT PAGE**

All other bond page(s) are deemed subsequent to this page regardless of any page number(s) that may be printed thereon.

PUBLIC CONSTRUCTION BOND

Bond No. \_\_\_\_\_  
(enter bond number)

BY THIS BOND, We \_\_\_\_\_, as Principal and \_\_\_\_\_, a corporation, as Surety, are bound to \_\_\_\_\_, herein called Owner, in the sum of \$\_\_\_\_\_, for payment of which we bind ourselves, our heirs, personal representatives, successors, and assigns, jointly and severally.

THE CONDITION OF THIS BOND is that if Principal:

1. Performs the contract dated \_\_\_\_\_, \_\_\_\_\_, between Principal and Owner for construction of \_\_\_\_\_, the contract being made a part of this bond by reference, at the times and in the manner prescribed in the contract; and
2. Promptly makes payments to all claimants, as defined in Section 255.05(1), Florida Statutes, supplying Principal with labor, materials, or supplies, used directly or indirectly by Principal in the prosecution of the work provided for in the contract; and
3. Pays Owner all losses, damages, expenses, costs, and attorney's fees, including appellate proceedings, that Owner sustains because of a default by Principal under the contract; and
4. Performs the guarantee of all work and materials furnished under the contract for the time specified in the contract, then this bond is void; otherwise it remains in full force.

Any action instituted by a claimant under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05(2), Florida Statutes.

Any changes in or under the contract documents and compliance or noncompliance with any formalities connected with the contract or the changes does not affect Surety's obligation under this bond.

DATED ON \_\_\_\_\_,

\_\_\_\_\_  
(Name of Principal)

By \_\_\_\_\_  
(As Attorney in Fact)

\_\_\_\_\_  
(Name of Surety)

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the Controlling Law.

# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

**ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE**

and

Issued and Published Jointly By



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Construction Specifications Institute



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These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor Nos. C-520 or C-525 (2002 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the EJCDC Construction Documents, General and Instructions (No. C-001) (2002 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. C-800) (2002 Edition).

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## GENERAL CONDITIONS

### ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

---

#### 1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

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

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

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

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

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

6. *Bidder*--The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*--A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

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

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

12. *Contract Documents*-- Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

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

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

15. *Contractor*--The individual or entity with whom Owner has entered into the Agreement.

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

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

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

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

20. *Field Order*--A written order issued by Engineer which requires minor changes in the Work but which does

not involve a change in the Contract Price or the Contract Times.

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

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

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

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

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

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

27. *Notice of Award*--The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

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

29. *Owner*--The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*--Polychlorinated biphenyls.

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

32. *Progress Schedule*--A schedule, prepared and maintained by Contractor, describing the sequence and

duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

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

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

36. *Related Entity* -- An officer, director, partner, employee, agent, consultant, or subcontractor.

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

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

39. *Schedule of Submittals*--A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

40. *Schedule of Values*--A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

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

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

43. *Specifications*--That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

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

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

46. *Successful Bidder*--The Bidder submitting a responsive Bid to whom Owner makes an award.

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

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

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

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

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

52. *Work Change Directive*--A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by

Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

## 1.02 Terminology

A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.

### B. Intent of Certain Terms or Adjectives

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered", "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

### C. Day

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

### D. Defective

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents, or

b. does not meet the requirements of any applicable inspection, reference standard, test, or

approval referred to in the Contract Documents, or

c. has been damaged prior to Engineer's - recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

#### E. *Furnish, Install, Perform, Provide*

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

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

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

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

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

## ARTICLE 2 - PRELIMINARY MATTERS

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### 2.01 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

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

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

### 2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

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

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

### 2.04 *Starting the Work*

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

### 2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule; indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

### 2.06 *Preconstruction Conference*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other



submittals, processing Applications for Payment, and maintaining required records.

### 2.07 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

## ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

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### 3.01 *Intent*

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

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

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

### 3.02 *Reference Standards*

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

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

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of, their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

### 3.03 *Reporting and Resolving Discrepancies*

#### A. Reporting Discrepancies

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

#### B. Resolving Discrepancies

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

- a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or
- b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

#### 3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

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

1. A Field Order;
2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3); or
3. Engineer's written interpretation or clarification.

#### 3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions; or

2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

#### 3.06 *Electronic Data*

A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

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

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#### 4.01 *Availability of Lands*

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

may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

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

#### 4.02 *Subsurface and Physical Conditions*

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

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and
2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

#### 4.03 *Differing Subsurface or Physical Conditions*

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

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
2. is of such a nature as to require a change in the Contract Documents; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

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

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

#### C. Possible Price and Times Adjustments

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

- a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
- b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

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

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

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

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

#### 4.04 *Underground Facilities*

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

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

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

a. reviewing and checking all such information and data,

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

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

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

#### B. *Not Shown or Indicated*

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

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

#### 4.05 *Reference Points*

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

4.06 *Hazardous Environmental Condition at Site*

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

*B. Limited Reliance by Contractor on Technical Data*

*Authorized:* Contractor may rely upon the general accuracy of the “technical data” contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such “technical data” is identified in the Supplementary Conditions. Except for such reliance on such “technical data,” Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor’s purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
3. any Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, interpretations, opinions or information.

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

*D.* If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.

*E.* Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice:

(i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

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

*G.* To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual’s or entity’s own negligence.

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

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

## ARTICLE 5 - BONDS AND INSURANCE

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

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

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

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

### 5.02 *Licensed Sureties and Insurers*

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

### 5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence

of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

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

### 5.04 *Contractor's Liability Insurance*

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

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

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insured (subject to any customary exclu-

sion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.

a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

#### 5.05 *Owner's Liability Insurance*

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

#### 5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, (other than caused by flood) and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and

any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

#### 5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and,

in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

#### 5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make



settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

#### 5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

#### 5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

### ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

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#### 6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques,

sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

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

#### 6.02 *Labor; Working Hours*

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

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

#### 6.03 *Services, Materials, and Equipment*

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

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

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

1. "*Or-Equal*" Items: If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole,

3) it has a proven record of performance and availability of responsive service; and

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times, and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. Substitute Items

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

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

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

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

a) perform adequately the functions and achieve the results called for by the general design,

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;

- b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
  - c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
- 3) will identify:
- a) all variations of the proposed substitute item from that specified, and
  - b) available engineering, sales, maintenance, repair, and replacement services;
- 4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,

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

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

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

*E. Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute

item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

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

#### 6.06 *Concerning Subcontractors, Suppliers, and Others*

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

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

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

- 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity, nor

2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

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

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

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

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

#### 6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or

royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

#### 6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

#### 6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

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

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on

entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

#### 6.10 Taxes

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

#### 6.11 Use of Site and Other Areas

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

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

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

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

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

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the

Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

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

#### 6.12 Record Documents

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

#### 6.13 Safety and Protection

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

1. all persons on the Site or who may be affected by the Work;
2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or

indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

#### 6.14 *Safety Representative*

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

#### 6.15 *Hazard Communication Programs*

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

#### 6.16 *Emergencies*

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

#### 6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

### 1. Shop Drawings

a. Submit number of copies specified in the General Requirements.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples*: Contractor shall also submit Samples to Engineer for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

### C. Submittal Procedures

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

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

b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and

d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the

requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

#### D. Engineer's Review

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

#### E. Resubmittal Procedures

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to

revisions other than the corrections called for by Engineer on previous submittals.

#### 6.18 *Continuing the Work*

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

#### 6.19 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;
2. recommendation by Engineer or payment by Owner of any progress or final payment;
3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
4. use or occupancy of the Work or any part thereof by Owner;
5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
6. any inspection, test, or approval by others; or
7. any correction of defective Work by Owner.

## 6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

## 6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures.

Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

## ARTICLE 7 - OTHER WORK AT THE SITE

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### 7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and
2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.



B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

#### 7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
2. the specific matters to be covered by such authority and responsibility will be itemized; and
3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

#### 7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and

disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

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## ARTICLE 8 - OWNER'S RESPONSIBILITIES

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### 8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

### 8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

### 8.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

### 8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

### 8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

### 8.06 *Insurance*

A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

### 8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

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9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to

check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the

Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

#### 9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

#### 9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

#### 9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

#### 9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to, the Resident Project Representative, if any, and assistants, if any.

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,
2. approve the Claim, or
3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

## ARTICLE 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

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### 11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All

cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to Engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone

directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expresses, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

**B. Costs Excluded:** The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.

**C. Contractor's Fee:** When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

**D. Documentation:** Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

## 11.02 Allowances

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

### B. Cash Allowances

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

### C. Contingency Allowance

ARTICLE 12 - CHANGE OF CONTRACT PRICE;  
CHANGE OF CONTRACT TIMES

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1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
2. there is no corresponding adjustment with respect any other item of Work; and
3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or
2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
  - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
  - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
  - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier

Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

## 12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

## 12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

## ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

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### 13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

### 13.02 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

### 13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections,



tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and
3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

#### 13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

#### 13.05 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

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

A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

#### 13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or
2. correct such defective Work; or
3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

#### 13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

#### 13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to

an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

## ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

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### 14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

### 14.02 *Progress Payments*

#### A. Applications for Payments

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

#### B. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment,

including final payment, will impose responsibility on Engineer:

- a. to supervise, direct, or control the Work, or
- b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
- c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
- d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
- e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
- b. the Contract Price has been reduced by Change Orders;
- c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
- d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

#### C. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

#### D. *Reduction in Payment*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

- a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
- b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
- c. there are other items entitling Owner to a set-off against the amount recommended; or
- d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.

3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

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

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

#### 14.04 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, , Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

#### 14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue

a certificate of Substantial Completion for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

#### 14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

#### 14.07 *Final Payment*

A. Application for Payment

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

- a. all documentation called for in the Contract Documents, including but not limited to the

evidence of insurance required by Paragraph 5.04.B.7;

b. consent of the surety, if any, to final payment;

c. a list of all Claims against Owner that Contractor believes are unsettled; and

d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

#### B. Engineer's Review of Application and Acceptance

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

#### C. Payment Becomes Due

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and , will be paid by Owner to Contractor.

#### 14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

#### 14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

### ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

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#### 15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
3. Contractor's disregard of the authority of Engineer; or
4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),
2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and
3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment

within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

## ARTICLE 16 - DISPUTE RESOLUTION

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### 16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or
2. agrees with the other party to submit the Claim to another dispute resolution process, or

3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

## ARTICLE 17 - MISCELLANEOUS

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### 17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or
2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

### 17.02 *Computation of Times*

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

### 17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

### 17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

### 17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.



17.06 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

**SECTION 00800**

**SUPPLEMENTARY CONDITIONS  
BID NO. 2019-068**

**Roseland Elevated Storage Tank and Pump Station**

**INDIAN RIVER COUNTY DEPARTMENT OF UTILITY SERVICES  
BOARD OF COUNTY COMMISSIONERS  
1801 27<sup>th</sup> Street, Vero Beach, Florida 32960**



**SUPPLEMENTARY CONDITIONS  
TO THE  
GENERAL CONDITIONS**

**PART I - AMENDMENTS TO GENERAL CONDITIONS**

**PART II – FORMS TO BE USED DURING PROJECT CONSTRUCTION**

NOTICE OF AWARD – (Sample)

NOTICE TO PROCEED (Sample)

FIELD ORDER

WORK CHANGE DIRECTIVE

CHANGE ORDER

APPLICATION FOR PAYMENT

CERTIFICATE OF SUBSTANTIAL COMPLETION

FINAL RELEASE OF LIEN

DUTIES RESPONSIBILITIES AND LIMITATIONS OF AUTHORITY OF  
RESIDENT PROJECT REPRESENTATIVE

## **SUPPLEMENTARY CONDITIONS**

### **PART I - AMENDMENTS TO GENERAL CONDITIONS**

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (EJCDC Document No. C-700, 2002 edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

#### **ARTICLE 1 – DEFINITIONS AND TERMINOLOGY**

##### **SC 1.01 A.53 Defined Terms**

A Whenever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

53. Modification--A change, revision or deviation in the Work as originally planned or designed as a result of unknown or unexpected field conditions, laws or rules revisions, or discovery of a more efficient or logical method or completion of the Work after notice to proceed.

#### **ARTICLE 2 - PRELIMINARY MATTERS**

SC-2.01. Delete paragraphs 2.01A and B of the General Conditions in its entirety.

SC 2.03A. Delete paragraph 2.03A of the General Conditions in its entirety, and replace with the following:

The Contract Times will commence to run on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 60 days after the Effective Date of the Agreement.

SC 2.05A1. Add the following immediately at the end of subparagraph 2.05A1: using the Critical Path Method (CPM).

SC 2.05A.4 Add new subparagraph 4 after the existing text of 2.05 of the General Conditions:

4. If this Project is an addition to an existing working plant, then the Contractor shall coordinate with the Owner on tie-ins. The Owner shall have final say on plant shut down times and duration to make tie-ins.

#### **ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE**

SC-3.01D. Add new paragraph D immediately after Paragraph 3.01C of the General Conditions:

D. Each and every provision of law and clause required by law to be inserted in these Contract Documents shall be deemed to be inserted herein, and they shall be read and enforced as though it were included herein.

SC3.03A.3. Delete existing subparagraph 3.03A.3 of the General Conditions in its entirety and replace with the following:

Contractor shall not be liable to Owner or Engineer for failure to report any such conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or, in the exercise of ordinary care, reasonably should have recognized such conflict, error, ambiguity, or discrepancy and failed to report it in writing to the Owner and the Engineer.

SC 3.03B. Delete existing paragraph 3.03B of the General Conditions in its entirety and replace with the following

B. Resolving Discrepancies. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall be read together as a whole not in isolation so as to give meaning to each provision; however, to the extent there is a conflict or inconsistency between or among provisions, the strictest or most stringent standard shall apply.

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

SC 4.01A. Delete existing paragraph 4.01A of the General Conditions in its entirety and replace it with the following:

A. Owner shall furnish the Site.

SC 4.01B. Delete existing paragraph 4.01B of the General Conditions in its entirety.

SC 4.01D. Add the following after paragraph 4.01C of the General Conditions:

D. Contractor shall provide to the Owner written evidence of authorization to use any private land for staging or storage of material and equipment on the private land. Such written evidence of authorization must be provided to the Owner prior to use of the private land.

SC 4.02A. Delete paragraph 4.02 A. of the General Conditions in its entirety and replace it with the following:

Reports and Drawings: The Contract Documents may identify reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents. Engineer has relied upon the data obtained from subsurface investigations made at the Site in the form of test borings. Such data is in the form of boring logs, which are available upon request. The locations of the test borings are indicated on the Drawings. Such logs and samples are not part of the Contract Documents. Contractor shall have full responsibility for physical conditions, and Underground Facilities owned by Owner or others, shown or indicated in the Contract Documents.

SC-4.02A.2. Add the following new sentences immediately at the end of existing paragraph 4.02A.2. of the General Conditions which is to read as follows:

In the preparation of Drawings and Specifications, the Engineer has relied upon the reports listed in Appendix A and tests of subsurface physical conditions at the Site. Copies of these reports are available upon request. The foregoing information and data shown or indicated in the Contract Documents is based on information and data furnished to owner or the Engineer by others. The Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data, and the Contractor shall have full responsibility for requesting, reviewing, and checking all such information and data.

SC-4.02B. Delete paragraph 4.02B in its entirety and replace with the following:

The information and data shown or indicated in the Contract Documents with respect to Underground Facilities owned by others or contiguous to the Site is based on information and data furnished to Owner or the Engineer by the owners of such Underground Facilities or by others. The Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data, and the Contractor shall have full responsibility for reviewing and checking all such information and data.

SC 4.02C, D, and E. Add new paragraphs C, D, and E immediately after Paragraph 4.02B of the General Conditions to read as follows:

C. Field Measurements: Before undertaking each part of the construction, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. Contractor shall promptly report in writing to the Owner any conflict, error or discrepancy which Contractor or any of his Subcontractors or Suppliers may discover and shall obtain a written interpretation or clarification from Owner before proceeding with any aspect of the work affected thereby; provided, however, Contractor shall not be liable to the Owner for failure to report any conflict, error or discrepancy unless Contractor or any of his Subcontractors or Suppliers had actual knowledge thereof or should reasonably have known thereof.

D. Scheduling: Unless it prejudices Work already excavated and uncovered, Contractor shall schedule layout, excavating and uncovering of Work or Underground Facilities a sufficient time in advance to allow the Engineer's review, and the possible amending or supplementing of the Contract Documents via a Work Change Directive or Change Order.

#### E. UTILITY COORDINATION.

1. Contractor's Responsibility: The Contractor shall be responsible for making all necessary arrangements with governmental departments, public utilities, public carriers, service companies and corporations owning or controlling roadways, railways, water, sewer, gas, electrical, cable television, telephone, and telegraph facilities such as pavements, tracks, piping, wires, cables, conduits, poles, guys, etc., including incidental structures connected therewith, that are encountered in the Work in order that such items may be properly shored, supported and protected, or the Contractor shall be solely responsible for coordinating their relocation. The Contractor shall give proper notices, shall comply with requirements of such parties in the performance of the Work, shall permit entrance of such parties on the Work controlled by the Contractor, and shall pay all charges and fees made by such parties for its Work. The Contractor's attention is called to the fact that there may be delays on the Project due to Work to be done by governmental departments, public utilities,

and others in repairing poles, conduits, etc. The Contractor shall cooperate with the above parties, in every way possible, so that the construction can be completed in the least possible time.

2. Connection: At all points where the Work constructed by the Contractor connects to existing utilities and services, the actual Work of making the necessary connection to the existing service or utility shall be arranged for by Contractor at no additional expense to Owner (unless specifically indicated otherwise). Services and utilities included within (but not limited to) this responsibility are roads, ditches, electrical, sewer, mechanical, utilities, water, fencing, etc. Connections shall be made at a time that will result in the least possible interference with existing services.

SC 4.03A. Delete 4.03 A of the General Conditions in its entirety and replace with the following:

A. Notice. The Contractor shall promptly, and before conditions of an unusual nature or differing materially from those indicated in the Contract are disturbed, and in no event later than 10 days after first observance of the conditions, notify the Owner and Engineer in writing of: (1) subsurface or latent physical conditions at the Site differing materially from those indicated in this Contract Documents, or (2) unknown physical conditions at the site of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract Documents. The Owner will promptly investigate the conditions, and if it finds that such conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the Work under the Contract Documents, unless the Contract is terminated a Change Order shall be issued accordingly based on the Schedule of Values and executed by the Owner and the Contractor. Contractor's failure to provide notice upon discovery of the differing site condition shall waive any entitlement to such an adjustment in the Contract Price or Contract Time. Further, no Claim of the Contractor under this paragraph 4.03A shall be allowed unless the Contractor has given the notice as required in this paragraph 4.03A.

SC 4.03B. Delete paragraph 4.03B of the General Conditions in its entirety.

SC 4.03C.1. Delete subparagraphs 4.03C1b. of the General Conditions in its entirety.

SC 4.03C3. Delete paragraph 4.03C3. of the General Conditions in its entirety.

SC-4.05A. Add the following new paragraph immediately after paragraph 4.05B. of the General Conditions to read as follows:

The Contractor shall furnish all stakes, templates and other materials necessary for establishing and maintaining the lines and grades necessary for control and construction of the Work. Engineer may check the lines, elevations, reference marks, batter boards, etc., set by Contractor, and Contractor shall correct any errors disclosed by such check. Such a check shall not be considered as approval of Contractor's work and shall not relieve Contractor of the responsibility for accurate construction of the entire Work. Contractor shall furnish personnel to assist Engineer in checking lines and grades.

SC 4.06D. Delete the last sentence of paragraph 4.06D of the General Conditions in its entirety

SC 4.06G. Delete paragraph 4.06G of the General Conditions in its entirety.

SC 4.07. Add new paragraph 4.07 of the General Conditions to read as follows:

4.07. Archaeological or Historical Resources at Site. If Archaeological or Historical Resources are revealed, uncovered, or discovered at the Site, Contractor shall cease work immediately and

promptly, and before such conditions are disturbed, and in no event later than 5 days after first observance of the conditions, notify the Owner and Engineer in writing of such conditions. Owner shall obtain the services of an Archaeologist registered with the State of Florida Register of Professional Archaeologists. Based on Archaeologist's determination, if Owner finds that such conditions cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the Work under this Contract, unless Contract is terminated a Change Order shall be entered accordingly. Contractor's failure to provide notice upon discovery of the Archaeological or Historical Resources shall waive any entitlement to Contractor for such an adjustment in the Contract Price or Contract Time.

## **ARTICLE 5 - BONDS AND INSURANCE**

SC 5.01A. Delete existing paragraph 5.01A of the General Conditions in its entirety and replace with the following:

5.01A. Contractor shall furnish Public Construction Bond, in an amount equal to the Contract Price as security for the faithful performance and payment of all Contractor's obligations under the Contract Documents. The Bond shall remain in effect at least until one year after the date when final payment is made, except as provided otherwise by Laws and Regulations or by the Contract Documents. Pursuant to Florida Statutes section 255.05(1)(c), any claimant (as such term is defined in Florida Statutes section 713.01) may apply to Indian River County as Owner for copies of the Agreement and the recorded payment and performance bonds and shall thereupon be furnished with certified copies of such documents.

SC 5.02A. Delete the words "Owner or" in line two.

SC 5.03B. Delete existing paragraph 5.03B of the General Conditions in its entirety.

SC 5.04B. Delete existing paragraph 5.04B of the General Conditions in its entirety and replace with the following:

B. The Contractor shall not commence Work under the Agreement until it has obtained all insurance required under the Contract Documents and the Indian River County Risk Manager has approved such insurance. The Contractor shall procure and maintain, as set forth herein, the minimum insurance coverage as set forth in the Contract Documents. The cost of such insurance shall be included in the Contract Price.

SC 5.04. Add Sections C, D, E, F and G

C. The insurance required by paragraph 5.04A of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation: To meet statutory limits in compliance with the Workers' Compensation Law of Florida. This policy must include employers' liability with a limit \$500,000 for each accident, \$500,000 disease policy limit and \$100,000 disease each employee. Such policy shall include a waiver of subrogation as against Owner on account of injury sustained by an employee(s) of the Contractor.
2. Commercial General Liability: A per occurrence form policy, including Premise Operations, Independent Contractors, Products and Completed Operations including X, C, U (Explosion, Collapse, Underground) Broad Form Property Damage, Broad Form Property Damage Endorsement, with a combined single limit of not less than \$1,000,000 general aggregate to



include products/completed operations, personal injury/advertising liability, fire damage /legal liability, and medical payments. Limits can be layered with an Excess Liability Policy (Umbrella).

3. Business Auto Liability: Business Auto Liability: Coverage shall include Owned vehicles and Hired/Non-Owned vehicles, for a combined single limit (bodily injury and property damage) of not less than \$1,000,000/combined single limit (Bodily Injury/Property Damage); personal injury protection -- statutory limits; \$300,000 uninsured/underinsured motorist; \$300,000/hired/non-owned auto liability. Limits can be layered with Excess Liability Policy (Umbrella).
4. Contractor's Builders' Risk "All Risk" Insurance: – All risk coverage with limits equal to one hundred percent (100%) of the completed value of the Work. There shall be a waiver of occupancy endorsement to enable the Owner to occupy the facility under construction during such activity. The policy must be endorsed to provide machinery/equipment endorsement during transit and installation, and Owner direct purchase materials, if any. The maximum deductible under this coverage is \$10,000 per claim, except Wind Storm coverage which will have a maximum deductible equal to 2 percent of the completed value of the work.
5. Flood Insurance - Contractor shall maintain coverage when the buildings or structures are located within an identified special flood hazard area. Such flood insurance shall protect the interests of the Contractor and the County and shall be afforded for the lesser of the total insurable value of such buildings or structures, or, the maximum amount of flood insurance coverage available under the National Flood Insurance Program.

D. Insurance Requirements – Fifteen (15) days prior to the commencement of any Work under the Contract Documents, a certificate of insurance shall be provided to the Indian River County Risk Manager for review and approval. The certificate shall provide that: (a) Indian River County as Owner and Kimley-Horn and Associates as Engineer be named as an additional insured on the commercial general liability, auto liability, and Contractor's Builders' Risk "All Risk" insurance policies; (b) the Contractor's insurance coverage shall be primary; and (c) Indian River County as Owner and will be given thirty (30) days' notice prior to cancellation or modification of any required insurance and such notice shall be in writing by registered mail, return receipt requested and addressed to the Indian River County Risk Manager. The Contractor shall be responsible to ensure that all subcontractors comply with all insurance requirements of the Contract Documents.

E. All coverage shall be maintained without interruption from the date of commencement of the Work and remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07. In addition, with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, such insurance shall remain in effect for at least two years after final payment. Contractor shall furnish Owner and Engineer with evidence satisfactory to Owner of the continuation of such insurance at final payment and again one year thereafter, so that Owner is assured of such continuing coverage.

F. All insurers must be authorized to do business in Florida and have a Best Key Rating of A- VII.

G. The insurance companies selected shall send written verification to the Indian River County Risk Manager that they will provide 30 days prior written notice to the Indian River County Risk Manager of its intent to cancel or modify any required policies of insurance.

SC 5.05. Delete existing paragraph 5.05 of the General Conditions in its entirety.

SC-5.06. Delete existing paragraph 5.06 of the General Conditions in its entirety.

SC-5.07. Delete existing paragraph 5.07 of the General Conditions in its entirety and replace with the following.

5.07. All insurance policies provided by the Contractor shall contain provisions to the effect that the insurer waives all rights of subrogation against any of the insured, additional insured, (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) Owner and the Engineer.

SC-5.08. Delete existing paragraph 5.08 of the General Conditions in its entirety.

SC-5.09. Delete existing paragraph 5.09 of the General Conditions in its entirety.

SC-5.10. Delete existing paragraph 5.10 of the General Conditions in its entirety.

## **ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES**

SC 6.01B. Delete paragraph 6.01B of the General Conditions in its entirety, and replace with the following:

6.01B. Contractor shall employ a competent superintendent and necessary assistants who shall be assigned to, and in attendance at, the Project Site during performance of the Work. So long as the superintendent remains employed by the Contractor or any related entity, the superintendent shall not be replaced without the Owner's prior written consent, except under extraordinary circumstances. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

SC-6.02C and D. Add the following new paragraphs immediately after paragraph 6.02B. of the General Conditions which are to read as follows:

C. Regular working hours are defined as 8 hours per day, Monday through Friday, excluding holidays, between the hours of 7:00 AM and 6:00 PM. Requests to work other than regular working hours shall be submitted to Engineer not less than 48 hours prior to any proposed weekend work or scheduled extended work weeks. Occasional unscheduled overtime on weekdays may be permitted provided two hours notice is given to Engineer.

D. Contractor shall reimburse the Owner for additional engineering and/or inspection costs incurred as a result of overtime work in excess of the regular working hours stipulated in SC-6.02C. At Owner's option, overtime costs may either be deducted from the Contractor's monthly payment request or deducted from the retainage prior to release of final payment. Overtime costs for the Owner's personnel shall be based on the individual's current overtime wage rate. Overtime costs for personnel employed by the Engineer or Owner's independent testing laboratory shall be calculated in accordance with the terms of their respective contracts with the Owner.

SC 6.04A.1 Add the following sentence immediately after the existing text in paragraph 6.04 A.1 of the General Conditions:

Additionally, any and all changes to the Project's critical path must be reflected in each Project schedule.

SC-6.04.A.3 Add the following paragraph immediately after paragraph GC-6.04.A.2 of the General Conditions:

6.04.A.3. Contractor shall give Owner full information in advance as to its plans for performing each part of the Work. If at any time during the progress of Work, Contractor's actual progress is inadequate to meet the requirements of the Contract Documents, Owner may, but is not obligated to, so notify Contractor. In such event, Contractor acknowledges and agrees that Contractor shall implement some or all of the following remedial actions at the sole cost and expense of Contractor: (a) Increase manpower in such quantities and crafts as necessary to eliminate the backlog of Work; (b) Increase the number of working hours per shift, shifts per working day, working days per week, the amount of construction equipment, or any combination of the foregoing to eliminate the backlog of Work; or (c) Reschedule the Work in conformance with the specifications. Neither such notice by Owner nor Owner's failure to issue such notice shall relieve Contractor of its obligation to achieve the quality of Work and rate of progress required by the Contract Documents. Failure of Contractor to implement some or all of the remedial actions may be grounds for determination by Owner that Contractor is not prosecuting its Work with such diligence as will assure completion within times specified. Upon such determination, Owner may terminate Contractor's right to proceed with the performance of the Contract Documents, or any separable part thereof, in accordance with the applicable provisions of this Contract Documents.

SC-6.06A. Delete Paragraph 6.06A of the General Conditions in its entirety and replace with the following:

A. Contractor shall not employ any Subcontractor, Supplier or other person or organization, (including those who are to furnish the principal items of materials or equipment), whether initially or as a substitute, against whom Owner may have reasonable objection. Acceptance of any Subcontractor, Supplier or other person or organization by Owner shall not constitute a waiver of any right of Owner to reject defective Work. Contractor shall not be required to employ any Subcontractor, Supplier or other person or organization against whom Contractor has reasonable objection.

SC-6.06B. Delete Paragraph 6.06B of the General Conditions in its entirety.

SC-6.08. Delete Paragraph 6.08 of the General Conditions in its entirety and replace with the following:

ALL PERMIT, IMPACT, OR INSPECTION FEES APPLICABLE AT THE TIME OF OPENING OF BIDS THAT ARE PAYABLE TO INDIAN RIVER COUNTY IN CONNECTION WITH THE WORK ON THIS COUNTY PROJECT WILL BE PAID BY INDIAN RIVER COUNTY. Contractor acknowledges that the foregoing items are governed by the provisions of Florida Statutes section 218.80, Public Bid Disclosure Act. Further, Contractor shall pay the applicable business tax and obtain a business tax receipt from the Indian River County Tax Collector. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all applicable construction permits. Owner shall reimburse Contractor for the cost of such permits on the basis of actual cost. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. As set forth in the Contract Documents, re-inspection fees are payable solely by Contractor. Owner has applied for and received: **Florida Department of Environmental Protection (FDEP)** Wastewater Construction Permit and **Indian River County** Right-of-Way Permit and such permits are included in the Contract Documents. Any permits issued after issuance of bid documents will be provided as an Addendum. Contractor acknowledges that the foregoing items are governed by the provisions of Florida Statutes section 218.80, Public Bid Disclosure Act.

SC 6.11 A.3. Delete the words: "arbitration or" in line 9 of paragraph 6.11 A.3 of the General Conditions.

SC-6.20A. Delete paragraph 6.20A of the General Conditions in its entirety and replace with the following:

To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the commissioners, officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all liability claims, costs, losses, and damages including but not limited to, reasonable attorney's fees, to the context caused by the negligence, recklessness, or intentional wrongful misconduct of the Contractor and persons employed or utilized by the Contractor in the performance of the construction contract.

SC-6.21E. Delete paragraph 6.21E of the General Conditions in its entirety and replace with the following:

E. Contractor shall not be responsible for the adequacy of the performance criteria or design criteria required by or contained in the Contract Documents.

## **ARTICLE 7 OTHER WORK AT THE SITE**

SC-7.01A. Delete paragraph 7.01A of the General Conditions in its entirety and replace with the following:

7.01A. Related Work at Site. Owner may perform other work related to the Project at the Site with Owner's employees, or pursuant to direct contracts with others. If such other work is not noted in the Contract Documents, then written notice thereof will be given by Owner to Contractor prior to Owner starting any such other work; and Contractor shall perform in accordance with Article 7 of the General Conditions.

## **ARTICLE 8 OWNER'S RESPONSIBILITIES**

SC-8.02. Delete paragraph 8.02 of the General Conditions in its entirety and replace with the following:

If Owner terminates the employment of Engineer, Owner may appoint another engineer whose status under the Contract Documents shall be that of the former Engineer.

SC-8.04. Delete paragraph 8.04 of the General Conditions in its entirety and replace with the following:

Payments under this contract are governed by the Local Government Prompt Payment Act, Florida Statutes section 218.70 et. seq.

SC-8.06. Delete paragraph 8.06 of the General Conditions in its entirety.

SC-8.11. Delete paragraph 8.11 of the General Conditions in its entirety.

## **ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION**

SC 9.02. Delete the first sentence of paragraph 9.02A of the General Conditions in its entirety and replace with the following:

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified Engineer the progress that has been made and the quality of the various aspects of Contractor's executed Work.

SC-9.03B. Add the following new paragraph immediately after paragraph 9.03A of the General Conditions which is to read as follows:

B. Engineer will furnish a part-time Resident Project Representative. Contractor is responsible to give 24-hour notice on all required inspections so that the Resident Project Representative may be present.

SC 9.04 A. Delete the third sentence of paragraph 9.04A of the General Conditions in its entirety and replace with the following:

However, if Contractor claims entitlement to additional time or money as a result of the Field Order, such entitlement is conditioned upon obtaining a Change Order authorized and executed by Owner after timely making a Claim as provided in the Contract Documents.

SC 9.08 A. Delete the second sentence of 9.08A of the General Conditions in its entirety and replace with the following:

Except for: (a) Claims for differing subsurface or physical conditions governed by paragraph 4.03; and (b) claims for time extensions governed by paragraph 12.03, all matters in question and other matters between Owner and Contractor arising prior to the date final payment is due, relating to the acceptability of the Work and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 15 days after occurrence of the event giving rise to such Claim or within 15 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later; provided, however, the Owner shall make all final determinations of such matters.

SC 9.08 C. Delete paragraph 9.08C of the General Conditions in its entirety

SC 9.08 D. Delete paragraph 9.08D of the General Conditions in its entirety

## **ARTICLE 10 - CHANGES IN THE WORK; CLAIMS**

SC 10.03 A.3. Delete subparagraph 10.03.A.3 of the General Conditions in its entirety

SC 10.05.A. Delete paragraph 10.05.A of the General Conditions in its entirety and replace with the following:

A. All Claims shall initially be referred to the Engineer for decision.

SC 10.05.B. Delete paragraph 10.05.B of the General Conditions in its entirety and replace with the following:

Notice: Except for: (a) Claims for differing subsurface or physical conditions governed by paragraph 4.03; and (b) claims for time extensions governed by paragraph 12.03, Claims by either party shall be initiated within 15 days after occurrence of the event giving rise to such Claim or within 15 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later, by written notice of the amount or extent of the Claim, dispute, or other matter with supporting data to the Engineer and the other party by written notice stating the general nature of each Claim, dispute, or other matter delivered by the claimant to Engineer and the other party to the Contract. A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of paragraph 12.02.B. No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under the Contract Documents.

SC 10.05 C, D, and E. Delete paragraphs 10.05C, D, and E of the General Conditions in its entirety.

#### **ARTICLE 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK**

SC 11.01A. Delete paragraph 11.01.A of the General Conditions in its entirety.

SC 11.01B. Delete paragraph 11.01B of the General Conditions in its entirety.

SC 11.02A. Delete paragraph 11.02.A of the General Conditions in its entirety and replace with the following:

It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums as may be acceptable to Owner.

SC 11.02 B, C, and D. Delete paragraphs 11.02B, C, and D of the General Conditions in their entirety.

#### **ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES**

SC 12.01A. Delete paragraph 12.01A of the General Conditions in its entirety and replace with the following:

The Contract Price may only be changed by a Change Order or by a Work Change Directive. Any Claim for an adjustment in the Contract Price shall be based on written notice in accordance with the provisions of paragraph 10.05.

SC 12.01B2. Delete paragraph 12.01B2 of the General Conditions in its entirety and replace with the following:

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum.

SC 12.01B3. Delete paragraph 12.01B3 of the General Conditions in its entirety.

SC12.01C. Delete paragraph 12.01C of the General Conditions in its entirety.

SC 12.03A and B. Delete paragraphs 12.03.A and 12.03B of the General Conditions in their entirety and replace with the following:

A. Where Contractor is delayed or prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if (1) a Claim is made therefore as provided in paragraph 12.02.A and (2) Contractor provides evidence that the delay impacted the critical path of the Project. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, abnormal weather conditions or acts of God. The Contractor must request the extension of time in writing and must provide the following information within the time periods stated hereafter. Failure to submit such information and in compliance with the time requirements given in Section 00530 of the Contract Documents, shall constitute a waiver by the Contractor and a denial of the claim for extension of time:

1. Nature of the delay or change in the Work;
2. Dates of commencement and cessation of the delay or change in the Work;
3. Activities on the current progress schedule affected by the delay or change in the Work;
4. Identification and demonstration that the delay or change in Work affects the critical path;
5. Identification of the source of delay or change in the Work;
6. Anticipated extent of the delay or change in the Work; and
7. Recommended action to minimize the delay.

B. Contractor hereby affirms that the extension of time granted herein is the Contractor's sole and exclusive remedy. Apart from extension of time, no payment or claim for damages shall be made to the Contractor as compensation for damages for any delays or hindrances from any cause whatsoever in the progress of the Work whether such delay is avoidable or unavoidable.

SC 12.03C. Delete paragraph 12.03.C of the General Conditions in its entirety.

SC 12.03D. Delete paragraph 12.03D of the General Conditions in its entirety and replace with the following:

In no event shall Owner, Engineer, or the Related Entities of either of them be liable to Contractor, any Subcontractor, any Supplier, any other person or organization, or any surety for or employee or agent of any of them, for any claim, cost, loss, or damages of any nature whatsoever arising out of or resulting from delays.

### **ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK**

SC 13.04C. Delete paragraph 13.04.C of the General Conditions in its entirety and replace with the following:

If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price.

SC 13.04D. Delete paragraph 13.04.D of the General Conditions in its entirety and replace with the following:

If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction.

SC 13.06A. Delete the words: "arbitration or" in line 9 of paragraph 13.06.A of the General Conditions.

SC13.07A. Add the following sentence at the beginning of paragraph 13.07A of the General Conditions:

Owner and Contractor agree that a warranty inspection shall be scheduled no later than eleven (11) months after final payment under the Contract Documents so that Owner and Contractor may inspect and otherwise examine the Work prior to the expiration of the Performance Bond.

SC 13.07E. Delete paragraph 13.07E of the General Conditions in its entirety and replace with the following:

Contractor's obligations under this paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or any way to limit the Contractor's continued liability for defective Work, including but limited to latent defects.

SC 13.08A. TWO changes:

1. Delete the words: "arbitration or" in line 8 of paragraph 13.08.A of the General Conditions.
2. Delete the phrase "(such costs to be approved by Engineer as to reasonableness)" in lines 10 and 11 of paragraph 13.08.A of the General Conditions.

13.09C. Delete the words: "arbitration or" in line 4 of paragraph 13.09.C of the General Conditions.

## **ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION**

SC 14.02A1. Delete the first sentence of paragraph 14.02.A.1 of the General Conditions in its entirety and replace with the following:

On or before the tenth (10<sup>th</sup>) day of each month, and not more often than once a month, the Contractor shall submit completed partial progress payment requests to the Engineer, as set forth herein. Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application for Payment and accompanied by such supporting documentation as is required by the Contract Documents. Such supporting documents shall include but not be limited to, the required Contractor's certification; retainage as set forth in the Contract Documents; and a monthly dated CPM schedule for the Project. The Contractor shall make the following certification (Affidavit) on each Application for Payment: "I hereby certify that the labor and materials listed on this Application for Payment have been used in the construction of this Work and payment received from the last request for payment has been used to make payments to all subcontractors, laborers, material, men and suppliers except as listed below: All payments by Indian River County as Owner shall be made in accordance with the Local Government Prompt Payment Act, Florida Statutes section 218.70 et. seq.



SC 14.02A4. Add a new paragraph immediately after paragraph 14.02A.3 of the General Conditions, which is to read as follows:

4. Contractor shall furnish satisfactory proof to Owner and Engineer that payment received from Owner for materials and equipment not incorporated into the Work and suitably stored, has in fact been paid to the respective supplier(s) within ten (10) days of Contractor's receipt of payment from Owner. Failure to provide such evidence of payment shall result in the withdrawal of previous approval(s) and removal of the cost of related materials and equipment from the next submitted Application for Payment, and shall be deemed a default under the Contract.

SC 14.02C1. Delete paragraph 14.02.C1 of the General Conditions in its entirety and replace with the following: All payments by Indian River County as Owner shall be made in accordance with the Local Government Prompt Payment Act, Florida Statutes section 218.70 et. seq.

SC 14.02D1d. Delete paragraph 14.02D1d of the General Conditions in its entirety and replace with the following:

d. Owner has actual knowledge of the occurrence or probable occurrence of any of the events enumerated in paragraphs 14.02.B.5.a through 14.02.B.5.c or paragraph 15.02.A.

SC 14.02D2. Delete paragraph 14.02D2 of the General Conditions in its entirety and replace with the following:

If Owner refuses to make payment of the full amount recommended by Engineer, Owner shall provide notice to Contractor in accordance with the provisions of the Local Government Prompt Payment Act, Florida Statutes section 218.70 et. seq. and pay Contractor any amount remaining after deduction of the amount so withheld in accordance with the provisions of the Local Government Prompt Payment Act, Florida Statutes section 218.70 et. seq. Owner shall pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, in accordance with the provisions of the Local Government Prompt Payment Act, Florida Statutes section 218.70 et. seq.

SC 14.02D3. Delete paragraph 14.02D3 of the General Conditions in its entirety

SC 14.03A. Add the following sentences to the end of the existing paragraph 14.03A of the General Conditions as follows:

No materials or supplies for the Work shall be purchased by Contractor or his Subcontractors subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. Contractor warrants that Contractor has good title to all materials and supplies used by Contractor in the Work, free from all liens, claims or encumbrances.

SC 14.04C. Delete paragraph 14.04C of the General Conditions in its entirety and replace with the following:

If Engineer considers the Work substantially complete, Engineer will prepare and deliver to Owner a tentative certificate of Substantial Completion that shall fix the date of Substantial Completion. In accordance with the provisions of Florida Statutes section 218.735(7)(a), upon receipt of the tentative certificate of Substantial Completion from Engineer, the Owner, the Engineer, and the Contractor shall conduct a walk-through inspection of the Project to document a list of any items required to render the Work on the Project complete, satisfactory, and acceptable under the

Contract Documents (herein the "Statutory List"). The Statutory List shall be reduced to writing and circulated among the Owner, the Engineer, and the Contractor by the Owner or the Engineer within 30 calendar days after Substantial Completion. The Owner and Contractor acknowledge and agree that: 1) the failure to include any corrective work, or pending items that are not yet completed, on the Statutory List does not alter the responsibility of the Contractor to complete all of the Work under the Contract Documents; 2) upon completion of all items on the Statutory List, the Contractor may submit a pay request for all remaining retainage except as otherwise set forth in the Contract Documents; and 3) any and all items that require correction under the Contract Documents and that are identified after the preparation of the Statutory List remain the obligation of the Contractor to complete to the Owner's satisfaction under this Agreement. After receipt of the Statutory List by the Contractor, the Contractor acknowledges and agrees that it will diligently proceed to complete all items on the Statutory List and schedule a final walk-through in anticipation of final completion on the Project.

SC 14.04D. Delete paragraph 14.04D of the General Conditions in its entirety and replace with the following:

At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, HVAC, utilities, insurance, and warranties and guarantees.

SC14.07A.3. Delete paragraph 14.07A.3 of the General Conditions in its entirety.

SC14.07B.1. Delete paragraph 14.07B.1 of the General Conditions in its entirety and replace with the following:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation, all as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will indicate, within twenty days after receipt of the final Application for Payment, in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. Thereupon Engineer will give written notice to Owner and Contractor that the Work is acceptable. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

SC-14.07.C.1. Delete paragraph GC-14.07.C.1 in its entirety and replace with the following:

Payment shall be made by Owner to Contractor according to the Local Government Prompt Payment Act, Florida Statutes section 218.70. et.seq.

SC 14.08. Delete paragraph 14.08 of the General Conditions in its entirety.

SC 14.09. Delete paragraph 14.09 of the General Conditions in its entirety.

## **ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION**

SC-15.02.A.1. Delete subparagraph 15.02.A1 of the General Conditions in its entirety, and replace with the following:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents;

SC-15.02.A.4. Delete subparagraph 15.02.A 4 of the General Conditions in its entirety, and replace with the following:

4. Contractor's violation of any material provisions of the Contract Documents.

SC 15.02.A.5 and 6: Add the following new subparagraphs at the end of paragraph GC-15.02.A

5. Failure of Contractor to make proper payments to Subcontractors or others for labor, services, materials or equipment in connection with the Work;

6. If Contractor abandons the Work.

SC 15.02.C. Delete the words: "arbitration or" in line 7 of paragraph 15.02.C of the General Conditions.

SC 15.02.G. Add the following new paragraph immediately following paragraph 15.02.F of the General Conditions:

G. If, after termination of the Contract by the Owner for cause as set forth in paragraph 15.02, it is determined that the Contractor had not failed to fulfill its contractual obligations, the termination under paragraph 15.02 shall be deemed to have been for the convenience of the Owner. In such event, adjustment of the Contract Price shall be made as provided in paragraph 15.03

SC15.03.A.3 and 15.03 A 4. Delete subparagraphs 15.03.A3 and 15.03 A 4 of the General Conditions in its entirety.

## **ARTICLE 16 - DISPUTE RESOLUTION**

SC16.01A. Delete paragraph 16.01A of the General Conditions in its entirety and replace with the following:

A. Prior to the filing of any suit or other legal proceedings, the parties shall endeavor to resolve claim disputes or other matters in question by mediation. Mediation shall be initiated by any party by serving a written request for same on the other party. The parties shall, by mutual agreement, select a circuit court mediator as certified by the Supreme Court of Florida within 15 days of the date of the request for mediation. If the parties cannot agree on the selection of a circuit court mediator as certified by the Supreme Court of Florida, then the Owner shall select the mediator, who shall be a circuit court mediator as certified by the Supreme Court of Florida. The mediator's fee shall be paid in equal shares by Owner and Contractor.

SC 16.01C. Delete paragraph 16.01 C of the General Conditions in its entirety and replace with the following:

C. Contractor shall carry on the Work and maintain the Progress Schedule during the dispute resolution proceedings, unless otherwise agreed by Contractor and Owner in writing.

## **ARTICLE 17 - MISCELLANEOUS**

SC 17.01A. Delete paragraph 17.01A of the General Conditions in its entirety and replace with the following

Notices: Any notice, request, demand, consent, approval, or other communication required or permitted by the Contract Documents shall be given or made in writing and shall be served, as elected by the party giving such notice, by any of the following methods: (a) Hand delivery to the other party; (b) Delivery by commercial overnight courier service; or (c) Mailed by registered or certified mail (postage prepaid), return receipt requested at the addresses of the parties shown in the Contract Documents. Notices shall be effective when received at the address as specified above. The original of the notice must additionally be mailed. Either party may change its address, for the purposes of this paragraph, by written notice to the other party given in accordance with the provisions of this paragraph.

SC 17.02 through and including 17.03. Replace Sections 17.02 and 17.03:

17.02. Utilities. The Contractor shall, at its expense, arrange for, develop and maintain all utilities in Work areas to meet the requirements of the Contract Documents. Such utilities shall be furnished by Contractor at no additional cost to the Owner, and shall include, but not be limited to the following: public telephone service for the Contractor's use; construction power as required at each point of construction; and water as required throughout the construction. Prior to final acceptance of the Work the Contractor shall, at its expense, satisfactorily remove and dispose of all temporary utilities developed to meet the requirements of the Contract.

17.03. Drainage. The Contractor shall so conduct its operations and maintain the Work in such condition that adequate drainage will be in effect at all times. Existing functioning storm sewers, gutters, ditches, and other run-off shall not be obstructed.

17.07. Fire Hydrants. Fire hydrants on or adjacent to the highway shall be kept accessible to fire apparatus at all times and no material or obstruction shall be placed within fifteen feet (15') of any such hydrant.

17.08. Protection of Structures. Heavy equipment shall not be operated close enough to pipe headwalls or other structures to cause their displacement.

17.09. Fencing. On all Work which includes fencing and where the Engineer determines it to be necessary for maintaining the security of livestock or adjacent property, or for protection of pedestrians who are likely to gain access to the Site or Work area from adjacent property, the Contractor shall erect an appropriate temporary security fence as a first order of business. Temporary fencing shall be installed at temporary construction easement areas on all commercial and residential properties appropriate to secure the Work area and protect persons and domestic animals. At all times, the Contractor shall conduct the Work under secure temporary fencing. Permanent fencing shall be addressed as required by the Plans and Specifications.

17.10. Record Drawings. The Contractor shall 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. These items shall be available to the Engineer and shall be delivered to the Engineer for the Owner. Record Drawings shall be submitted with each pay request. Record Drawings shall be submitted with each pay request. Final acceptance of the Work will be withheld until the approval of such documents are made by the Owner.

17.11. Progress Videotapes. Contractor shall deliver to the Owner both prior to commencing the Project and before receipt of Final Payment, a DVD Type color videotape of the Project showing the Site before and after Work has been completed. Contractor shall audibly identify on the videotape the station numbers as those areas of the Project are taped. The cost of the videotaping is included in the bid submitted by the Contractor.

17.12. Commercial Activities. Contractor shall not establish any commercial activity or issue concessions or permits of any kind to third parties for establishing commercial activities on land owned or controlled by Owner. Contractor shall not allow its employees to engage in any commercial activities on the Project site.

## PART II – FORMS TO BE USED DURING PROJECT CONSTRUCTION (Pages 20 through 37)

NOTICE OF AWARD – (Sample)  
NOTICE TO PROCEED  
FIELD ORDER  
WORK CHANGE DIRECTIVE  
CHANGE ORDER  
APPLICATION FOR PAYMENT  
CERTIFICATE OF SUBSTANTIAL COMPLETION  
FINAL RELEASE OF LIEN  
DUTIES RESPONSIBILITIES AND LIMITATIONS OF AUTHORITY OF  
RESIDENT PROJECT REPRESENTATIVE

**(SAMPLE)  
NOTICE OF AWARD**

Dated \_\_\_\_\_, 20\_\_

TO: \_\_\_\_\_

ADDRESS: \_\_\_\_\_  
\_\_\_\_\_

REFERENCE: INDIAN RIVER COUNTY BID NO. 2019-068  
**Roseland Elevated Storage Tank and Pump Station**

Dear \_\_\_\_\_

I am pleased to inform you that on [DATE], the Board of County Commissioners awarded the above-referenced project to your company. In accordance with section 255.05(1)(a), Florida Statutes, you are required to execute a Public Construction Bond for the above referenced project.

The following documents are required before the applicable County department can issue a “Notice to Proceed” letter:

1. Public Construction Bond in the amount of **100%** of the contract amount.
2. Certificate of Insurance, **must** name Indian River County as an additional insured and **must** provide for a 30 day Notice of Cancellation.
3. W-9 Form.
4. Two Signed Copies of Enclosed Agreement.

**Please execute both copies of the enclosed Agreement and return them together with the required Bond, W-9, and Certificate of Insurance to this office at the address provided below no later than**

\_\_\_\_\_.

Failure to comply with the established deadline for submittal of required documents may be grounds for cancellation of the award.

Thank you for your prompt attention and if you have any questions, please do not hesitate to contact this office.

Sincerely,

Jennifer Hyde, Purchasing Manager

SAMPLE NOTICE TO PROCEED

\_\_\_\_\_, 20\_\_

CONTRACT FOR: **Roseland Elevated Storage Tank and Pump Station**

CONTRACTOR:

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

Gentlemen:

You are hereby notified to commence work on the subject contract on or before \_\_\_\_\_, 20\_\_ and are to fully complete the work within \_\_\_\_\_ calendar days. In accordance with the contract documents, the Substantial Completion date is \_\_\_\_\_, (\_\_\_\_\_ days) with the Final Completion date being \_\_\_\_\_ (\_\_\_\_\_ days). Extension in time will be by written change order only.

The contract provides for assessment of liquidated damages for each consecutive calendar day that the work remains incomplete after the above established substantial completion date the sum of \$ \_\_\_\_\_ and for each consecutive calendar day that the work remains incomplete after the above established final completion date the sum of \$ \_\_\_\_\_.

\_\_\_\_\_  
Indian River County, Florida  
(OWNER)

By: \_\_\_\_\_  
(Authorized Signature)

\_\_\_\_\_  
(Printed Name & Title of Above Signer)

NOTE: Attach this notice to your contract making it a part thereof.

FIELD ORDER

PROJECT: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

FIELD ORDER NO.: \_\_\_\_\_

DATE: \_\_\_\_\_

CONTRACT: \_\_\_\_\_

OWNER: \_\_\_\_\_

OWNER'S PROJECT NO.: \_\_\_\_\_

TO: \_\_\_\_\_

CONTRACT DATE: \_\_\_\_\_

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

-----

This Field Order is issued to interpret/clarify the Contract Documents, order minor changes in the work and/or memorialize trade-off agreements. Both parties hereby agree that the work described by this Field Order is to be accomplished without change in Contract Sum, Contract Time, and/or claims for other costs.

-----

DESCRIPTION: (Here insert a written description of the interpretation, change or agreement.)

FIELD ENGINEER: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

BY: \_\_\_\_\_

BY: \_\_\_\_\_

DATES: \_\_\_\_\_

DATE: \_\_\_\_\_



WORK CHANGE DIRECTIVE

No. \_\_\_\_\_

**PROJECT: Roseland Elevated Storage Tank and Pump Station**

DATE OF ISSUANCE:

OWNER: Indian River County Utilities 1801 27th Street, Vero Beach, FL 32960

(Name, Address)

CONTRACTOR:

OWNER's Project No.: 2019-068

ENGINEER: \_\_\_\_\_

CONTRACT FOR:

ENGINEER's Project No.: \_\_\_\_\_

You are directed to proceed with the following change(s):

Description: \_\_\_\_\_

Purpose of Work Directive Change: \_\_\_\_\_

Attachment(s) (list documents supporting change):  
\_\_\_\_\_

If a claim is made that the above change(s) have affected Contract Price or Contract Time, any claim for a Change Order based thereon will involve one of the following methods of determining the effect of the change(s).

Method of determining change in Contract Price:  
Time:

Method of determining change in Contract

Time and Materials

Contractor's records

Unit Prices

Engineer's records

Cost plus fixed fee

Other \_\_\_\_\_

Estimated increase (decrease) in Contract Price  
\$\_\_\_\_\_. If the  
change involves an increase, the estimated  
amount is not to be exceeded without further  
authorization.

Estimated increase (decrease) in Contract Time  
\_\_\_\_\_ days. If the change involves an  
increase, the estimated time is not to be exceed  
without further authorization.

Once the Work covered by the directive is completed or final cost and time determined, Contractor should submit documentation for inclusion in a change Order.

**THIS IS A DIRECTIVE TO PROCEED WITH A CHANGE THAT MAY AFFECT THE CONTRACT PRICE OR THE CONTRACT TIME. A CHANGE ORDER, IF ANY, SHOULD BE CONSIDERED PROMPTLY.**

RECOMMENDED:

APPROVED:

ACCEPTED:

By: \_\_\_\_\_  
Engineer (Authorized Signature)

By: \_\_\_\_\_  
Owner (Authorized Signature)

By: \_\_\_\_\_  
Contractor (Authorized Signature)

Date: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**CHANGE ORDER**

No. \_\_\_\_\_

PROJECT: **Roseland Elevated Storage Tank and Pump Station**

DATE OF ISSUANCE \_\_\_\_\_ EFFECTIVE DATE \_\_\_\_\_

OWNER Indian River County Department of Utilities Services

OWNER's Contract No. 2019-068

Project No. \_\_\_\_\_

CONTRACTOR \_\_\_\_\_ ENGINEER \_\_\_\_\_

You are directed to make the following changes in the Contract Documents:

Description: \_\_\_\_\_

Reason for change order: \_\_\_\_\_

Attachments: (List documents supporting change) \_\_\_\_\_

CHANGE IN CONTRACT PRICE	CHANGE IN CONTRACT TIME
Original Contract Price \$ _____	Original Contract Times Substantial Completion: _____ Ready for final payment: _____ Days or dates
Net changes from previous Change Orders No. ___ to No. _____ \$ _____	Net change from previous Change Orders No. ___ to No. _____ _____ days
Contract Price prior to this Change Order \$ _____	Contract Time prior to this Change Order Substantial Completion: _____ Ready for final payment: _____ Days or dates
Net Increase (decrease) in this Change Order \$ _____	Net Increase in this Change Order _____ days
Contract Price with all approved Change Orders \$ _____	Contract Time with all approved Change Orders Substantial Completion: _____ Ready for final payment: _____ Days or dates

RECOMMENDED:

APPROVED:

ACCEPTED:

By: \_\_\_\_\_

Engineer (Authorized Signature)

By: \_\_\_\_\_

Owner (Authorized Signature)

By: \_\_\_\_\_

Contractor (Authorized Signature)

Date: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

EJCDC No. C-700 (2002 Edition)

Prepared by the Engineers Joint Contract Documents Committee and endorsed by The Associated General Contractors of America.

APPLICATION FOR PAYMENT NO. \_\_\_\_\_

To: Indian River County Department of Utilities Services \_\_\_\_\_ (OWNER)

From: \_\_\_\_\_ (CONTRACTOR)

Contract: \_\_\_\_\_

PROJECT: **Roseland Elevated Storage Tank and Pump Station** \_\_\_\_\_

OWNER's Contract No. 2019-068 ENGINEER's Project No. \_\_\_\_\_

For Work accomplished through the date of: \_\_\_\_\_

- 1. Original Contract Price: \$ \_\_\_\_\_
- 2. Net change by Change Orders and Written Amendments (+ or -): \$ \_\_\_\_\_
- 3. Current Contract Price (1 plus 2): \$ \_\_\_\_\_
- 4. Total completed and stored to date \$ \_\_\_\_\_
- 5. Retainage (per Agreement):  
     \_\_\_\_\_ % of completed Work: \$ \_\_\_\_\_  
     \_\_\_\_\_ % of retainage: \_\_\_\_\_
- Total Retainage: \$ \_\_\_\_\_
- 6. Total completed and stored to date less retainage (4 minus 5): \$ \_\_\_\_\_
- 7. Less previous Application for Payments: \$ \_\_\_\_\_
- 8. **DUE THIS APPLICATION (6 MINUS 7):** \$ \_\_\_\_\_

Accompanying Documentation:

CONTRACTOR'S Certification:

The undersigned CONTRACTOR certifies that (1) title to all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to OWNER at time of payment free and clear of all Liens, security interests and encumbrances; (2) all Work covered by this Application for Payment is in accordance with the Contract Documents and not defective; and (3) the labor and materials listed on this Application for Payment have been used in the construction of this Work and payment received from the last progress payment has been used to make payments to all subcontractors, laborers, materialmen and suppliers except as listed below: \_\_\_\_\_ "

Dated \_\_\_\_\_  
CONTRACTOR

By: \_\_\_\_\_

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

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

Subscribed and sworn to before me this \_\_\_\_\_  
day of \_\_\_\_\_, \_\_\_\_\_

Notary Public

My Commission expires: \_\_\_\_\_

Payment of the above AMOUNT DUE THIS APPLICATION is recommended.

Dated \_\_\_\_\_  
ENGINEER

By: \_\_\_\_\_

EJCDC No. C-700-E (2002 Edition)

Prepared by the Engineers Joint Contract Documents Committee and endorsed by The Associated General Contractors of America and the Construction Specification Institute.

**CERTIFICATE OF SUBSTANTIAL COMPLETION**

---

**PROJECT:** Roseland Elevated Storage Tank and Pump Station

**DATE OF ISSUANCE**

---

**OWNER** Indian River County Board of County Commissioners

**OWNER's Contract No.** 2019-068      **ENGINEER's Project No.** \_\_\_\_\_

**CONTRACTOR** \_\_\_\_\_      **ENGINEER** [INSERT NAME OF ENGINEER]

---

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

To: Indian River County Department of Utilities Services  
**OWNER**

And To \_\_\_\_\_  
**CONTRACTOR**

---

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the contract Documents on

**DATE OF SUBSTANTIAL COMPLETION**

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within \_\_\_\_\_ Days of the above date of Substantial Completion.

EJCDC No. C-700 (2002 Edition)  
Prepared by the Engineers Joint Contract Documents Committee and endorsed by The Associated General Contractors of America.

From the date of Substantial Completion, the responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties and guarantees shall be as follows:

RESPONSIBILITIES:

OWNER: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CONTRACTOR: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

The following documents are attached to and made a part of this Certificate:

*[For items to be attached see definition of Substantial Completion as supplemented and other specifically noted conditions precedent to achieving Substantial Completion as required by Contract Documents.]*

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

Executed by ENGINEER on \_\_\_\_\_

\_\_\_\_\_  
**ENGINEER**

By: \_\_\_\_\_  
(Authorized Signature)

CONTRACTOR accepts this Certificate of Substantial Completion on \_\_\_\_\_, 20\_\_

\_\_\_\_\_  
**CONTRACTOR**

By: \_\_\_\_\_

OWNER accepts this Certificate of Substantial Completion on \_\_\_\_\_, 20\_\_

INDIAN RIVER COUNTY DEPARTMENT OF UTILITIES SERVICES  
**OWNER**

By: \_\_\_\_\_  
(Authorized Signature)

**FINAL RELEASE OF LIEN**

KNOW ALL MEN BY THESE PRESENTS, that

\_\_\_\_\_

(Company Name)

The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER from all claims and all liability to the CONTRACTOR other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in connection with the work under this Contract and for every act and neglect of the OWNER and others relating to or arising out of the work.

For all in consideration of

\_\_\_\_\_ dollars (\$ \_\_\_\_\_)

(Total Amount of Contract)

paid to \_\_\_\_\_ by receipt of which is hereby acknowledged,

(Contractor)

do \_\_\_\_\_ hereby release and quit claim to the OWNER, its successors

(I/We)

or assigns, all liens, lien rights, claims or demands of any kind whatsoever

which \_\_\_\_\_ now have or might have against the property, building, and/ or

(I/We)

for any incidental expense for the construction of

\_\_\_\_\_

(Project Number)

**Roseland Elevated Storage Tank Water Transmission Main**

\_\_\_\_\_

(Project Name)

IN WITNESS WHEREOF I have hereunto set my hand and seal this \_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_ (SEAL)

By \_\_\_\_\_

WITNESS:

\_\_\_\_\_

Title \_\_\_\_\_

DUTIES, RESPONSIBILITIES AND LIMITATIONS OF AUTHORITY  
OF RESIDENT PROJECT REPRESENTATIVE

A. GENERAL

Resident Project Representative is ENGINEER'S Agent, will act as directed by and under the supervision of ENGINEER, and will confer with ENGINEER regarding his actions. Resident Project Representative's dealings in matters pertaining to the on-site Work shall in general be only with ENGINEER and CONTRACTOR, and dealings with Subcontractors shall only be through or with the full knowledge of CONTRACTOR. Written communication with OWNER will be only through or as directed by ENGINEER.

B. DUTIES AND RESPONSIBILITIES

Resident Project Representative will:

1. Schedules: Review the progress schedule, schedule of Shop Drawing submissions and schedule of values prepared by CONTRACTOR and consult with ENGINEER concerning their acceptability.
2. Conferences: Attend preconstruction conferences. Arrange a schedule of progress meetings and other job conferences as required in consultation with ENGINEER and notify those expected to attend in advance. Attend meetings, and maintain and circulate copies of minutes thereof.
3. Liaison:
4. Serve as ENGINEER'S liaison with CONTRACTOR, working principally through CONTRACTOR'S superintendent and assist him in understanding the intent of the Contract Documents. Assist ENGINEER in serving as OWNER'S liaison with CONTRACTOR when CONTRACTOR'S operations affect OWNER'S on-site operations.
5. As requested by ENGINEER, assist in obtaining from OWNER additional details or information, when required at the job site for proper execution of the Work.
6. Shop Drawings and Samples:
  - a. Receive and record date of receipt of Shop Drawings and samples, receive samples which are furnished at the site by CONTRACTOR, and notify ENGINEER of their availability for examination.
  - b. Advise ENGINEER and CONTRACTOR or his superintendent immediately of the commencement of any Work requiring a Shop Drawing or sample submission if the submission has not been approved by the ENGINEER.
7. Review of Work, Rejection of Defective Work, Inspections and Tests:
  - a. Conduct on-site observations of the Work in progress to assist ENGINEER in determining if the Work is proceeding in accordance with the Contract Documents and that completed Work will conform to the Contract Documents.
  - b. Report to ENGINEER whenever he believes that any Work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or does not meet the requirements of any inspections, tests or approval required to be made or has been damaged prior to final payment; and advise ENGINEER when he believes Work should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

- c. Verify that tests, equipment and systems startups and operating and maintenance instructions are conducted as required by the Contract Documents and in presence of the required personnel, and that CONTRACTOR maintains adequate records thereof; observe, record and report to ENGINEER appropriate details relative to the test procedures and startups.
  - d. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the outcome of these inspections and report to ENGINEER.
- 8. Interpretation of Contract Documents: Transmit to CONTRACTOR engineer's clarifications and interpretations of the Contract Documents.
- 9. Modifications: Consider and evaluate CONTRACTOR'S suggestions for modifications in Drawings or Specifications and report them with recommendations to ENGINEER.
- 10. Records:
  - a. Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and samples submissions, reproductions of original Contract Documents including all Addenda, change orders, field orders, additional Drawings issued subsequent to the execution of the Contract, ENGINEER'S clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.
  - b. Keep a diary or log book, recording hours on the job site, weather conditions, data relative to questions of extras or deductions, list of visiting officials and representatives of manufacturers, fabricators, suppliers and distributors, daily activities, decisions, observations in general and specific observations in more detail as the case of observing test procedures. Send copies to ENGINEER.
  - c. Record names, addresses and telephone numbers of all contractors, Subcontractors and major suppliers of materials and equipment.
- 11. Reports:
  - a. Furnish ENGINEER periodic reports as required of progress of the Work and CONTRACTOR'S compliance with the approved progress schedule and schedule of Shop Drawing submissions.
  - b. Consult with ENGINEER in advance of scheduled major tests, inspections or start of important phases of the Work.
  - c. Report immediately to ENGINEER upon the occurrence of any accident.
- 12. Payment Requisitions: Review applications for payment with Contractor for compliance with the established procedure for their submission and forward them with recommendations to ENGINEER, noting particularly their relation to the schedule of values, Work completed and materials and equipment delivered at the site but not incorporated in the Work.
- 13. Certificates, Maintenance and Operation Manuals: During the course of the Work, verify that certificates, maintenance and operation manuals and other data required to be assembled and furnished by CONTRACTOR are applicable to the items actually installed; and deliver this material to ENGINEER for his review and forwarding to OWNER prior to final acceptance of the Work.
- 14. Completion:
  - a. Before ENGINEER issues a Certificate of Substantial Completion, submit to CONTRACTOR a list of observed items requiring completion or correction.
  - b. Conduct final inspection in the company of ENGINEER, OWNER and CONTRACTOR and prepare a final list of items to be completed or corrected.
  - c. Verify that all items on final list have been completed or corrected and make recommendations to ENGINEER concerning acceptance.



### C. LIMITATIONS OF AUTHORITY

Except upon written instructions of ENGINEER, Resident Project Representative:

15. Shall not authorize any deviation from the Contract Documents or approve any substitute materials or equipment.
16. Shall not exceed limitations on ENGINEER'S authority as set forth in the Contract Documents.
17. Shall not undertake any of the responsibilities of CONTRACTOR, Subcontractors or CONTRACTOR'S superintendent, or expedite the Work.
18. Shall not advise on or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the Contract Documents.
19. Shall not advise on or issue directions as to safety precautions and programs in connection with the Work.
20. Shall not authorize OWNER to occupy the Project in whole or in part.
21. Shall not participate in specialized field or laboratory tests.

END OF SECTION



## TECHNICAL SPECIFICATIONS

# ROSELAND ELEVATED STORAGE TANK CONVERSION AND PUMP STATION

*Prepared For:*

**Indian River County Utilities**



**Kimley»»Horn**

May 2019  
Project No. 044572041-B  
© Kimley-Horn and Associates, Inc.  
1920 Wekiva Way  
Suite 200  
West Palm Beach, FL 33411  
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561/863-8175 FAX

# ROSELAND EST PUMP STATION

## **TECHNICAL SPECIFICATIONS**

### **DIVISION 1 – GENERAL REQUIREMENTS**

### **PAGES**

01010	SUMMARY OF WORK	01010-1 to 01010-4
01025	MEASUREMENT AND PAYMENT	01025-1 to 01025-5
01050	FIELD ENGINEERING AND SURVEYING	01050-1 to 01050-2
01090	REFERENCE STANDARDS	01090-1 to 01090-6
01300	SUBMITTALS	01300-1 to 01300-4
01410	TESTING LABORATORY SERVICES	01410-1 to 01410-4
01510	TEMPORARY UTILITIES	01510-1 to 01510-2
01560	TEMPORARY CONTROL	01560-1 to 01560-2
01600	MATERIALS AND EQUIPMENT	01600-1 TO 1600-2
01700	PROJECT CLOSEOUT	01700-1 to 01700-4
01720	PROJECT RECORD DRAWINGS	01720-1 to 01720-4
01730	OPERATING AND MAINTENANCE MANUALS	01730-1 to 01730-4

### **DIVISION 2 – TECHNICAL SPECIFICATIONS**

### **PAGES**

02016	EXISTING UTILITIES AND UNDERGROUND STRUCTURES	02016-1 to 02016-2
02065	DEMOLITION	02065-1 to 02065-4
02150	DEWATERING	02150-1 to 02150-3
02200	EARTHWORK	02200-1 to 02200-6
02270	EROSION CONTROL AND SEDIMENTATION CONTROL	02270-1 to 02270-3
02485	GRASSING	02485-1 to 02485-5
02670	FLUSHING, TESTING AND DISINFECTION	02670-1 to 02670-6
02800	RESTORATION OF SURFACE IMPROVEMENTS	02800-1 to 02800-8

### **DIVISION 3 – CONCRETE**

03100	CONCRETE FORMWORK	03100-1 to 03100-6
03200	CONCRETE REINFORCEMENT	03200-1 to 03200-4
03300	CAST-IN-PLACE CONCRETE	03300-1 to 03300-8

### **DIVISION 4 – MASONRY – NOT USED**

### **DIVISION 5 – METALS**

05500	MISCELLANEOUS METALS	05500-1 to 05500-6
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### **DIVISION 6 – WOOD AND PLASTICS – NOT USED**

### **DIVISION 7 – THERMAL AND MOISTURE PROTECTION – NOT USED**

### **DIVISION 8 – DOORS AND WINDOWS – NOT USED**

### **DIVISION 9 – FINISHES**

09900	PAINTING	09900-1 to 09900-14
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**DIVISION 10 – SPECIALTIES**

10400 IDENTIFYING DEVICES 10400-1 to 10400-4

**DIVISION 11 – EQUIPMENT**

11280 CONTROL VALVES 11280-1 to 11280-4  
11930 PUMPS – GENERAL 11930-1 to 11930-2  
11932 HORIZONTAL SPLIT CASE PUMPS 11932-1 to 11932-10

**DIVISION 12 – FURNISHINGS – NOT USED****DIVISION 13 – SPECIAL CONSTRUCTION**

13080 VIBRATION AND ALIGNMENT 13080-1 to 13080-2  
13120 PRE-ENGINEERED BUILDING 13120-1 to 13120-7  
13441 INSTRUMENTATION COMPONENTS 13441-1 to 13441-6

**DIVISION 14 – CONVEYING SYSTEM – NOT USED****DIVISION 15 – MECHANICAL**

15000 BASIC MECHANICAL REQUIREMENTS 15000-1 to 15000-4  
15100 PIPING AND VALVES 15100-1 to 15100-12  
15140 SUPPORT AND ANCHORS 15140-1 to 15140-4

**DIVISION 16 – ELECTRICAL**

16000 ELECTRICAL GENERAL REQUIREMENTS 16000-1 to 16000-8  
16050 BASIC MATERIALS AND METHODS 16050-1 to 16050-8  
16202 GENERATOR 16202-1 to 16202-13  
16250 AUTOMATIC TRANSFER SWITCH 16250-1 to 16250-4  
16681 VARIABLE FREQUENCY DRIVES 16681-1 to 16681-6  
16690 ELECTRIC MOTORS 16690-1 to 16690-8  
16901 I&C SYSTEMS 16901-1 to 16901-15  
16910 PROGRAMMABLE LOGIC CONTROLLERS 16910-1 to 16910-6  
16913 PLC AND SCADA PROGRAMMING 16913-1 to 16913-1  
16950 COMPUTER AND ACCESSORIES 16950-1 to 16950-13  
16960 SCADA SYSTEM 16960-1 to 16960-4

**APPENDIX**

Appendix A Geotechnical Report dated August 14, 2018 from KSM Engineering  
Appendix B Subsurface Utility Locates dated August 9, 2018 from InfraMap  
Appendix C FDEP Permit

SECTION 01010

SUMMARY OF WORK

PART 1- GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor and materials necessary to;
1. Construction of the Roseland Elevated Storage Tank (EST) Pump Station. Work includes, but is not limited to, three (3) single stage, horizontal split case pumping units and motors, piping, fittings, valves, instrumentation, piping support, variable frequency drives (VFD), FPL electrical service, control panels, supporting systems for communications with IRCU SCADA system, motor disconnects, conduit, site work, concrete and all appurtenances necessary to make a fully functional and complete working system.
  2. Furnish and install pre-engineered electrical building including associated electrical equipment, back-up emergency generator, automatic transfer switch, and various electrical improvements as shown on the contract plans to make a fully functional and complete working system.
- B. Contractor's Duties:
1. Except as specifically noted, provide and pay for:
    - a. Labor, materials, and equipment.
    - b. Tools, construction equipment, mobilization, and fuel.
    - c. Water and utilities required for construction.
    - d. Freight and sales tax.
    - e. Required permits.
    - f. Field engineering and surveying services.
    - g. Testing laboratory services.

1.02 CONTRACTS

- A. Construct the Work under a Lump Sum price in accordance with the Contract Documents and with the Owner.
- B. Subcontractors (when used) will work directly for the contractor.

1.03 WORK BY OTHERS

- A. The Owner reserves the right to add to the work in accordance with the Contract Documents.
- B. The programming for the Programmable Logic Controller (PLC) and Human Machine Interface and Graphic User Interface (HMI/GUI) will be provided by Owners, Subconsultant, Control Design Systems, Inc. The instrumentation and controls (I&C) supplier will coordinate as necessary with the programmer, and

shall supply, install and test the complete instrumentation including 5-point calibration on all instruments with completed calibration sheets. This includes furnishing and installing additional Input/Output (I/O) cards in the PLC as necessary, testing, including processors, discrete I/O devices and analog I/O devices.

#### 1.04 WORK SEQUENCE

- A. The sequence of work shall be developed by the contractor and shall be discussed at the pre-work conference.
- B. Certain components of the project may be assigned priority to accommodate the Owner's needs.

#### 1.05 CONTRACTOR'S USE OF THE PREMISES

- A. All work shall be on Indian River County owned property and within the limits of construction shown on the plans.
- B. Access to the Roseland EST site shall be from the main gate as shown on the contract plan. Contractor shall not obstruct IRCU operations or park along the right of way or any roadways.
- C. Time restrictions for performing work: All work shall be performed during daylight working hours, Monday through Friday, 7:00 AM to 6:00 PM. The Contractor may extend working hours only if approved in writing by the Owner.

#### 1.06 OWNER-FURNISHED PRODUCTS

- A. Products furnished by Owner:
  - 1. No products/equipment identified at this time.
- B. Owner's Responsibilities:
  - 1. Pay invoices when recommended.
- C. Contractor's Responsibilities:
  - 1. Arrange and pay for product delivery to site.
  - 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
  - 3. Handle, store, install, and finish products.
  - 4. Repair or replace items damaged after receipt.

PART 2 - PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

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SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.01 GENERAL

A. SCOPE OF THIS SECTION

1. The following explanation of the Measurement and Payment for the Schedule of Payment items is provided; however, the omission or reference to any item shall not alter the intent of the Bid Form or relieve the Contractor of the necessity of constructing a complete project under this Contract.
2. The quotations prepared by the Contractor for the various items of work are intended to establish a total price for completion of the work in its entirety. Should the contractor feel that the cost for any particular work item has not been established by the Schedule of Payment items or this section, the Contractor shall include the cost for that work in one of the bid items so the proposal for the project reflects the total cost to complete the work in its entirety.
3. The Owner reserves the right to increase or decrease the quantity of any item or portion of the work during the progress of construction in accordance with the terms of the Contract.
4. Unit prices, if used, are used as a means for computing the bid, for Contract purposes, for periodic payments, for determining value of additions or deletions.
5. 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, tools, transportation, delivery, disposal of waste and surplus material, and backfilling as shown in the plans, and all other appurtenances to complete the construction and installation of the work as shown on the drawings and described in the specifications.

1.02 SUBMITTALS

A. Informational:

1. Schedule of Values
2. Application for Payment
3. Final Application for Payment

B. Submittals shall be in accordance with Section 01300.

1.03 SCHEDULE OF VALUES

- A. Contractor shall prepare a schedule of values for review with the return of the executed agreement to the Owner. The schedule shall contain the installed value of the component parts of work for the purpose of making progress payments during the construction period.
- B. The schedule shall contain sufficient detail for proper identification of work accomplished. The sum of all scheduled items shall equal the total value of the contract.
- C. Unit Price Work: Reflect unit price quantity and price breakdown from the conformed bid form.
- D. Lump Sum Work:
  - 1. Reflect Schedule of Values
  - 2. List Bonds and Insurance, Mobilization, Demobilization, Facility Startup and Contract Closeout separately.
  - 3. Breakdown Divisions 2 through 16 with appropriate subdivision of each Specification.
- E. An unbalanced, front end loaded schedule will not be acceptable.

#### 1.04 APPLICATION FOR PAYMENT

- A. Include accepted schedule of values for each portion of work and the unit price breakdown for the work to be paid on a unit price basis, and a listing of Owner selected equipment, if applicable, and allowances, as appropriate.
- B. Preparation:
  - 1. List each Change Order and Written Amendment executed prior to date of submission as a separate line item.
  - 2. Submit application for payment, a listing of materials on hand as applicable, and such supporting data as may be requested by the Owner/Engineer.

### PART 2 – PRODUCTS

#### 2.01 ITEM DESCRIPTIONS

##### A. MOBILIZATION AND DEMOBILIZATION

- 1. The work specified in this Section consists of 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, record drawings, establishment of temporary provisions, and adherence to state and local laws and regulations.

B. BONDS AND INSURANCE

1. The work specified in this Section consists of securing the appropriate bonds and insurance policies in the amounts specified by the contract documents.
2. The items specified in this Section consist of the costs of bonds and any required insurance necessary for the start of the work.

C. SITE PREPARATION/RESTORATION

1. Method of Measurement: The quantity to be paid for under this Section shall be on a lump sum basis.
2. Basis of Payment: Payment shall be at the Contract Lump Sum Price and shall include, but not be limited to, clearing, grubbing, relocation and reinstallation of utilities, light pole relocation, sodding, potable water system repair/modifications, filling, excavation, compaction, removal and disposal of deleterious materials off-site, restoration, site cleanup and any other items required to complete the work in its entirety as shown on the plans and specified herein.

D. PUMP STATION AND PIPING

1. Method of Measurement: The quantity to be paid for under this Section shall be on a lump sum basis.
2. Basis of Payment: Payment shall be at the Contract Price and shall include, but not limited to, all necessary equipment, labor, materials, trench safety provision, excavation, dewatering, filling, compaction, installation of piping, valves, pumps, flow meter, pressure control valve and all elements associated, concrete pads and supports, above and below ground piping and appurtenances, painting and coatings, tie-ins, testing and disinfection, start up and testing, and any other items required for a complete and functional system.

E. ELECTRICAL, BUILDING, EQUIPMENT, INSTRUMENTATION, AND CONTROLS

1. Method of Measurement: The quantity to be paid for under this Section shall be on a lump sum basis.
2. Basis of Payment: Payment shall be at the Contract Lump Sum Price and shall include, but not be limited to, all necessary equipment, labor, materials, to install the electrical building equipment, concrete slab pads, generator, ATS, electrical meter, conduits, wiring, grounding, sensors, and any other items required for a complete and functional system. Control system programming is to be performed by the Owner.

2.02 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

- A. Payment will not be made for following:
1. Loading, hauling, and disposing of rejected material.
  2. Quantities of excavated material wasted or disposed of in manner not called for under Contract Documents.
  3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.
  4. Material not unloaded from transporting vehicle.
  5. Defective Work not accepted by Owner.
  6. Material remaining on hand after completion of Work.

#### 2.03 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

- A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored unless Shop Drawings or preliminary operation and maintenance manuals are acceptable to Engineer.
- B. Final Payment: Will be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert to Contractor unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

END OF SECTION

SECTION 01050

FIELD ENGINEERING AND SURVEYING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Provide and pay for field engineering and surveying services required for the project.
- B. Owner's representative will identify existing control points, as required.
- C. Related requirements in other parts of the project manual:
  - 1. Conditions of the Contract.
- D. Related requirements specified in other sections and divisions:
  - 1. Section 01010 - Summary of Work.
  - 2. Section 01720 – Project Record Drawings.

1.02 QUALIFICATIONS OF SURVEYOR

- A. Qualified Land Surveyor registered in the state of Florida.

1.03 SURVEY REFERENCE POINTS

- A. Existing basic horizontal and vertical control points for the project are those designated on the drawings.
- B. Contractor shall locate and protect survey control and reference points.

1.04 PROJECT SURVEY REQUIREMENTS

- A. Establish lines, grades, and elevations by instrumentation or similar appropriate means utilizing recognized engineering survey practices.
- B. Horizontal alignment for the proposed construction will be controlled by right-of-way lines, property line, and existing structures. The Contractor shall be responsible to establish reference lines and necessary offsets to establish piping alignment, and equipment and structure location.
- C. Vertical alignment for the proposed construction will be based on the existing grades and benchmark identified on the drawings. The Contractor shall be responsible to establish proposed grades. The grade stakes shall be provided by the Contractor.

1.05 RECORDS

- A. Maintain a complete, accurate log of all control and survey work as it progresses.
- B. Submit a copy of the site drawing and certificate signed by land surveyor that the elevations and locations of the Work are in conformance with the Contract Documents.

#### 1.06 SUBMITTALS

- A. Submit name and address of Surveyor/Engineer or Owner.
- B. On request, submit copies of field notes.

#### 1.07 EXAMINATION

- A. Contractor is responsible for verifying survey control points prior to initiation of work.
- B. Contractor shall promptly notify Engineer of any discrepancies discovered.

#### 1.08 QUALITY CONTROL

- A. Quality control of the Work shall be the Contractor's responsibility and Contractor shall make every effort to produce the best quality of work, as specified on the drawings and specifications.
- B. Twenty-four (24) hour notification to the Engineer by the Contractor shall be required for all specified field investigations unless otherwise noted.

### PART 2 – PRODUCTS

Not used.

### PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01090

REFERENCE STANDARDS

PART 1 -- GENERAL

1.01 REQUIREMENTS INCLUDED

Abbreviations and acronyms used in Contract Documents to identify reference standards.

1.02 QUALITY ASSURANCE

- A. Application: When a standard is specified by reference, comply with requirements and recommendations stated in that standard, except when requirements are modified by the Contract Documents, or applicable codes establish stricter standards.
- B. Publication Date: The publication in effect on the date of issue of Contract Documents, except when a specific publication date is specified.
- C. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- D. Conform to reference standard by date of issue current on bid date.
- E. Obtain copies of standards when required by the Contract Documents.
- F. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- G. Should specified reference standards conflict with Contract Documents, request clarification from the Engineer before proceeding.
- H. Neither the contractual relationship, duties, nor responsibilities of the parties in Contract nor those of the Engineer shall be altered by the Contract Documents by mention or inference otherwise in any reference document.

1.03 ABBREVIATIONS, NAMES, AND ADDRESSES OR ORGANIZATIONS

- A. Obtain copies of reference standards direct from publication source, when needed for proper performance of work, or when required for submittal by Contract Documents.
- B. The following, as appropriate to project, is a list of referenced standards and their mailing addresses for requesting copies of standards:

AA	Aluminum Association 818 Connecticut Avenue, NW Washington, D.C. 20006
AABC	Associated Air Balance Council 1000 Vermont Avenue, NW Washington, D.C. 20005
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, NW Washington, D.C. 20001
ACI	American Concrete Institute Box 19150 Redford Station Detroit, MI 48219
ADC	Air Diffusion council 435 North Michigan Avenue Chicago, IL 60611
AI	Asphalt Institute Asphalt Institute Building College Park, MD 20740
AISC	American Institute of Steel Construction 1221 Avenue of the Americas New York, NY 10020
AISI	American Iron and Steel Institute 1000 16 <sup>th</sup> Street, NW Washington, D.C., 20036
AMCA	Air Movement and Control Association 30 West University Drive Arlington Heights, IL 60004
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
ARI	Air Conditioning and Refrigeration Institute 1815 North Fort Myer Drive Arlington, VA 22209
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers 345 East 47 <sup>th</sup> Street New York, NY 10017



ASME	American Society of Mechanical Engineers 345 East 47 <sup>th</sup> Street New York, NY 10017
ASPA	American Sod Producers' Association Association Building Ninth and Minnesota Hastings, NE 68901
ASSE	American Society of Sanitary Engineers 960 Illuminating Building Cleveland, OH 44113
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWI	Architectural Woodwork Institute 2310 South Walter Reed Drive Arlington, VA 22206
AWPA	American Wood-Preservers Association 7735 Old Georgetown Road Bethesda, MD 20014
AWS	American Welding Society 2501 NW 7 <sup>th</sup> Street Miami, FL 33125
AWWA	American Water Works Association 6666 W. Quincy Avenue Denver, CO 80235
CDA	Copper Development Association 57 <sup>th</sup> Floor, Chrysler Building 405 Lexington Avenue New York, NY 10017
CLFMI	Chain Link Fence Manufacturers Institute 1101 Connecticut Avenue Washington, D.C. 20036
CRSI	Concrete Reinforcing Steel Institute 180 North LaSalle Street, Suite 2110 Chicago, IL 60601
FBC	2004 Florida Building Code Florida Department of Community Affairs Building Codes and Standards 2555 Shumard Oak Boulevard Tallahassee, Florida 32399-2100

FDEP	Florida Department of Environmental Protection 3900 Commonwealth Boulevard M.S. 49 Tallahassee, FL 32399
FDOT	Florida Department of Transportation Haydon Burns Building 605 Suwannee Street Tallahassee, FL 32301
FM	Factory Mutual System 1151 Boston-Providence Turnpike Norwood, MA 02062
FS	Federal Specifications General Services Administration Specifications and Information Distribution Section (WFSIS) Washington Navy Yard, Bldg. 197 Washington, D.C. 20407
GA	Gypsum Association 1603 Orrington Avenue Evanston, IL 60201
MLSFA	Metal Lath / Steel Framing Association 221 North LaSalle Street Chicago, IL 60601
NAAMM	National Association of Architectural Metal Manufacturers 221 North LaSalle Street Chicago, IL 60601
NEC	National Electric Code National Fire Protection Association (NFPA) 1 Batterymark Park Quincy, MA 02169
NEBB	National Environmental Balancing Bureau 8224 Old Courthouse Road Vienna, VA 22180
NEMA	National Electrical Manufacturers Association 2101 L Street, NW Washington, D.C. 20037
NFPA	National Fire Protection Association 470 Atlantic Avenue Boston, MA 02210

NFPA	National Forest Products Association 1619 Massachusetts Avenue, NW Washington, D.C. 20036
NSF	National Sanitation Foundation NSF Building 3475 Plymouth Road Ann Arbor, MI 48106
NSWMA	National Solid Waste Management Association 1120 Connecticut Avenue, NW Washington, D.C. 20036
PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 20076
PCI	Prestressed Concrete Institute 20 North Wacker Drive Chicago, IL 60606
PS	Product Standard U.S. Department of Commerce Washington, D.C. 20203
SDI	Steel Door Institute 712 Lakewood Center North Cleveland, OH 44107
SMACNA	Sheet Metal and Air Conditioning Contractors National Association 8224 Old Courthouse Road Vienna, VA 22180
TCA	Technical Aid Series Construction Specifications Institute 1150 Seventeenth Street, NW Washington, D.C. 20036
Town Standards	Town of Jupiter Utilities Guide For Development Design and Construction Standards Water and Stormwater 210 Military Trail Jupiter, FL 33458
UL	Underwriters Laboratories, Inc. 333 Pfingston Road Northbrook, IL 60062

PART 2 -- PRODUCTS

Not Used

PART 3 -- EXECUTION

Not Used

END OF SECTION

## SECTION 01300

### SUBMITTALS

#### PART 1 - GENERAL

##### 1.01 WORK INCLUDED

- A. Contractor shall submit to the Engineer, shop drawings, project data and samples required by specification sections in hard copy and electronic format.

##### 1.02 SCHEDULES

- A. Prepare and submit a Construction Schedule.
- B. Prepare and submit a separate schedule listing dates for submission of shop drawings and projected return dates.
- C. Schedules shall be updated and re-submitted on a monthly basis throughout the duration of the project.
- D. Prepare and submit two-week look ahead schedules bi-weekly throughout duration of the project.
- E. Coordinate all work with IRCU operations staff. Construction activities that impact operations and require shutdowns require 48 hours advance notice and approval from IRCU.

#### PART 2 - PRODUCTS

##### 2.01 SHOP DRAWINGS

- A. Original drawings, prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate portions of the Work; showing fabrication, layout, setting or erection details including, but not limited to the following:
  - 1. Pumps
  - 2. Mechanical equipment
  - 3. Valves and operators (w/specific locations)
  - 4. Piping and fittings (w/specific locations)
  - 5. Electrical wiring diagrams
  - 6. Panel fabrication drawings
  - 7. Instrumentation – flow meters, transmitters, etc.
  - 8. Concrete mix designs (with specific locations), grouts, etc.
  - 9. Concrete reinforcement
  - 10. Coatings
  - 11. Electrical equipment, panels and materials
  - 12. Variable Frequency Drives (VFDs)

13. Generator System including fuel system
  14. Packaged electrical building (all components)
  15. Conduit Layout Plan
  16. RTU Control Panel, Antenna & equipment
  17. All structural items
  18. Miscellaneous metals and non-metal fabrications
  19. Any other items requested by the Engineer
- B. Prepare submittals by a qualified detailer.
- C. Identify details by reference to sheet numbers and detail shown on Contract Drawings.

## 2.02 PROJECT DATA

- A. Manufacturer's standard schematic drawings:
1. Modify drawings to delete information which is not applicable to project.
  2. Supplement standard information to provide additional information applicable to project.
- B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data.
1. Clearly mark each copy to identify pertinent materials, products or models.
  2. Show dimensions and clearances required.
  3. Show performance characteristics and capacities.
  4. Show wiring diagrams and controls.

## 2.03 SAMPLES

- A. Physical examples to illustrate materials, equipment or workmanship, and to establish standards by which completed work is judged.
- B. Office samples of sufficient size and quantity to clearly illustrate:
1. Functional characteristics of product or material, with integrally related parts and attachment devices.
  2. Full range of color samples.

## 2.04 PAY REQUESTS

- A. Pay Requests shall be made in accordance with the requirements of the Agreement between Owner and Contractor. Payment requests shall include updated schedules as required in required 01300-1.02.

## PART 3 - EXECUTION

### 3.01 SUBMISSION REQUIREMENTS

- A. Schedule submissions at least 14 days before dates reviewed submittals will be needed.
- B. Submit number of copies of Shop Drawings, Project Datum and Samples which Contractor requires for distribution plus 4 copies for the Owner and Engineer.
- C. Accompany submittals with transmittal letter, in duplicate, containing:
  - 1. Date.
  - 2. Project title and number.
  - 3. Contractor's name and address.
  - 4. Notification of deviations from Contract Documents.
  - 5. Other pertinent data.
- D. Submittals must include:
  - 1. Date of submittal and revision dates.
  - 2. Project title and number.
  - 3. The names of:
    - a. Engineer.
    - b. Contractor.
    - c. Subcontractor.
    - d. Supplier.
    - e. Manufacturer.
    - f. Separate detailer when pertinent.
  - 4. Identification of product or material.
  - 5. Relation to adjacent structure or materials.
  - 6. Field dimensions, clearly identified as such.
  - 7. Identification of deviations from Contract Documents.
  - 8. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract Documents.

### 3.02 RESUBMISSION REQUIREMENTS

- A. Shop Drawings:
  - 1. Revise initial drawings as required and resubmit as specified for initial submittal.
  - 2. Clearly indicate on shop drawings all changes or revisions which have been made other than those requested by Engineer.
  - 3. Re-submittals without all comments from original review addressed will be returned to the contractor.

B. Project Data and Samples:

1. Submit new datum and samples as required for initial submittal.

3.03 DISTRIBUTION OF SUBMITTALS AFTER REVIEW

A. Distribute copies of Shop Drawings and Project Datum which carry Engineer's stamp, to:

1. Contractor's file.
2. Job site file.
3. Record Documents file.
4. Other prime contractors.
5. Subcontractors.
6. Supplier.
7. Fabricator.

B. Distribute samples as directed.

END OF SECTION



SECTION 01410

TESTING LABORATORY SERVICES

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Contractor shall employ and pay for services of an Independent Testing Laboratory to perform specified services.
- B. Inspection, Sampling and Testing is required for:
  - 1. Densities and Proctors (for soil compaction)
  - 2. Cast-in-place Concrete (slump and compressive strength)
  - 3. Bacteriological Clearance
  - 4. Painting
  - 5. Water Quality Tests
  - 6. Other operations specified in these specifications as required by the Engineer.
- C. Contractor's employment of Testing Laboratory shall in no way relieve Contractor of their obligation to perform Work in accordance with Contract.

1.02 QUALIFICATION OF LABORATORY

- A. Meet "Recommended Requirements for Independent Laboratory Qualification", latest edition, published by American Council of Independent Laboratories.
- B. Meet basic requirements of ASTM E 329-90 "Standard Practice for Use in the Evaluation of Testing Agencies for Concrete and Steel as Used in Construction".
- C. Certified in the State of Florida in accordance with FDEP requirements.

1.03 LABORATORY DUTIES; LIMITATIONS OF AUTHORITY

- A. Cooperate with Engineer and Contractor; provide qualified personnel promptly on notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction:
  - 1. Comply with specified standards; ASTM, other recognized authorities, and as specified.
  - 2. Ascertain compliance with requirements of Contract Documents.

- C. Promptly notify Engineer, and Contractor, of irregularities or deficiencies of Work which are observed during performance of services.
- D. Promptly submit 2 copies of reports of inspections and tests to Engineer, including:
  - 1. Date issued.
  - 2. Project title and number.
  - 3. Testing Laboratory name and address.
  - 4. Name of Inspector
  - 5. Date of inspection or sampling.
  - 6. Record of temperature and weather.
  - 7. Date of test.
  - 8. Identification of product and specification section.
  - 9. Location in project.
  - 10. Type of inspection or test.
  - 11. Observations regarding compliance with Contract Documents.
- E. Laboratory is not authorized to:
  - 1. Release, revoke, alter, or enlarge on, requirements of Contract Documents.
  - 2. Approve or accept any portion of Work.
  - 3. Perform any duties of the Contractor.

#### 1.04 CONTRACTOR'S RESPONSIBILITIES

- A. Select laboratory, and coordinate testing with Lab and Engineer's representative.
- B. Cooperate with Laboratory personnel, provide access to Work.
- C. Provide to Laboratory, preliminary representative samples of materials to be tested, in required quantities.
- D. Furnish copies of mill test reports.
- E. Furnish casual labor and facilities:
  - 1. To provide access to Work to be tested.
  - 2. To obtain and handle samples at the site.
  - 3. To facilitate inspections and tests.
  - 4. For Laboratory's exclusive use for storage and curing of test samples.

- F. Notify Laboratory sufficiently in advance of operations to allow for his assignment of personnel and scheduling of tests.
- G. Pay for services of the Testing Laboratory to perform additional inspections, sampling and testing required:
  - 1. For Contractor's convenience.
  - 2. When initial tests indicate Work does not comply with Contract Documents.
  - 3. Such payment shall be made directly by the Contractor.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

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SECTION 01510

TEMPORARY UTILITIES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish, install, and maintain temporary utilities required for construction; remove on completion of entire project.
- B. Provide temperature, ventilation, and lighting requirements, if applicable, as specified in each individual section or recommended by manufacturer.

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including the General and Supplementary Conditions and Division 1 Specification sections, apply to this section.
- B. Section 01010: Summary of Work

1.03 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with National Electric Code.
- B. Comply with federal, state, and local codes and regulations, and with utility company requirements.

PART 2 - PRODUCTS

2.01 MATERIALS (GENERAL)

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

2.02 TEMPORARY WATER

Contractor shall make arrangements with the Owner for all temporary water at the project site. Contractor shall coordinate and pay for the costs related to obtaining a meter from the Indian River County Utilities Department. The Owner will provide water to the contractor at no charge as long as the Contractor is not found to be using the water in a wasteful manner. The contractor will be held responsible for water use that is determined to be wasteful by the Owner/Engineer.

2.03 TEMPORARY SANITARY FACILITIES

- A. Contractor shall provide temporary sanitary facilities in compliance with laws and regulations.

- B. Contractor shall provide for regular service, cleaning, and maintenance of temporary facilities and enclosures.

### PART 3 - EXECUTION

#### 3.01 GENERAL

- A. Comply with applicable requirements specified herein.
- B. Maintain and operate systems to ensure continuous service.

#### 3.02 REMOVAL

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

END OF SECTION

SECTION 01560

TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish, install, and maintain temporary control facilities required for construction; remove on completion of entire project any features not intended to remain on the project site.
- B. Provide noise control, dust control, water control, debris control, pollution control and erosion control as specified in the appropriate sections of these documents.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with federal, state, and local codes and regulations and utility company requirements.

PART 2 - PRODUCTS

2.01 MATERIALS (GENERAL)

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

2.02 TEMPORARY NOISE CONTROL

- A. Mechanical equipment shall be fitted with mufflers to reduce noise from internal combustion type engines.
- B. Bells, sirens, alarms, etc., shall be adjusted to provide adequate warnings to personnel on the project site; however, they shall be regulated to an intensity that is amenable to the neighboring communities.
- C. In addition to on-site control, noise considerations shall be made to off-site vehicles and equipment (mobilization, demobilization, deliveries, etc.).
- D. Contractor shall familiarize himself with Indian River County noise ordinance within the County's Code of Ordinances and abide by the Code at all times.

2.03 TEMPORARY DUST CONTROL

Dust formed as a result of the construction shall be controlled by the Contractor. Cleaning of work areas and application of dust control materials are the most effective methods of dust control.

2.04 TEMPORARY WATER CONTROL

- A. The flow of water through the construction site shall be controlled by the Contractor such that it does not damage any constructed items; however, it shall be diverted and channeled to effectively leave the site as soon as possible. Puddling and ponding on the site is not permitted.
- B. Water shall not be deposited on or against constructed features.

2.05 TEMPORARY DEBRIS CONTROL

- A. Provision shall be made by the Contractor to have available adequate containers to hold any and all debris that is to be generated from the project. Containers should be covered to prevent wind blowing paper, plastic, and lightweight products around and off the site.
- B. Instructions shall be given to personnel to utilize the trash containers. Containers shall be placed in convenient places at the site.
- C. At least once per week, a thorough cleaning of trash and debris shall be made at the construction site. An acceptable method of disposal shall be employed.

PART 3 – EXECUTION

Not used.

END OF SECTION



## SECTION 01600

### MATERIAL AND EQUIPMENT

#### PART 1 – GENERAL

##### 1.01 TRANSPORTATION AND HANDLING

- A. Deliver manufactured materials and products to the project site as needed for installation, undamaged, in original packages, containers, or bundles, as packaged by the manufacturer with manufacturer's name, brand, seals, and labels intact. Materials other than those designated within the Specifications shall not be delivered to the project site.

##### 1.02 STORAGE AND PROTECTION

- A. Protect and preserve all materials until final acceptance of the Project. Store all materials in a manner to facilitate inspection and to prevent damage, contamination, intermixing, or theft.
- B. Miscellaneous metal, anchor bolts, reinforcement bars, welded wire fabric, and masonry reinforcement materials shall be stored to prevent contact with the ground and from being damaged by its own weight or by other loads. Reinforcement which has become muddy shall be cleaned before use.
- C. Store cementitious materials in weather tight sheds on elevated floors away from damp surfaces. Prevent freezing.
- D. Do not use and dispose of materials that have been stored for longer than their maximum recommended shelf life or beyond their recommend shelf date.
- E. Store and protect all material and equipment in accordance with manufacturer's recommendations.

##### 1.03 PROTECTION OF EQUIPMENT

- A. During construction, protect all equipment from moisture absorption and metallic component corrosion by appropriate use of strip heaters, lamps, coverings, or other suitable means. Apply protection immediately on receiving the products and maintain continually.
- B. Keep products clean by elevating above ground or floor and by using suitable coverings. Take such precautions as are necessary to protect apparatus and materials from damage. Failure to protect materials is sufficient cause for rejection of the apparatus or material in question.
- C. Protect factory finish from damage during construction operations and until acceptance of the project. Satisfactorily restore any finishes that become stained or damaged.

1.04 EQUIPMENT SELECTION AND SERVICEABILITY

- A. Locate and install all equipment so that it may be serviced. Demonstrate that there is room to remove all fan shafts, bearings, filters, pumps and motors, and similar equipment.
- B. Equipment which is too large or poorly located to permit servicing shall be replaced or repositioned at no additional cost to the Owner.

END OF SECTION

SECTION 01700

PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Comply with requirements stated in the Agreement between Owner and Contractor and in Specifications for administrative procedures in closing out the Work.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Section 01720 - Project Record Drawings
- B. Section 01730 – Operating and Maintenance Manuals

1.03 SUBSTANTIAL COMPLETION

- A. Substantial completion shall be defined as beneficial use of the pump station, packaged electrical building, generator, Roseland EST, and 12-inch water transmission main including functional use of ancillary equipment of each system. The Contractor shall deliver to the Engineer the Record Drawings and a draft copy of the Operations and Maintenance manuals for review and deliver to the Owner a complete set of all spare parts.
- B. When Contractor considers the Work is substantially complete, Contractor shall submit to Engineer:
  - 1. A written notice that the Work or designated portion thereof, is substantially complete.
- C. Within a reasonable time after receipt of such notice, Engineer will perform a field investigation to determine the status of completion.
- D. Should Engineer determine that the Work is not substantially complete:
  - 1. Engineer will promptly notify the Contractor in writing, giving the reasons therefore.
  - 2. Contractor shall remedy the deficiencies in the Work, and send a second written notice of substantial completion to the Engineer.
  - 3. Engineer will reinvestigate the Work.
- E. When the Engineer finds that the Work is substantially complete, he will:

1. Prepare and deliver to Owner a tentative Certificate of Substantial Completion, with a tentative list of items to be completed or corrected before final payment.
2. After consideration of any objections made by the Owner and when Engineer considers the Work substantially complete, he will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

#### 1.04 FINAL SITE REVIEWS

- A. When Contractor considers Work is complete, he shall submit written certification that:
  1. Contract Documents have been reviewed.
  2. Work has been investigated for compliance with Contract Documents.
  3. Work has been completed in accordance with Contract Documents.
  4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
  5. Work is completed and ready for Final Investigation.
- B. Engineer will perform a field investigation to verify the status of completion with reasonable promptness after receipt of such certification.
- C. Should Engineer consider that the Work is incomplete or defective:
  1. Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.
  2. Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to Engineer that the Work is complete.
  3. Engineer will reinvestigate the Work.

When the Engineer finds that the Work is acceptable under the Contract Documents, he shall request the Contractor to make closeout submittals.

#### 1.05 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

- A. Project Record Drawings to the requirements specified.
- B. Operating and Maintenance Manuals to the requirements specified.
- C. Contractor's affidavit of payment of debts and claims.
  1. Contractor's release or waiver of liens.

- D. Separate releases or waivers of liens for subcontractors, suppliers and others with lien rights against property of Owner, together with list of those parties.

#### 1.06 FINAL ADJUSTMENTS OF ACCOUNTS

- A. Submit a final statement of accounting to Engineer.
- B. Statement shall reflect all adjustments to the Contract Sum:
  - 1. The original Contract Sum.
  - 2. Additions and deductions resulting from:
    - a. Previous Change Orders.
    - b. Allowances.
    - c. Unit Prices.
    - d. Deductions for uncorrected Work.
    - e. Deductions for liquidated damages.
    - f. Deductions for re-inspection payments.
    - g. Other adjustments.
  - 3. Total Contract Sum, as adjusted.
  - 4. Previous payments.
  - 5. Sum remaining due.
- C. Engineer will prepare a final Change Order reflecting approved adjustments to the Contract Sum which was not previously made by Change Orders.

#### 1.07 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit the final Application for Payment in accordance with procedures and requirements stated in the Condition of the Contract.

#### 1.08 FINAL CERTIFICATE FOR PAYMENT

- A. Engineer will issue final certificate in accordance with provisions of the Contract Documents.

#### 1.09 POST-CONSTRUCTION INSPECTION

- A. Prior to expiration of one year from Date of Substantial Completion, Engineer will make visual field investigation of Project in company with Owner and Contractor to determine whether correction of Work is required, in accordance with provisions of the Contract Documents.
- B. For Guarantees beyond one year, Engineer will make field investigations at request of Owner, after notification to Contractor.

C. Engineer will promptly notify Contractor, in writing, of any observed deficiencies.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01720

PROJECT RECORD DRAWINGS

PART 1 – GENERAL

1.01 PROJECT RECORD DOCUMENTS

- A. Maintain at the site for the Owner one record copy of:
  - 1. Drawings.
  - 2. Specifications.
  - 3. Addenda.
  - 4. Change Orders and other Modifications to the Contract.
  - 5. Engineer Field Orders or written instructions.
  - 6. Reviewed Shop Drawings.
  - 7. Field test records.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Conditions of the Contracts
- B. Section 01700 – Project closeout

1.03 MAINTENANCE OF DOCUMENTS

- A. Store documents in approved location apart from documents used for construction.
- B. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- C. Make documents available at all times for inspection by Engineer and Owner. Record drawing information shall be maintained concurrently with Pay Requests and updated project schedules.

1.04 MARKING DEVICES

- A. Provide ink marking pens for recording information in a color code.

1.05 RECORDING

- A. Label each document "PROJECT RECORD" in neat large printed letters.
- B. Record information concurrently with construction progress.

1. Do not conceal any work until required information is recorded.
- C. Drawings shall be drawn to record actual construction:
1. Horizontal location of pipes shall be provided any time the pipe passes a permanent surface reference point. Permanent surface reference points must be permanent structures manholes, catch basins, concrete sidewalk or concrete curbs. Edge of pavement and road intersections may not be used without the Engineer's approval. Any deviations from the alignment shown on the drawings must be noted.  
  
Vertical location of piping shall be provided at fittings, tie-ins and 25-foot intervals. Vertical location shall be pipe elevation as called for on the drawings.  
  
All fittings, including sleeves and valves shall be located vertically and horizontally by two measurements to permanent surface reference points.
  2. Field changes of dimension and detail.
  3. Changes made by Field Order or by Change Order.
  4. Details not on original Contract Drawings.
- D. Specifications and Addenda; Legibly mark each Section to record:
1. Manufacturer, trade name, catalog number, and supplier of each item actually installed.
  2. Changes made by Field Order or by Change Order.

#### 1.06 SUBMITTAL

- A. At Contract Close-out, Record Documents shall be submitted to Engineer in the following formats for Owner:
1. One set on 22" x 34".
- B. Accompany submittal with transmittal letter in duplicate, containing:
1. Date.
  2. Project title and number.
  3. Contractor's name and address.
  4. Title and number of each record document.
  5. Signature of Contractor or his authorized representative.

#### PART 2 – PRODUCTS

Not used.



PART 3 – EXECUTION

Not used.

END OF SECTION

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SECTION 01730

OPERATION AND MAINTENANCE MANUALS

PART 1 – GENERAL

1.01 RELATED INFORMATION

- A. Compile product data and related information appropriate for Owner's maintenance and operation of products furnished under the Contract.
  - 1. Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of Specifications.
- B. Instruct Owner's personnel in the maintenance of products and in the operation of equipment and systems.
- C. Related Requirements Specified in Other Sections.
  - 1. Section 01300 - Submittals
  - 2. Section 01720 - Project Record Drawings

1.02 FORM OF SUBMITTALS

- A. Prepare data in the form of an instructional manual and electronic format for use by Owner's personnel.
- B. Hard-Copy Format:
  - 1. Size: 8-1/2 in. x 11 in.
  - 2. Text: Manufacturer's printed data, or neatly typewritten.
  - 3. Drawings:
    - a. Provide reinforced punch binder tab, bind in with text.
    - b. Fold larger drawings to the size of the text pages.
  - 4. Provide fly-leaf for each separate product, or each piece of operating equipment.
    - a. Provide typed description of product, and major component parts of equipment.
  - 5. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
    - a. Title of Project.
    - b. Identity of separate structure as applicable.

- c. Identity of general subject matter covered in the manual.
- C. Binders:
  - 1. Commercial quality expandable catalog binders with durable and cleanable plastic covers.
  - 2. When multiple binders are used, correlate the data into related consistent groupings.
- D. Electronic format shall be in .pdf file format. Copies of specific manuals shall either be scanned or converted to .pdf format and submitted on CD disc to Owner. Submit after approval of hard copies from Engineer.

### 1.03 CONTENT OF MANUAL

- A. Neatly typewritten table of contents for each volume, arranged in a systematic order.
  - 1. Contractor, name of responsible principal, address and telephone number.
  - 2. A list of each product required to be included, indexed to the content of the volume.
  - 3. List, with each product, the name, address and telephone number of:
    - a. Subcontractor or installer.
    - b. Maintenance contractor, as appropriate.
    - c. Identify the area of responsibility of each.
    - d. Local source of supply for parts and replacement.
  - 4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.
- B. Product Data:
  - 1. Include only those sheets which are pertinent to the specific product.
  - 2. Annotate each sheet to:
    - a. Clearly identify the specific product or part installed.
    - b. Clearly identify the data applicable to the installation.
    - c. Delete references to inapplicable information.

- C. Drawings:
  - 1. Supplement product data with drawings as necessary to clearly illustrate relations of component parts of equipment and systems.
  - 2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
  - 3. Do not use Project Record Documents as maintenance drawings.
- D. Written text, as required to supplement product data for the particular installation:
  - 1. Organize in a consistent format under separate headings for different procedures.
  - 2. Provide a logical sequence of instructions for each procedure.
- E. Copy of each warranty issued.
  - 1. Provide information sheet for Owner's personnel, give:
    - a. Proper procedures in the event of failure.
    - b. Instances which might affect the validity of warranties.

#### 1.04 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit six (6) complete copies of manual in final form and two compact discs (CD) in PDF format. CD shall include bookmarks and chapters to closely duplicate that of the paper copy.
- B. Content, for each unit of equipment and system, as appropriate:
  - 1. Description of unit and component parts.
    - a. Function, normal operating characteristics, and limiting conditions.
    - b. Performance curves, engineering data and tests.
    - c. Complete nomenclature and commercial number of all replaceable parts.
  - 2. Operating procedures:
    - a. Start-up, break-in, routine and normal operating instructions.
    - b. Regulation, control, stopping, shut-down and emergency instructions.

- c. Summer and winter operating instructions.
    - d. Alignment, adjusting and checking.
  - 3. Servicing and lubrication schedule:
    - a. List of lubricants required for each piece of equipment.
    - b. Schedule for manufacturer recommended maintenance.
  - 4. Manufacturer's printed operating and maintenance instructions.
  - 5. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
  - 6. Other data as required under pertinent sections of specifications.

#### 1.05 SUBMITTAL SCHEDULE

- A. Submit one copy of completed data in final form fifteen days prior to final inspection or acceptance. Electronic submittal for initial review is acceptable.
  - 1. Copy will be returned after final inspection or acceptance, with comments.
- B. Submit specified number of copies of approved data in final form 10 days after final inspection or acceptance.

#### 1.06 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in the operation, adjustment and maintenance of all products, equipment and systems.
- B. Operating and maintenance manual shall constitute the basis of instruction.
  - 1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

#### PART 2 PRODUCTS

Not Used

#### PART 3 EXECUTION

Not Used

END OF SECTION

## SECTION 02016

### EXISTING UTILITIES AND UNDERGROUND STRUCTURES

#### PART 1 – GENERAL

##### 1.01 GENERAL

- A. The plans depict the approximate location of the existing utilities. The locations of those facilities (horizontal and vertical) were obtained from record drawings. Guarantee is not made that all existing underground utilities are shown or that the location of those shown are entirely accurate. Finding the actual location of any existing utilities is the contractor's responsibility and shall be done before he commences any work in the vicinity. Furthermore, the contractor shall be fully responsible for any and all damages due to the contractor's failure to exactly locate and preserve any and all underground utilities.

##### 1.02 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor shall notify the Sunshine State One Call of Florida (SSOCF) service at 811, 48 hours prior to digging.
- B. Locate the cables, ducts, conduit, pipeline, etc. in advance of the proposed construction.
- C. Notify Engineer of any substantial changes and/or conflicts that would require a deviation in the plans. Late discovery of existing underground utilities does not constitute "required" deviations should early discovery prevent them.
- D. Repair any damage done to existing utilities at no additional expense to the Owner.
- E. Remove or modify those utilities scheduled to be removed or modified on the plans.

##### 1.03 PRECONSTRUCTION VIDEO

- A. At least one (1) week prior to the start of construction, the contractor shall have video recordings taken of the entire project area. This area includes but is not limited to, the entire site work area, the construction staging area, site access driveways, the area around the existing structures, the mechanical equipment and structural components to be modified as part of this project including the interior of the existing concentrate clearwell. Such recordings shall be provided to the Owner and Engineer before the commencement of construction. These recordings shall serve as record of the conditions as they existed prior to the start of the work. They will be used in the event of a dispute that arises from restoration or damage claims. The contractor shall pay particular attention to

existing damage on public and private property near the work area and ensure that these items are documented on the video.

- B. Video tapes are to be delivered to the Owner and Engineer on a DVD in a standard video format that is able to be viewed on a Windows operating system. All videotapes shall become the property of the Owner.

#### PART 2 – EXECUTION

Not used.

#### PART 3 – EXECUTION

Not used.

END OF SECTION



SECTION 02065

DEMOLITION

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all supervised labor, materials, equipment, and incidentals required for the removal of the existing piping and equipment as indicated on the plans.
- B. The Contractor is responsible for removal of all debris from the site and proper disposal of debris.

1.02 CONDITION OF STRUCTURES

- A. By submitting a bid, the Contractor affirms that the Contractor has carefully examined the site and all conditions affecting the Work. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner insofar as practicable.

1.03 RULES AND REGULATIONS

- A. The Building Code of the State of Florida shall control the demolition.
- B. No blasting shall be done on site.

1.04 SUBMITTALS

- A. Provide a detailed sequence of demolition and removal work as part of the Contractor's schedule.

1.05 ACCESS

- A. Conduct demolition and modification operations, and the removal of equipment and debris to ensure minimum interference with roads and walks both on-site and off-site and to ensure minimum interference with occupied or used facilities.
- B. Special attention is directed towards maintaining safe and convenient access to the existing facilities by Owner's operations personnel and associated vehicles.
- C. Do not close or obstruct streets, walks or other occupied or used facilities without permission from the Engineer. Provide alternate routes around closed or obstructed traffic in access ways.

## 1.06 PROTECTION

- A. The Contractor shall conduct construction activities to minimize damage to adjacent buildings, structures, utilities, storm drainage, and other facilities, including persons.

## 1.07 DAMAGE

- A. The Contractor shall immediately report damage caused to adjacent facilities by demolition operations. The Contractor shall promptly make all required repairs as directed by the Engineer and at no cost to the Owner.

## 1.08 UTILITIES

- A. It shall be the Contractor's responsibility to maintain existing utilities in service and protect against damage during demolition operations.

## 1.09 POLLUTION CONTROL

- A. For pollution control, use sprinkling, temporary enclosures, and other suitable methods as necessary to limit the amount of dust and dirt rising and scattering in the air to the lowest level of air pollution practical for the conditions of work. Comply with the governing regulations.
- B. Clean adjacent structures and improvements of all dust, dirt, and debris caused by demolition operations. Return areas to conditions existing prior to the start of work.

## PART 2 - PRODUCTS

Not used.

## PART 3 - EXECUTION

### 3.01 REMOVAL OF EXISTING EQUIPMENT, PIPING AND APPURTENANCES

- A. Subject to the constraints of maintaining the existing utilities in operation; existing pumping equipment, valves, piping, and appurtenances not necessary for the operation of the newly modified facilities shall remain the property of the Owner unless otherwise directed by the Owner. The Contractor shall remove, clean, and prepare for storage all equipment to remain as directed by the Owner. If the Owner elects not to retain ownership of a certain item, the item shall become the property of the Contractor and shall be removed from the site at the Contractor's expense.
- B. All equipment and materials to be stored for reinstallation or salvage shall be properly protected from damage.

- C. Any items of equipment damaged or lost due to the Contractor's carelessness, mishandling, or faulty procedures and/or workmanship shall be repaired or replaced in kind to the satisfaction of the Engineer.

END OF SECTION

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## SECTION 02150

### DEWATERING

#### PART 1 – GENERAL

##### 1.01 SECTION INCLUDES

The work covered by this Section consists of furnishing all permits, labor, equipment, appliance and materials, and performing all operations required for dewatering all excavations, if required, complete.

##### 1.02 RELATED SECTIONS SPECIFIED ELSEWHERE

- A. Drawings and general provisions of the Contract, including the General Conditions and Terms and Division 1 Specification sections, apply to this section.
- B. Section 02200 – Earthwork, Excavation, and Backfill.

#### PART 2 - PRODUCTS

##### 2.01 TEMPORARY FACILITIES

- A. All materials and equipment shall be suitable and adequate to function continuously as a dewatering system.
- B. All material and equipment used in the dewatering system remain the property of the Contractor and shall be removed off-site when dewatering is completed.
- C. All dewatering equipment shall conform with the noise standards set forth in the Indian River County Code of Ordinances.

##### 2.02 SUBMITTALS

- A. Submit the dewatering method or plan in accordance with Submittal specifications prior to commencing dewatering if it is determined by the Contractor that dewatering beyond that allowed by a no-notice dewatering permit is required to construct the project.
- B. The Contractor shall prepare and submit the necessary permit applications and supporting documents for the purposes of obtaining a dewatering permit from the South Florida Water Management District and any other required agencies.

#### PART 3 - EXECUTION

##### 3.01 METHODS

- A. The method of dewatering is to be selected by the Contractor and may include:

1. Wellpoints
2. Sump pumps
3. Bedding rock
4. Dewatering wells
5. Other approved items.

### 3.02 DISCHARGE

- A. The Contractor shall provide all labor, materials, tools and equipment necessary to properly control the quality of the discharge from his dewatering operations as described herein. The Contractor shall comply with all applicable laws, rules and regulations governing the discharge of water from his dewatering operations.
- B. Contractor shall not discharge water in any manner that will:
  1. Adversely affect water quality of nearby water bodies.
  2. Violate Federal, State or local laws or regulations.
  3. Allow discharge to flow onto private property.
  4. Hamper movement of traffic.
  5. Damage portions of the work previously constructed.
  6. Damage portions of existing facilities or structures.
  7. Violate the conditions of the SJRWMD Dewatering Permit.
  8. Violate the conditions of the Stormwater Pollution Prevention Plan.
  9. Violate the conditions of the FDEP ERP Permit.
- C. Contractor shall obtain and pay for any permits required to discharge the dewatering waters.
- D. Contractor shall coordinate and pay for any water quality monitoring program that may be required by the applicable dewatering permit(s).

END OF SECTION

## SECTION 02200

### EARTHWORK

#### PART 1 - GENERAL

##### 1.01 WORK INCLUDED

The work covered by this section consists of furnishing all labor, equipment, and materials, and performing all earthwork operations to include:

- A. Excavation and backfill of structures and foundations
- B. Surface preparation for structures and foundations
- C. Excavation and backfill of pipe trenches
- D. Site grading

##### 1.02 SOURCE QUALITY CONTROL

- A. If tests for a material type fail three times, the Engineer may reject the source supplier and require the contractor to submit a new source for approval, at no additional cost to the Owner. The on-site is considered acceptable material and may be used, provided it meets the specified requirements.

##### 1.03 COMPACTION TESTING

- A. In-situ compaction testing shall be performed by a certified laboratory.
- B. Compaction testing shall be done by nuclear density equipment or other approved methods. (ASTM D-2937, D-1556, D-2922)

##### 1.04 RELATED SECTIONS SPECIFIED ELSEWHERE

- A. Section 01410 - Testing Laboratory Services
- B. Section 02150 – Dewatering
- C. Appendix A – Subsurface Investigation Report is referenced for informational purposes only and does not form a part of the Contract Documents.

#### PART 2 - PRODUCTS

##### 2.01 EXCAVATION

All excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

## 2.02 STRUCTURAL FILL AND BACKFILL

Fill and backfill under and around all structures shall be suitable on-site excavation material or approved imported material. Material shall be free of organic material, shall have 3 to 10 percent by dry weight passing the U.S. Standard No. 200 sieve, and shall have no rocks larger than 3 inches in size. On-site Fine Sand and Slightly Silty Fine Sand soils, without roots, are suitable material. Imported material may be provided by the Contractor at no additional cost to the Owner.

## 2.03 EARTHFILL

On-site excavated material free from roots, trash, and rocks larger than 3 inches.

## 2.04 WATER FOR COMPACTION

Contractor shall furnish potable water, as required.

## 2.05 EQUIPMENT

All equipment shall be suitable and adequate to perform the work specified. Compaction equipment shall be vibratory type.

## PART 3 – EXECUTION

### 3.01 STRUCTURAL EXCAVATION

A. Refer to the attached Subsurface Exploration Report, see Appendix A.

### 3.02 IN-SITU DENSIFICATION

A. Refer to the attached Subsurface Exploration Report, see Appendix A.

### 3.03 SUBGRADE COMPACTION

A. Footings and Slabs: Compact the excavation subgrade to achieve a minimum dry density equivalent to 98 percent of the modified Proctor (AASHTO T-180) maximum dry density in the top 24 inches of the subgrade. See Subsurface Exploration Report for additional requirements.

### 3.04 TRENCH EXCAVATION

A. Refer to attached Subsurface Investigation Report, Appendix A.

B. Excavation: U.O.N. in Appendix A, excavate as required for the installation of all piping, utilities, conduits, and appurtenances.

C. Trench Width: U.O.N. in Appendix A, cut trenches sufficiently wide to enable installation, compaction and inspection. The maximum width will not be limited



except where excessive trench width would cause damage to adjacent structures or piping.

- D. Grade: U.O.N. in Appendix A, excavate the bottom of the trench to the line and grade shown, or as established by the Engineer with proper allowance for pipe bedding.
- E. U.O.N. in Appendix A, the trench bottom shall provide a uniform and continuous support for the pipe. If materials are encountered in the trench unsuitable for proper bedding they shall be removed for the full trench width to a depth where suitable materials are encountered. The overexcavated trench shall be backfilled with Pipe Bedding material in maximum 6 inch lifts and compacted to a minimum 90 percent modified Proctor maximum dry density (AASHTO T-180).
- F. All trench work shall comply with the Trench Safety Act of 1990, with latest revisions.
- G. Sheeting and Bracing: In order to prevent damage to property, injury to persons, erosion, cave-ins, or excessive trench widths, adequate sheeting and bracing shall be provided, as required, and/or directed by the Engineer, in accordance with accepted standard practice. When the situation arises, sheeting and bracing shall be used as necessary to protect the integrity of the road shoulder. Sheeting shall be removed when the trench has been backfilled to at least one-half its depth, or when removal would not endanger the construction of adjacent structures. When required, to eliminate excessive trench width or other damage, sheeting, bracing, or shoring shall be left in place and the top cut off at an elevation of 5.0 feet below finished grade, unless otherwise directed.

All sheeting and bracing will be in accordance with OSHA, and the Florida Trench Safety Act.

- H. Excavated Material: Excavated material to be used for backfill shall be neatly and safely deposited at the sides of the trenches where space is available. Whenever possible, excavated material near a roadway should be deposited on the right-of-way side of the trench away from the travel way. 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. All sites shall be restored after fill is removed.
- I. Material Disposal: Excess, unsuitable, or cleared and grubbed material resulting from the utility installation shall be removed from the work site and disposed of a location(s) secured by the Contractor, and in accordance with the agency having jurisdiction. Excess excavated material shall be spread on the disposal site and graded in a manner to drain properly and not disturb existing drainage conditions, in accordance with applicable permit requirements.

### 3.05 TRENCH BACKFILLING

- A. Refer to attached Subsurface Investigation Report, Appendix A.

- B. Haunch Backfill: U.O.N. in Appendix A, carefully place Pipe Bedding material so as not to damage the pipe in maximum 6 inch loose lifts and compact to a minimum 90 percent of maximum dry density (AASHTO T-180) to the pipe centerline. Use hand-held compaction equipment.
- C. Pipe Zone: U.O.N. in Appendix A, backfill with Pipe Bedding material in maximum 12 inch loose lifts and compact to a minimum 90 percent of maximum dry density (AASHTO T-180) to a point 12 inches above the pipe crown.
- D. Under Roadway Areas, and Structures: U.O.N. in Appendix A, in areas where backfill settlement must be held to a minimum, backfill above the pipe zone with Pipe bedding material in maximum 12 inch loose lifts and compact to a minimum 98 percent maximum dry density (AASHTO T-180) up to the subgrade elevation.

### 3.06 FILL UNDER STRUCTURES AND PAVEMENT AREAS

- A. Fill under structures and pavement areas with Structural Backfill placed in maximum 12 inch loose lifts and compacted with a vibratory roller to a minimum 98 percent of modified Proctor maximum dry density (AASHTO T-180). If hand-held compaction equipment is used, reduce the loose lift thickness to 6 inches. The completed, compacted surface shall be at the proper final subgrade elevation.
- B. Refer to attached Subsurface Exploration Report for additional requirements (Appendix A).

### 3.07 BACKFILL AROUND STRUCTURES:

- A. Obtain Engineer's acceptance of concrete work and attained concrete strength prior to backfilling.
- B. Backfill with Structural Backfill material placed in maximum 12 inch loose lifts and compacted to a minimum 95 percent of maximum dry density (AASHTO T-180).
- C. Compact backfill adjacent to structures with equipment that will not damage the structure.
- D. Refer to attached Subsurface Exploration Report for additional requirements (Appendix A).

### 3.08 SITE GRADING

- A. Fill and contour site areas with Earthfill material to elevations shown and as required to prepare the site for landscape grading and sodding.
- B. Place materials in maximum 8 inch loose lifts and compact as required to limit subsequent settlement.

### 3.09 EXCESS MATERIAL

- A. Remove all excess suitable material from the site and dispose of at Contractor's expense.
- B. Unsuitable materials shall also be removed and disposed of off-site at Contractor's expense.

END OF SECTION

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## SECTION 02270

### EROSION AND SEDIMENTATION CONTROL

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

The work specified in this Section consists of measures required to control erosion on the project and in areas outside the project area where work is accomplished in conjunction with the project, so as to prevent pollution of water, detrimental effects of public or private property adjacent to the project area and damage to work on the project. These measures will consist of construction and maintenance of temporary erosion control features or, where practical, the construction and maintenance of permanent erosion control features.

##### 1.03 START OF WORK

Do not start work until erosion control measures are in place.

#### PART 2 - PRODUCTS

##### 2.01 GENERAL

1. Contractor to provide temporary drainage plan for erosion and sedimentation control.
2. No testing of materials used in construction of temporary erosion control features will be required.
3. Materials used for the construction of the temporary erosion and sedimentation control measures not to be incorporated into the completed project may be new or used.
4. All excavation material must be contained onsite.

#### PART 3 - EXECUTION

##### 3.01 GENERAL

- A. Construct temporary and permanent erosion and sediment control measures to prevent the pollution of adjacent water ways in conformance with the laws, rules and regulations of Federal, State and local agencies.
- B. Temporary erosion control features shall consist of, but are not be limited to, temporary grassing, temporary sodding, temporary mulching, spoil containment pits, sandbagging, slope drains, sediment basins, artificial coverings, berms, baled hay or straw, floating silt barriers, staked silt barriers and staked silt fences. Design details for some of these items may be found in the Chapter 6 of the Florida Land Development Manual: A Guide to Sound Land Water Management

(Department of Environmental Regulation, 1988) or the Water Quality Section of the applicable edition of the FDOT Roadway and Traffic Design Standards.

- C. Incorporate permanent erosion control features into the project within seven (7) days of any construction activity. Correct conditions, using temporary measures, that develop during construction to control erosion prior to the time it is practical to construct permanent control features.
- D. Construct temporary erosion control measures to protect the cover soil of the lake liner during the filling of the lake. Provide an Erosion Control plan to the Engineer for review and approval prior to filling the lake.

### 3.02 INSTALLATION

- A. Temporary Grassing: This work shall consist of furnishing and placing grass seed in accordance with Section 02485, Grassing.
- B. Baled Hay or Straw:
  - 1. This work shall consist of construction of baled hay or straw dams to protect against downstream accumulations of silt. The baled hay or straw dams shall be constructed in accordance with the details shown in FDOT's Roadway and Traffic Design Standards.
  - 2. The dam shall be placed so as to effectively control silt dispersion under conditions present on this project. Alternate solutions and usage of materials may be used if approved.
- C. Temporary Silt Fences and Staked Silt Barriers: This work shall consist of furnishing, installing, maintaining and removing staked turbidity barriers in accordance with the manufacturer's directions, these specifications, conditions of the project permits, and the details as shown in FDOT's Roadway and Traffic Design Standards. Turbidity barriers shall be installed and maintained in all locations where suspended solids may be transferred to navigable waters due to the project including pile installation. Turbidity barriers shall remain in place until construction is completed, soils are stabilized, and vegetation has been established.

### 3.03 REMOVAL OF TEMPORARY EROSION CONTROL FEATURES

In general, remove or incorporate into the soil any temporary erosion control features existing at the time of construction of the permanent erosion control features in such a manner that there will be no detrimental effect.

### 3.04 MAINTENANCE OF EROSION CONTROL FEATURES

- A. General: Provide routine maintenance of permanent and temporary erosion control features until the project is completed and accepted.

- B. Maintenance of erosion control measures shall be in strict accordance with condition of the applicable FDEP, NPDES, and Indian River County requirements.

### 3.05 PROTECTION DURING SUSPENSION OF CONTRACT TIME

In the event that it is necessary that the construction operations be suspended for any appreciable length of time, shape the top of the earthwork in such a manner as to permit runoff of rainwater and construct earth berms along the top edges of embankments to intercept runoff water. Should such preventive measures fail, immediately take such other action as necessary to effectively prevent erosion and siltation.

END OF SECTION

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## SECTION 02485

### GRASSING

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION OF WORK

The Contractor shall furnish all labor, equipment, and materials necessary for grassing all areas disturbed by his operations. It is the intent of this specification that damaged areas are to be replaced in kind, with sod to be used for all maintained yard areas. The Engineer shall designate those areas to receive seed and those areas to receive sod. Engineer shall also designate the type of seed/sod to be used in each area. Contractor shall take all steps practical to minimize the area required to be sodded or seeded. All grassing shall be in accordance with Section 570-1 through 570-9 of the 2010 FDOT Standard Specifications for Road and Bridge Construction, except as modified herein.

##### 1.02 STORAGE OF MATERIALS

The Contractor shall provide space for storage of sod prior to placement in a manner that will not endanger or restrict pedestrian or vehicular traffic or interfere with other aspects of the work.

#### PART 2 - PRODUCTS

##### 2.01 SOD

- A. Types: Sod shall be St. Augustine Floratam, Argentine Bahia, Centipede, or Bermuda, depending on type of existing sod in adjacent area to be matched. Sod shall be well matted with roots. Where sodding will adjoin, or be in sufficiently close proximity to private lawns, types of sod other than those listed above may be used if desired by the affected property owners and approved by the Engineer. Sod shall be delivered in commercial-size rectangles, preferably 12-inch by 24-inch or larger.
- B. Condition: The sod shall be sufficiently thick to secure a dense stand of live grass. The sod shall be live, fresh, and uninjured at the time of planting. It shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. It shall be reasonably free of weeds and other grasses. It shall be planted as soon as possible after being dug and shall be kept moist from the time it is planted.

## 2.02 SEED

- A. General: All seed shall meet the requirements of the State Department of Agriculture and Consumer Services and all applicable State laws. The seed shall have been harvested from the previous year's crop. When a low percentage of grass seed or native seed germination causes the quality of the seed to fall below the minimum pure live seed percentage as to specified below, the Contractor may elect, subject to the approval of the Engineer, to increase the rate of application sufficiently to obtain the minimum germination rate specified. No payment will be made for the added seed.
- B. Delivery and Storage: Each of the species or varieties of seed shall be furnished and delivered in separate labeled bags. During handling and storage, the seed shall be cared for in such a manner that it will be protected from damage by heat, moisture, rodents, and other causes. All permanent and temporary grass seed shall have been tested within a period of six months of the date of planting.
- C. Purity and Germination: All permanent and temporary grass seed shall have a minimum percent of purity and germination as follows:
  - 1. Argentine Bahia Grass Seed shall have a minimum pure seed content of 95 percent, with a minimum germination of 80 percent.
  - 2. Pensacola Bahia Grass Seed shall have a minimum pure seed content of 95 percent, with a minimum active germination of 40 percent and a total germination of 80 percent, including firm seed.
  - 3. Bermuda Grass Seed shall be of common variety with a minimum germination of 85 percent.
  - 4. Annual Type Rye Grass Seed shall have a minimum pure seed content of 95 percent, with a minimum germination of 90 percent.

## 2.03 MULCH

The mulch material used shall normally be dry mulch. Dry mulch shall be straw or hay, consisting of oat, rye, of wheat straw, or of pangola, peanut, coastal Bermuda, or Bahia grass hay. Only deteriorated mulch which can readily be cut into the soil shall be used.

## 2.04 GRASSING EQUIPMENT

- A. Seed Spreader: The seed spreader shall be an approved mechanical hand spreader or other approved type of spreader.
- B. Equipment for Cutting Mulch into Soil: The mulching equipment shall be of a type capable of cutting the specified materials uniformly into the soil, and to the required depth. Harrows will not be allowed.
- C. Rollers: A cultipacker, traffic roller, or other suitable equipment will be required for rolling the grassed areas.

## PART 3 - EXECUTION

### 3.01 GENERAL CONSTRUCTION METHODS

Seeding and mulching operations will not be permitted when wind velocities exceed 15 miles per hour. Seed shall be sown only when the soil is moist and in proper condition to induce growth. No seeding shall be done when the ground is frozen, unduly wet, or otherwise not in a tillable condition. Whenever a suitable length of right-of-way or adjacent area has been graded, it shall be made ready, when directed by the Engineer, and grassed in accordance with these specifications. Grassing shall be incorporated into the project at the earliest practical time.

### 3.02 SODDING

- A. Preparation of Area to be Sodded: The ground which is to receive sod shall have been graded to proper elevations (2" below sodded grade) to match pre-construction conditions or proposed grades. All disturbed swales and ditches shall have been restored to their pre-construction condition or better. The pre-construction grade shall be maintained and the prepared soil shall be loose and reasonable smooth. It shall be reasonable free of large clods, roots, patches of existing grass, and other material which will interfere with the sod-laying operations or subsequent mowing and maintenance operations.
- B. Laying of Sod: Sod shall be installed in all areas so designated by Engineer. Sod shall be carefully placed so that each piece abuts flush to all surrounding sod, regardless of whether surrounding sod is new or existing. Where new sod is to be placed adjacent to existing sod, the new sod must be cut in to match the elevation of the existing sod. Uneven sod which might cause mowing problems will be rejected. New sod laid on top of existing sod will also be rejected. All sod placed on steep slopes (greater than 1:1) shall be pinned with a wooden pin to keep it in place.
- C. Rolling: Immediately after completion of the sod laying, the entire sodded area shall be rolled thoroughly with the equipment specified. At least two trips over the entire area will be required.
- D. Watering: Newly-sodded areas are to be watered by Contractor as necessary to keep sod alive until the Contract is closed out. Dead sod shall be replaced by Contractor prior to contract closeout.

### 3.03 SEEDING

- A. Sequence of Operations: The operations involved in the work shall proceed in the following sequence: preparation of the ground, seeding, spreading, and cutting in mulch.
- B. Preparation of Area to be Seeded: The ground over which the seed is to be sown shall be prepared by disk-harrowing and thoroughly pulverizing the soil to a suitable depth. The prepared soil shall be loose and reasonably smooth. It shall

be reasonable free of large clods, roots, and other material which will interfere with the work or subsequent mowing and maintenance operations.

- C. Application of Seed: While the soil is still loose, the seed shall be scattered uniformly over the grassing area and immediately mixed into the seed bed to a depth of one-half inch. Unless other types of seed are called for, permanent-type grass seed shall be a mixture of 20 parts of Bermuda seed and 80 parts of Pensacola Bahia seed. Quick-growing type grass seed shall be a species which will provide an early ground cover during the particular season when planting is done and will not later compete with permanent grass. The separate types of seed used shall be thoroughly dry-mixed immediately before sowing. Seed which has become wet shall not be used.
- D. Mulching: When mulching is called for, approximately two inches, loose thickness, of the mulch material shall then be applied uniformly over the seeded area, and the mulch material cut into the soil with the equipment specified, so as to produce a loose mulched thickness of three to four inches. Care shall be exercised that the materials are not cut too deeply into the soil. No artificial watering of the mulch shall be done before it is applied.
- E. Rolling: Immediately after completion of the seeding, the entire grassed or mulched area shall be rolled thoroughly with the equipment specified. At least two trips over the entire area will be required.
- F. Watering: Newly seeded areas are not to be watered to force the seed germination, but only to sustain grass growth. Water will only be used on vegetated areas when permitted by the Engineer.
- G. Operations on Steep Slopes: On steep slopes when mulching is called for, the mulch material may be anchored down in lieu of being cut into the soil by use of a machine. Anchoring may be done by either of the following methods:
  - 1. Placing a layer of soil, approximately two inches thick by nine inches wide, along the upper limits of the mulch, and spotting soil piles over the rest of the area at a maximum spacing of four feet.
  - 2. Spreading a string net over the mulch, using stakes driven flush with the top of the mulch, at six-foot centers, and stringing parallel and perpendicular, with diagonals in both directions.
- H. Maintenance: The Contractor shall, at his expense, maintain the planted areas in a satisfactory condition until final acceptance of the project. Such maintenance shall include the filling, leveling, and repairing of any washed or eroded areas, as may be necessary. The Engineer, at any time, may require replanting of any areas in which the establishment of the grass stand does not appear to be developing satisfactorily. If a planted area must be replanted due to the Contractor's negligence, carelessness, or failure to provide routine maintenance of such areas, such replacement shall be at the Contractor's expense. If replanting is necessary due to factors determined to be beyond the control of the Contractor, payment for replacement will be made under the appropriate contract pay items.

END OF SECTION

SECTION 02670

FLUSHING, TESTING AND DISINFECTION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Flushing, Pressure Testing, and Disinfection of all piping systems.
- B. Contractor shall furnish all necessary pumps, hoses, piping, fittings, meters, gauges, chemicals and labor to conduct specified testing.
- C. Testing shall be repeated at the Contractor's expense until satisfactory results are achieved.
- D. Refer the specific chemical system specification section for additional flushing and testing procedures.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Section 15100 – Piping
- B. Section 15400 – Directional Boring of Pipe

1.03 REFERENCES

- A. ANSI/AWWA C651 - Standard for Disinfecting Water Mains.

1.04 SUBMITTALS

- A. Test Reports: Indicate results comparative to specified requirements. Submit two (2) copies of test results to Engineer in accordance with Submittal specifications.
- B. Final approval of the bacterial samples shall be received from the Florida Department of Environmental Protection prior to the time that the system is placed into operation. Sampling procedures shall be done in accordance with FDEP requirements.
- C. Bacteriological sampling locations shall meet FDEP requirements and be taken where shown on the drawings and as directed by the Engineer.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with ANSI/AWWA C651.

1.06 REGULATORY REQUIREMENTS

- A. Conform to applicable Florida DEP requirements for performing the work of this Section.

- B. Work shall conform to IRCU Standards.

## PART 2 - PRODUCTS

### 2.01 DISINFECTION CHEMICALS

- A. Chemicals: The disinfecting agent shall be sodium hypochlorite solution ANSI/AWWA B303 or liquid chlorine ANSI/AWWA B301. Dry hypochlorite, similar to "HTH" or equal may also be used as the disinfecting agent. Bleach or Clorox is not acceptable.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Verify that piping systems have been cleaned, inspected, and tested.
- B. Coordinate scheduling of flushing, pressure testing, and disinfection activities with tie-ins, certifications, and sequence of construction.

### 3.02 FLUSHING AND PRESSURE TESTING - PIPING

- A. The Contractor shall furnish and install suitable temporary testing plugs or caps for the water lines, all necessary pressure pumps, hose, pipe connections, meters, gauges and other similar equipment, and all labor required, all without additional compensation for conducting pressure and leakage tests and flushing of the piping. Flushing and pressure testing shall be conducted in the following order.
- B. After all piping lines have been installed and before pressure testing and final connections to existing equipment, each run of pipe shall be thoroughly flushed so as to remove all debris and foreign matter from the piping and equipment. Clean and flush all piping using potable water. Pigging of piping systems shall be incorporated in to this flushing procedure. Non-abrasive pigs shall be employed to clean the HDPE pipes. Sufficient flushing water and pigging shall be introduced into the piping to produce a discharge that is clear with no evidence of silt or foreign matter is visible. Contractor to provide means of discharging and disposing of water at Contractor's expense.
- C. Pressure testing Ductile Iron and PVC piping systems:
  - 1. The test pressure shall be 150 psi and this pressure shall be maintained for a period of not less than two hours. Tests shall be made between valves and as far as practicable and as approved by the Engineer. Potable water from the distribution system shall be used. Pressure shall not vary more than five (5) psi for piping during the test periods or as approved by the Engineer. Allowable leakage shall be computed on the basis of AWWA C-600.

2. All leaks evident at the surface shall be uncovered and repaired regardless of the total leakage as indicated by the test, and all pipes, valves and fittings and other materials found defective under the test shall be removed and replaced at the Contractor's expense. Tests shall be repeated until leakage has been reduced below the allowable amount.
3. In the judgment of the Engineer, should it not be practical to follow the foregoing procedures exactly for any reason, modifications in the procedure shall be made as approved by the Engineer. In any event, the Contractor shall be responsible for the ultimate water tightness of the piping within the preceding requirements.

D. Pressure Testing HDPE Piping Systems

1. The test pressure for all piping systems shall be 150 psi and this pressure shall be maintained for a period of two hours. Testing procedure shall be as follows.
  - a. Completely fill pipe with clean water and remove all air from pipe to be tested.
  - b. Allow water in pipe to equalize with surrounding ground/groundwater for 24 hours.
  - c. Bring pipe being tested to test pressure.
  - d. Add make-up liquid once per hour to bring pipe back to test pressure over a 3 hour period.
  - e. Immediately following the end of the 3 hour period, begin test of pipe section. Test period is 2 hours. Add make-up fluid at 1 hour and 2 hours to return test section to test pressure. Measure all fluid added. Make-up fluid may not exceed the following:

Nominal Pipe Size (in)	Allowance for Expansion (Gallons per 100 ft.)
12	2.3
14	2.8
16	3.3
18	4.3
20	5.5
22	7.0
24	8.9

- f. All leaks, visible or not, shall be repaired regardless of the total leakage as indicated by the test, and all pipes, valves and fittings and other materials found defective under the test shall be removed and re placed at the Contractor's expense. Tests shall be repeated until leakage has been reduced below the allowable amount.
- g. Should, in the judgment of the Engineer, it not be practical to follow the foregoing procedures exactly for any reason, modifications in the procedure shall be made as approved by the Engineer. In any event, the Contractor shall be responsible for the ultimate tightness of the watermain within the preceding requirements.

### 3.03 DISINFECTION

- A. The Contractor shall furnish and install suitable temporary connections to the piping, all necessary pressure pumps, hose, pipe connections, meters, gauges and other similar equipment, and all labor required, all without additional compensation for the disinfection of all required piping systems. Disinfection shall be conducted on the following systems:
  - 1. Pump station piping and valves at Roseland EST
  - 2. Water transmission main
  - 3. All potable water main
- B. Conform to AWWA Standards and as modified herein.
- C. Maintain disinfectant for a minimum of 8 hours in such a manner that the entire system will be filled with water containing a minimum chlorine concentration of 50 ppm at any point.
- D. After the disinfecting agents have been permitted to remain for the specified contact periods, the water lines, and valves shall be thoroughly flushed with water until the residual chlorine tests are less than 2 PPM in each instance. The determination of the amount of residual chlorine in the system shall be made at such points and in accord with standard tests by means of a standard orthotolodine test set.

### 3.04 BACTERIOLOGICAL SAMPLING

- A. It shall be the responsibility of the Contractor under this contract to perform the bacteriological testing required by the Florida Department of Environmental Protection and IRCU to obtain clearance of the water main piping. The Contractor shall be responsible to disinfect and repeat testing as needed until clearance is obtained for all required systems. The Contractor shall be responsible to pay for additional water needed if the bacteriological testing must be repeated for the clearance of the water mains.
- B. The proposed systems require two (2) consecutive successful daily samples taken from the locations called out on the plans or as determined by the Engineer. The samples shall be taken at all the respective sample point locations.
- C. Well clearance shall include ten (10) consecutive successful daily bacteriological samples taken from the well column.
- D. Sampling must be coordinated with Engineer and other construction activities so as to minimize re-sampling.
- E. Contractor shall submit schedule for bacteriological testing and pressure tests.
- F. The Contractor shall incur all costs needed to provide bacteriological clearance of the piping systems.



### 3.11 QUALITY CONTROL

- A. The laboratory and personnel collecting bacteriological samples shall be Florida State certified in accordance with FDEP requirements.

END OF SECTION

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## SECTION 02800

### RESTORATION OF SURFACE IMPROVEMENTS

#### PART 1 - GENERAL

##### 1.01 GENERAL

All applicable provisions of the General Conditions are part of this section. Payment for all labor, equipment and materials shall be as set out in the General Conditions and Agreement. Any conflict between the Project Plans and Technical Specifications shall be constructed according to the Project Plans.

##### 1.02 DESCRIPTION OF WORK

Work includes the restoration of driveways, trees and plants, roadways, and any other existing improvement affected by the proposed work. This section includes furnishing equipment, labor and materials, and performing all necessary and incidental operations to perform the required work.

##### 1.03 TEMPORARY RESTORATION

The Contractor shall be aware and make provisions as necessary to provide temporary resurfacing if required by the governmental agency having jurisdiction for roadways, drives and/or sidewalks. If required, the Contractor will provide temporary resurfacing after final backfill over the open cut, for a period specified by the agency, prior to final roadway replacement.

##### 1.04 QUALITY ASSURANCE

- A. The work in this section shall generally conform to the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, hereafter called the FDOT Standard Specifications.
- B. Florida Grades and Standards for Nursery Plants, Part 1 shall be used when determining quality of plants and shrubs.

##### 1.05 SUBMITTALS

Certification: Certification of quality by producer, nursery or manufacturer shall be delivered to Owner 10 days prior to use.

#### PART 2 - PRODUCTS

##### 2.01 PLANTS

- A. Existing damaged plants shall be replaced by plants of equal type, quality and size whenever possible. All new plants shall be sound, healthy, vigorous and free from defects, decay, disfiguring, bark abrasions, plant diseases, insect pests, their eggs or larvae. The new plants shall be approved by the Owner before placing.
- B. Existing plants may be removed, preserved, and replaced at the Contractor's option. Plants shall be handled by an approved nursery.

- C. Plants shall be watered and cared for until new growth appears. Dead and dying plants shall be immediately replaced. Plants used shall be in accordance with the "Grades and Standards", Florida No. 1 or better. Plants shall conform to the sizes indicated by the Owner.

## 2.02 PLANTER MULCH

Mulch for planter areas shall be Cypress Bark, clean, bright and free from weeds, moss, sticks, and other debris. Bark size shall not be over 2-1/2 inch diameter.

## 2.03 WATER

The water used in the grassing operations may be obtained from any approved spring, pond, lake, stream or municipal water system. The water shall be free of excess and harmful chemicals, acids, alkalis, or any substance which might be harmful to plant growth or obnoxious to traffic. Salt water shall not be used.

## 2.04 EQUIPMENT

- A. Fertilizer Spreader: The device for spreading fertilizer shall be capable of uniformly distributing the material at the specified rate.
- B. Seed Spreader: The seed spreader shall be an approved mechanical hand spreader or other approved type of spreader.
- C. Rollers: A cultipacker, traffic roller, or other suitable equipment will be required for rolling the grassed areas.

## 2.05 BASE COURSES (SUBBASE)

- A. Technical specifications shall conform to Section 200 through 290 Florida Department of Transportation's Standard Specifications for Road and Bridge Construction, latest edition.
- B. It is the responsibility of the Contractor to provide all materials to assure base courses meet the above-mentioned specifications.

## 2.06 ASPHALTIC CONCRETE & PORTLAND CEMENT CONCRETE PAVEMENT

- A. The standard technical specifications for the above-mentioned items shall meet the specifications as set forth in Sections 300 through 370 of the Florida Department of Transportation's Standard Specifications of Road and Bridge Construction, latest edition. Materials for these items shall meet the Florida Department of Transportation's Standard Specifications of Road and Bridge Construction, latest edition.
- B. Certification by means of a job mix formula shall be submitted by the Contractor to the Engineer before the asphalt is placed on the project. If said certification is not submitted to the Engineer, the materials may be rejected or at the discretion of the Engineer, asphalt may be allowed to be placed at the risk of the Contractor.

## 2.07 PORTLAND CEMENT CONCRETE

- A. The standard technical specifications for Portland Cement Concrete shall meet the specifications as set forth in the Florida Department of Transportation's Standard Specifications for Road and Bridge Construction, latest edition.
- B. Certification shall be obtained by the Contractor from the supplier, stating that the materials meet the above stated specifications and be submitted to the Engineer before the concrete is placed on the project. If said certification is not submitted to the Engineer, the concrete may be rejected or at the discretion of the Engineer, concrete may be allowed to be placed at the risk of the Contractor.

## 2.08 CONCRETE CURB & GUTTER

All curb and gutter shall conform to Section 520 of the Florida Department of Transportation's Standard Specifications for Road and Bridge Construction, latest edition, or as specified in the project plans and details.

## 2.09 CONCRETE SIDEWALK

All sidewalk shall conform to Section 522 of the Florida Department of Transportation's Standard Specifications for Road and Bridge Construction, latest edition, or as specified in the project plans and details.

## 2.10 JOINT MATERIAL

Perform joint filler, one-half inch thick, conforming to AASHTO M153 or AASHTO M213.

## PART 3 - EXECUTION

### 3.01 LANDSCAPING RESTORATION

- A. General: All seeding sodding, and landscaping shall conform to Florida Department of Transportation's Standard Specifications for Road and Bridge Construction, latest edition, or as specified in the project plans and details.

Regarding the warranty, the Contractor must provide (a) one (1) year warranty from date of final acceptance including coverage of plants from death or unhealthy conditions, and (2) replacement plants shall be of same size and species as specified, planted in the next growing season, with a new warranty commencing on date of replacement.

- B. Lawn Areas: Any lawn area affected by the required work shall be restored to a condition equal or better than the conditions existing before the commencement of work.
- C. Balled Plants: Plants where required shall be adequately balled with firm natural balls of soil, sized as set forth in "Grades and Standards". Balls shall be firmly wrapped with burlap or equally approved strong cloth. No balled plant will be planted if the ball is cracked or broken before or during the process of planting.
- D. Option: Plants may be furnished as container grown instead of balled if all other

requirements are met.

- C. Preparation of Plant Pits: All plant pits shall be circular in outline and have vertical sides. Tree pits shall be two feet wider than the width of the ball and one foot deeper than the depth of the ball. Shrubs that are either B&B or 3-gallon containers shall have pits that are two feet wider than the width of the plant ball and 6-inches deeper than the depth of the ball. Smaller shrubs shall have pits that are at least one foot wider than the width of the plant ball and 6-inches deeper than the ball depth.
- F. Setting Plant: All plants except as otherwise specified, shall be centered in pits. Deep planting shall be avoided and unless otherwise specified, plants shall be set at such a level that after settlement they will bear the same relation to the required grade as they have to the natural grade before being transplanted.

Balled and burlapped plants and palm trees shall be placed on 6-inches to 12-inches of tamped planting mixture and adjusted so as to be at the proper level. The rope and burlap shall be cut away and the burlap folded down to the bottom of the pit. Very large B&B plants shall remain wrapped until fully backfilled and then just the upper portion of the burlap shall be removed. Backfill of planting mix shall be placed halfway up the pit and then water tamped. After this water has drained away, backfill around the edge of the pit to form a saucer and fill area three times with water.

- G. Water: Water to be used initially during plant installation shall be furnished by the Contractor.

### 3.02 SOD PLACEMENT

- A. Sod is required in all disturbed areas.
- B. The areas over which the sod is to be placed shall be scarified or loosened to suitable depth. On areas where the soil is sufficiently loose, particularly on shoulders and fill slopes, the Engineer may, at his discretion, authorize the elimination of the ground preparation. Immediately before sod is placed, 12-8-8 fertilizer shall be applied at the rate of approximately 500 pounds per acre, by broadcasting and raking into the planting area.
- C. Sod shall be firmly embedded by light tamping. Wherever necessary to prevent an erosion condition caused by vertical edges at the outer limits of the sodded area, the sod shall be tamped so as to produce a featheredge at the outer limits. The sod shall be kept in a moist condition after it is planted. Water shall not be applied between the hours of 8:00 a.m. and 4:00 p.m., nor when there is danger of freezing. On areas where the sod may slide, due to height and slope, the Engineer may direct that the sod be pegged, with pegs driven through the sod blocks into firm earth, at suitable intervals.
- D. Maintenance: Contractor shall, at his expense, maintain the planted areas in a satisfactory condition until final acceptance of the project. Such maintenance shall include watering, filling, leveling and repairing of any washed or eroded areas as may be necessary.

### 3.03 SEEDING

- A. Seeding and fertilizer shall only be used in areas where dirt is existing and no grass

or grass/weed mixture is present.

- B. Execution of seeding shall be in accordance to Florida Department of Transportation's Standard Specifications for Road and Bridge Construction, latest edition

### 3.04 EXCAVATION AND EMBANKMENT

- A. All excavated material which is suitable shall be used in the formation of embankments or shoulders, or for backfilling as directed. Excavated material which will be suitable when dry shall be allowed to dry and be used as required. All materials removed which are considered unsuitable or spoil material shall be disposed of outside the limits of the site at the Contractor's expense
- B. All other technical specifications shall conform to Florida Department of Transportation's Standard Specifications for Road and Bridge Construction, latest edition, or as specified in the project plans and details.

### 3.05 PAVEMENT REPLACEMENT

- A. Asphalt pavement shall be removed by saw cutting on a straight line with edges as vertical as possible. Concrete pavement or asphalt surfaced concrete shall be removed by cutting with a concrete saw in as straight a line and vertically as possible.
- B. Prior to replacing concrete or asphalt pavement, a subbase and base course corresponding to the required materials and thicknesses specified on the Construction Drawings shall be installed. The Contractor will have tests made by an independent testing laboratory to verify that the required compaction densities are obtained.
- C. Non-asphalt pavement replacement shall be replaced of like material and thickness in accordance to the Construction Drawings. Asphalt or built-up asphalt pavement replacement shall be replaced with like material or concrete as directed by the Engineer. Where asphalt or built-up asphalt pavement is replaced by concrete, the concrete shall have a minimum of 6-inches in thickness and be reinforced with 6 by 6 No. 6 gage welded wire fabric or as specified within the construction drawings. Where the pavement replacement is of like material, it shall be replaced in thickness equal to or better than that existing at the time of removal.
- D. Road cuts shall be repaired with a temporary asphalt patch the same day as cut and maintained for a period of 90 days prior to placing the final wearing surface.
- E. Unless the base is sealed or other temporary paving applied over driveway areas to be repaved, pavement shall be replaced not later than three weeks after completion of backfill

### 3.06 CURB REMOVAL AND REPLACEMENT

Curb removal and replacement required in the construction of this work shall be done by the Contractor. Reasonable care shall be exercised in removing the curb, saw cutting curb is required to obtain a vertical roughened surface without spalling fractures, and the Contractor shall either stockpile or dispose of this material as directed by the Engineer. Curb shall be replaced of like material and design in a manner and condition equal to or better than that

existing at the time of removal. Materials and methods of replacing State Highway sidewalks or curbs shall conform to the FDOT Standard Specifications. It shall be the Contractor's responsibility to verify existing curb/gutter grades and place the new curb/gutter to these same grades.

### 3.07 CONCRETE SIDEWALK

- A. Concrete sidewalk shall be removed by saw cutting on a straight line with edges as vertical as possible. The new sidewalk segments shall match the existing sidewalk as to width, thickness, and elevation, and have a medium broom finish.
- B. Expansion joints between the sidewalk and the curb or driveway or at fixed objects and sidewalk intersections shall be 1/2-inch joints formed with a performed joint filler.

### 3.08 TESTS

The Contractor shall furnish facilities for making all density tests and make such restorations as may be necessary due to test operations. All density tests on backfill or base replacement will be made by a commercial testing laboratory employed by the Contractor and at such locations as may be recommended by the Engineer. If the densities as determined by the specified tests fall below the required minimums, the Contractor shall pay for all retests.

END OF SECTION



SECTION 03100  
CONCRETE FORMWORK

PART 1 — GENERAL

1.01 WORK INCLUDED

- A. Formwork for cast-in place concrete, with shoring, bracing, and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

1.02 RELATED SECTIONS SPECIFIED ELSEWHERE

- A. Section 03200 - Concrete Reinforcement
- B. Section 03300 - Cast-in-Place Concrete

1.03 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 318 - Building Code Requirements for Reinforced Concrete.
- C. ACI 347 - Recommended Practice for Concrete Formwork.
- D. PS 1 - Construction and Industrial Plywood.
- E. 2017 Florida Building Code

1.04 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 318.
- B. Maintain one copy of each document on site.

1.05 REGULATORY REQUIREMENTS

- A. Conform to applicable code for design, fabrication, erection, and removal of formwork.

1.06 COORDINATION

- A. Coordinate this Section with other Sections of work which require attachment of components to formwork.

- B. Coordinate formwork with reinforcement installation to provide sufficient concrete cover over reinforcement.

## 1.07 DESIGN

- A. All formwork shall be designed by a Florida Registered structural engineer. Special attention shall be given to the additional hydraulic pressures imparted by concrete containing superplasticizer admixture. The contractor is specifically cautioned that not all of the specified superplasticizer admixtures will cure at the same rate.

## PART 2 – PRODUCTS

### 2.01 WOOD FORM MATERIALS

- A. Form Materials: At the discretion of the Contractor.
- B. All form lumber shall be free from warp, holes, loose knots, dressed to uniform width and thickness. All forming shall conform to ACI 347.
  - a. Unexposed concrete surfaces: No. 2 common lumber or better lumber
  - b. Exposed concrete surfaces: commercial standard, moisture resistant, concrete form plywood.

### 2.02 FORMWORK ACCESSORIES

- A. Wall Form Ties: Removable Snap-off type, 316 stainless steel, fixed length, cone type, with waterproofing rubber washer, 1-1/2 inch back break dimension, free of defects that could leave holes larger than 1-inch in concrete surface.
- B. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete. Diesel oil or motor oil will not be permitted.
- C. Corners Chamfer, wood strip type; 3/4 x 3/4 inch size; maximum possible lengths.
- D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

## PART 3 – EXECUTION

### 3.01 EXAMINATION

- A. Verify lines, levels, and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

### 3.02 EARTH FORMS

- A. Earth forms are not permitted.

### A.03 ERECTION - FORMWORK

- A. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 318.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.
- E. Obtain approval before framing openings in structural members which are not indicated on Drawings.
- F. Provide chamfer strips on external corners of all exposed concrete elements.
- G. Induce camber on existing roof slab structure prior to casting concrete.

### 3.04 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes applied coverings which are affected by agent. Soak inside surfaces of untreated forms with clean water.
- D. Keep surfaces coated prior to placement of concrete.

### 3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items which will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, regrets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

- D. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Install waterstops continuous without displacing reinforcement. Heat seal joints watertight. Conform to manufacturers recommendations.
- F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

### 3.06 CONSTRUCTION JOINTS

- A. Construct and locate as indicated on the drawings and so as not to impair the strength of the structure and only at locations approved by the Engineer. Form keys in cold joints shown on the drawings.

### 3.07 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
- C. Use compressed air to remove remaining foreign matter.

### 3.08 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 318.
- B. Camber slabs and beams 1/4 inch per 10 feet in accordance with ACI 318.

### 3.09 FIELD QUALITY CONTROL

- A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
- B. Do not reuse wood formwork more than three times for concrete surfaces to be exposed to view.

### 3.10 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads. Determination of form removal timing is the Contractor's responsibility and shall be in accordance with ACI 347, except that the Engineer reserves the right to delay form removal for a period not to exceed 14 days after the pour.
- B. Do not remove forms, shores and bracing until concrete has gained sufficient strength to

carry its own weight, and construction and design loads which are liable to be imposed upon it. Verify strength of concrete by compressive test results.

- C. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- D. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.
- E. Remove formwork progressively and in accordance with code requirements and so that no shock loads or unbalanced loads are imposed on the structure.
- F. Re-shore structural members where required due to design requirements of construction conditions and as required to permit progressive construction.

END OF SECTION

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SECTION 03200  
CONCRETE REINFORCEMENT

PART 1 — GENERAL

1.01 WORK INCLUDED

- A. Reinforcing steel bars, wire fabric, and accessories for cast-in-place and precast concrete.

1.02 RELATED SECTIONS SPECIFIED ELSEWHERE

- A. Section 01300 - Submittals
- B. Section 03100 - Concrete Formwork
- C. Section 03300 - Cast-in-Place Concrete

1.03 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 318 – Building Code Requirements for Reinforced Concrete
- C. ACI SP-66 - American Concrete Institute -Detailing Manual.
- D. ANSI/ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.
- E. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- F. ANSI/AWS D1.4 - Structural Welding Code for Reinforcing Steel.
- G. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- H. ASTM A704 - Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
- I. AWS D12.1 - Welding Reinforcement Steel, Metal Inserts, and Connections in Reinforced Concrete Construction.
- J. CRSI -Concrete Reinforcing Steel Institute -Manual of Practice.
- K. CRSI 63 -Recommended Practice For Placing Reinforcing Bars.
- L. CRSI 65 - Recommended Practice For Placing Bar Supports, Specifications, and Nomenclature.
- M. 2014 Florida Building Code



#### 1.04 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01300.
- B. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel and wire fabric, bending and cutting schedules, and supporting and spacing devices.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

#### 1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 318.
- B. Maintain one copy of document on site.

#### 1.06 QUALIFICATIONS

- A. Welders' Certificates: Submit under provisions of Section 01300 Manufacturer's Certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

#### 1.07 COORDINATION

- A. Coordinate with placement of formwork, formed openings, and other Work.

#### 1.08 STORAGE

- A. Reinforcing steel shall be clean, new stock, properly marked and tagged for identification prior to placing. Store reinforcing to avoid excessive rusting or coating with grease, oil, dirt, or other objectionable materials.

### PART 2 — PRODUCTS

#### 2.01 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615, 60-ksi yield grade; deformed billet steel bars, unfinished.
- B. Welded Steel Wire Fabric: ASTM A185 Plain Type; in flat sheets unfinished.
- C. Ties: Shall be No. 16 gauge minimum, fully annealed, black steel wire.
- D. Hooks and Bends in Reinforcement shall conform to ACI 315 unless otherwise noted on the drawings.

## 2.02 ACCESSORY MATERIALS

- A. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.
- B. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather-exposed Concrete Surfaces: Plastic coated steel or stainless steel type; size and shape as required.

## 2.03 FABRICATION

- A. Fabricate concrete reinforcing in accordance with ACI 318.
- B. Locate reinforcing splices not indicated on drawings, at point of minimum stress. Review location of splices with Engineer.

## PART 3 — EXECUTION

### 3.01 PLACEMENT

- A. Fabrication, detailing and placement of reinforcing steel shall conform to CRSI Manual of Standard Practice, ACI 315 and ACI 318. Reinforcement shall be carefully placed, rigidly supported and well tied with bar supports and spacers.
- B. Reinforcement shall be accurately placed and securely tied at intersections with 16 gauge black annealed wire. It shall be maintained in proper position by chairs, bar supports, or other devices approved by the Engineer.
- C. All splices and laps shall be as shown on the drawings, or 36 bar diameters, whichever is greater.
- D. Concrete protection of reinforcing shall be not less than the following or as shown on the drawings if greater:
  - 1. Concrete cast against and permanently exposed to earth or exposed to corrosive environment -- 3 inches.
  - 2. Concrete cast against forms, but exposed to earth or weather:
    - a. No. 6 through No. 11 bars -- 2 inches
    - b. No. 5 bars, or equivalent, and smaller -- 1-1/2 inches.
  - 3. Concrete cast against forms, but not exposed to earth or weather (interior construction):
    - a. Slabs, walls and joists:  
No. 14 and No. 18 bars -- 1-1/2 inches  
No. 11 bars and smaller for liquid retaining structures -- 2 inches  
No. 11 bars and smaller elsewhere -- 3/4 inch

- b. Beams and Columns, including primary reinforcement, ties, stirrups, and spirals -- 1-1/2 inches.
- E. The clear distance between parallel bars in a layer shall be the nominal diameter of the bar, but not less than one inch. Wherever conduits, piping, inserts or sleeves interfere with the placing of reinforcing steel as shown, the Contractor shall consult with the Engineer before pouring concrete. The bending or field cutting of bars around openings or sleeves will not be permitted.
- F. Clean bars of loose scale, heavy deposits or rust and oil, wax or other coatings that may reduce or destroy bonding, before placing. Check and clean again if necessary before concrete is poured.
- G. Concrete beam sizes may be increased as required for architectural details or to fit block coursing, subject to Engineer approval.
- H. Reinforcing steel in footings shall be assembled as mats with bars equally spaced and wired together at each intersection before concrete is placed.
- I. Center all footings on wall, pier or column above unless otherwise indicated.
- J. Dowel column and wall reinforcing to footing or pile cap with same size and number of dowels as vertical bars above.
- K. Dowels shall be hooked "L" at bottom and shall be lapped 36 bar diameter with the column or wall reinforcing above.
- L. Concrete columns shall be tied columns unless otherwise indicated.
- M. Provide one layer 6 x 6 - W2.9 x W2.9 WWF in slabs on grade including walkways and sidewalks unless otherwise indicated.

### 3.02 COORDINATION

- A. Coordinate work with other trades in order to eliminate interference before concrete is poured.

### 3.03 CLEANUP

- A. In accordance with General Conditions.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART I — GENERAL

1.01 Notice: Engineer shall be given a minimum of 48 hours advance notice to all concrete placements and no concrete shall be placed without approval of Engineer.

1.02 WORK INCLUDED

A. Cast-in-place concrete foundations, walls, slab-on-grade, equipment pads, underground concrete vaults and structures, pipe supports, curbs, and sidewalks. All cast-in-place concrete for this project shall be ready mix per this specification. Pre-mixed, bagged mixes shall not be utilized for any purpose on the project unless specifically approved by the engineer.

1.03 RELATED SECTIONS SPECIFIED ELSEWHERE

- A. Section 01300 – Submittals
- B. Section 01410 – Testing Laboratory Services
- C. Section 03100 - Concrete Formwork
- D. Section 03200 - Concrete Reinforcement

1.04 REFERENCES

- A. ACI 301 - Specifications for Structural Concrete for Buildings.
- B. ACI 318 - Building Code Requirements for Reinforced Concrete
- C. ASTM C33 - Concrete Aggregates.
- D. FDOT Standard Specifications for Road and Bridge Construction
- E. ASTM C94 - Ready-mixed Concrete.
- F. ASTM C150 - Portland cement.
- G. ASTM C260 - Air Entraining Admixtures for Concrete.
- H. ASTM C494 – Chemical Admixtures for Concrete
- I. ASTM C618 – Pozzolonic Materials.

1.05 QUALITY ASSURANCE

- A. Perform Work: in accordance with ACI 301 and FDOT Standard Specifications.
- B. Obtain materials for same source throughout the Work.
- C. Submit manufacturer's certification that materials meet specification requirements.
- D. Submit ready-mix delivery tickets, ASTM C94-78.

#### 1.06 TESTS

- A. Testing and analysis of concrete will be performed under provisions of this Section and Section 01410.
- B. Submit proposed mix design of each class of concrete to Engineer for review prior to commencement of work in accordance with Submittal Section. Submittal shall include proposed location for each class of concrete.
- C. Independent Testing laboratory shall take cylinders and perform slump and air entrainment tests in accordance with ACI 301.
- D. Provide 5 cylinders per set. Test one at 3 days, one at 7 days, two at 28 days, and hold one.
- E. Slump tests shall be taken for every truck delivery and each set of test cylinders taken.
- F. In general, cylinders shall be taken for each concrete pour event, and every 50 cubic yards placed.
- G. All tests failing minimum specified criteria shall be billed to and paid for by the Contractor.

#### 1.07 SUBMITTALS

- A. Submit product data under provisions of Section 01300 for Fine and Coarse aggregates, admixtures, concrete mix design, joint devices, attachment accessories, and curing compounds.
- B. Field test reports: Submit field test reports for all cylinder tests.

### PART 2 — PRODUCTS

#### 2.01 CONCRETE MATERIALS

- A. Cement: ASTM C150 -Type II Cement.
- B. Fine and Coarse Aggregates: ASTM C33.

- a. Conform to ASTM C33: Local aggregates not complying with this standard may be used provided it can be shown by special test or a record of past performance these aggregates produce concrete or adequate strength and durability.
  - b. Fine Aggregate: Clean, washed natural sand of hard, sound, uncoated grains. Manufactured clean, washed, hard sand may be used for structures other than water retention structures.
  - c. Course Aggregates: Clean, washed, sound and crushed.
  - d. Aggregate Size Requirements: Use largest practicable aggregate size for each condition of placement subject to limitations stipulated in paragraph 3.3, ACI Code 318.
- C. Water: Clean potable water.

## 2.02 ADMIXTURES

- A. Air Entrainment: All concrete shall entrain from two to four percent air, whether batched with or without other admixtures. Conform to ASTM C260. Use Darex II AEA or equal.
- B. Water-reducing admixture may be used and must meet ASTM C-494 as a Type A and Type D. Use WRDA 64 or equal. Add in accordance with ACI-350.
- C. Use of calcium chloride is not permitted.
- D. Air entraining agent to normal weight concrete mix if used, shall not exceed 4%.
- E. Superplasticizer: A superplasticizer admixture may be used on all structures if approved by the Engineer. Superplasticizer shall be used on all water retention structures. The superplasticizer shall satisfy the following requirements.
  - a. Conform to ASTM C494, Type F or Type G.
  - b. Superplasticizer admixture shall be added to the mix at the batch plant unless otherwise approved by the Engineer.
  - c. Provide documentation showing, at a 6-inch slump plus or minus 1-inch, the relative durability factors of air entrained concrete as determined in accordance with ASTM C-666, Procedure A, as compared to the same air entrained concrete mix at a 2-inch slump or minus 1-inch without superplasticizer admixture.
  - d. A qualified concrete technician employed by the manufacturer shall be available to assist in proportioning concrete materials for optimum use, to advise on proper use of the superplasticizer admixture and adjustment of concrete mix proportions to meet job site and climatic conditions.
  - e. Approved Products:
    - i. Sikament 300, Sika Chemical Corp. or Engineered approved equal.
    - ii. Pozzolith 440 N, Master Builders Company, or Engineer approved equal.

2.03 CURING MATERIALS

- A. Chemical Curing: Curing compounds shall be liquid, membrane forming and shall conform to ASTM C309, as approved by the Engineer. The liquid compound shall not reduce the adhesion of tile, paint, roofing, waterproofing or other material to be applied to the concrete. No liquid compound shall be allowed to cure a first pour of concrete that will receive a second pour. The use of a curing compound in lieu of water spray curing is subject to the Engineer's approval and will, generally, not be approved as an alternate to impervious membrane and spray mist curing.
- B. Impervious Membrane Sheeting: Kraft paper or 4 mil polyethylene sheeting, in accordance with ASTM C171 may be used with approval of the Engineer.

2.04 CONCRETE MIX

- A. Mix concrete in accordance with ASTM C94.
- B. Provide concrete to satisfy the following requirements:
  - a. Compressive Strength (28 days): 3000 psi for sidewalks and curbs, 4000 psi all other locations.
  - b. Water/Cement ratio: maximum 0.45 without admixtures by weight.
  - c. Fly Ash Content: maximum 15% of cement content, Type F only.
  - d. Slump  $4 \pm 1$  inch regular,  $6 \pm 1$  inch with superplasticizer, 6-8 inch pea rock pump mix.
- C. Use set-retarding admixtures during hot weather only when approved by Engineer.
- D. Air entrainment: Total air content required (air-entrained and entrapped air) shall be as follows, and as measured in accordance with ASTM C231:

<u>Nominal Maximum Size of coarse aggregate, in.</u>	<u>Total Air Content Percentage by volume</u>
3/8	6 to 10
2	5 to 9
3/4	4 to 8
1	3.5 to 6.5
1-1/2	3 to 6
2	2.5 to 5.5
3	1.5 to 4.5

2.05 ACCESSORIES

- A. Vapor Barrier: 10 mil thick clear polyethylene film, type recommended for below-grade application. Use in all locations under slabs on grade.
- B. Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days.

- C. Water Stop (PVC): 4" x 3/16" water stop, Dumbell polyvinylchloride Greenstreak - Style 741 or approved equivalent.
- D. Water Stop (Other): Bentonite type strips Rx101, or applicable to condition, as manufactured by Volclay, or equal.
- E. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.
- F. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel or Stainless steel type; size and shape as required. Do not use concrete or clay bricks to support reinforcing.
- G. Backing rod and sealant as indicated on drawings for construction joints.
- H. Sealing Materials: Material for sealing and filling joints and for sealing premolded filler strip, shall conform to ASTM D1190 for "Concrete Joint Sealer; Hot-Poured Elastic Type."
- I. Curbs: Construct roadway and sidewalk curbs as shown on the drawings and in accordance with local codes and regulations. Construct all other curbs that support equipment or structural wall systems as indicated on the drawings.

## PART 3 — EXECUTION

### 3.01 INSPECTION

- A. Verify reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.
- B. Verify site dewatering conditions. All foundations shall be cast in the dry.
- C. Verify requirements for concrete cover over reinforcement.
- D. Clean forms of trash, wood, excess steel, and deleterious materials.

### 3.02 PREPARATION

- A. Install vapor barrier under all slabs, footings, and other concrete exposed to earth. Lap joints a minimum of 6 inches. Do not disturb or damage vapor barrier while placing concrete. Repair damaged vapor barrier.
- B. In locations where new concrete is dowelled to existing work, drill holes in existing concrete, clean holes, insert steel dowels and epoxy in accordance with manufacturer's installation instructions keeping the minimum embedment depth specified on drawings.
- C. Coordinate the placement of joint devices with erection of concrete formwork and



placement of form accessories.

### 3.03 PLACING CONCRETE

- A. Notify Engineer and Owner's Representative minimum 48 hours prior to commencement of concreting operations.
- B. Place concrete in accordance with ACI 301 and FDOT Standard Specifications.
- C. Hot Weather Placement ACI 301.
- D. Cold Weather Placement ACI 301.
- F. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.
- G. Use Ready-Mixed Concrete: Conform to ASTM C94. Plant and truck mixers subject to examination by Engineer.
- H. Water and Mixing: Mix concrete at least 10 minutes, 5 minutes of which is at the job, after the last addition of water. Retempering in truck is prohibited. Any concrete in truck longer than 1-1/2 hours after the water has been added at the plant, or any that has become harsh or non-plastic, shall be rejected based solely upon the Engineer's discretion.
- I. Load Tickets: Shall include all information required by ASTM C94 and be legible, showing quantities of all constituents in the batch, and bearing signature of plant inspector or bonded weighmaster. Maintain all tickets on file for inspection by the Engineer. All tickets shall show the mix number. Tickets not showing the mix number shall cause the load to be immediately rejected.
- J. Slumps: At point of delivery to forms the concrete slump requirements shall conform to this section of the specifications.
- K. Place concrete continuously between predetermined construction and control joints. Do not break or interrupt successive pours such that cold joints occur.
- L. Contractor shall be responsible for means and methods to ensure concrete is poured in a dry area.
- M. All concrete shall be placed with the aid of mechanical vibrating equipment supplemented by hand forking or spading. Contractor needs to use mechanical vibrating equipment for consolidating concrete and should have a minimum of (2) two operable vibrators on the job. Vibration shall be transmitted directly to the concrete and not through the forms.
- N. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- O. Saw cut curb joints within 24 hours after placing. Use 3/16 inch thick blade, cut 1/4 of slab thickness.

- P. Screed floors level, maintaining surface flatness of maximum 1/4 inch in 10 ft.

### 3.04 FINISHING

- A. Provide formed concrete walls, columns, beams, Class 5 finish above the water line.
- B. Finish building slabs and miscellaneous horizontal concrete surfaces in accordance with ACI 301, steel trowel finish.
- C. Sidewalks shall have a light broom finish.

### 3.05 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. Concrete shall be kept moist for fourteen days after pouring. Vertical forms may be left in place and horizontal surfaces continuously moistened with water via spray misting. If forms are removed, impervious membrane sheeting or chemical curing may be used if approved by the Engineer. The Engineer shall have the right to determine when the forms may be removed and whether a curing compound can be used in lieu of spray misting.
- B. Water cure concrete surfaces in accordance with ACI 301 for 7 days or apply curing compound.
- C. Contractor shall use curing compounds for vertical surfaces.

### 3.06 PATCHING

- A. Notify Engineer immediately upon removal of forms. No surfaces are to be patched or backfilled prior to being reviewed by the Engineer.
- B. Patch imperfections as requested by the Engineer or his field representative in accordance with ACI 301 and FDOT Standard Specifications.
- C. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.

### 3.07 DEFECTIVE CONCRETE

- A. Modify or replace concrete not conforming to required levels, lines, details, elevations, dimensions, tolerances, or specified requirements.
- B. Repair or replace concrete not properly placed will be determined by the Engineer or Owner's Representative.
- C. Unless the removal of a defective slab is required by the Engineer, defective surfaces, such as honeycomb, shall be cut out entirely until homogeneous concrete is met, even if it means going through the slab.

- D. Such areas shall be coated with an approved epoxy bonding material, which shall be applied in accordance with the manufacturer's instruction, before damp packing the area with a mix consisting of one part of Portland cement and two parts of sand and fine gravel, epoxy and sand mix, or any combination of materials and mixes as the situation dictates in the opinion of the Engineer.
- E. The water content of the damp-pack material shall be such that a ball of the mix may be squeezed in the hand without bringing free water to the surface.
- F. Damp-pack material shall be tamped into place and finished to match adjacent concrete surfaces.
- G. Particular care shall be taken that no sagging of the material will occur.
- H. The bond between any two layers of damp-pack shall be improved through the use of an approved epoxy bond agent.
- I. Surfaces which have been damp-packed shall be kept continuously damp during and for a period of not less than seven days after completing the damp-pack operation, by polyethylene coverings thoroughly taped to the original concrete surface in a manner that loss of moisture, evidence by lack of water droplets on the inside surface of the polyethylene, is avoided. If this moisture condition cannot be maintained, a continuous water cure may be required by the Engineer.
- J. Under no circumstances shall Contractor apply a plaster coat over the honeycomb areas to conceal the existence of the honeycomb in the concrete.
- K. Neither Embecco nor calcium chloride shall be used for filling honeycomb areas, nor shall they be mixed with damp-pack material.
- L. Any concrete with excess air entraining agent will be rejected.

### 3.08 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01410.
- B. Contractor will be required to contact Testing Lab to be present for concrete deliveries.
- C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

END OF SECTION

SECTION 05500

MISCELLANEOUS METALS

PART 1 - GENERAL

1.01 SCOPE

- A. This Section includes the furnishing and installation of fabricated metal work which applies to all sections, unless otherwise noted.

1.02 REFERENCE SPECIFICATIONS AND STANDARDS ARE REFERRED TO BY ABBREVIATION AS FOLLOWS:

- |    |  |       |
|----|--|-------|
| A. | The Aluminum Association                                     | AA    |
| B. | American Institute of Steel Construction                     | AISC  |
| C. | American National Standards Institute                        | ANSI  |
| D. | American Society for Testing and Materials                   | ASTM  |
| E. | American Welding Society                                     | AWS   |
| F. | National Association of Architectural<br>Metal Manufacturers | NAAMM |
| G. | Steel Structures Painting Council                            | SSPC  |

1.03 QUALITY ASSURANCE

- A. Portions of the design not shown shall be completed by the fabricator in accordance with the latest edition of Specifications for Design, Fabrication and Erection of Structural Steel for Buildings of the AISC.
- B. Shop fabricated connections may be bolted or welded. Field connections shall be bolted.
- C. Burning/torching for enlarging holes will not be acceptable except with written permission of the Engineer.
- D. Responsibility for all errors in fabrication and correct fitting of structures shown on the shop drawings is the Contractor's responsibility.

1.04 REGULATORY REQUIREMENTS

- A. Metal fabrication materials shall meet the requirements of the following ASTM Standards and Specifications, but limited to.

1. Aluminum Alloy, plate and sheet B209-3003-H14, extruded trim B308-6063-T5 & T6, structure shapes B308-6061-T5, structural pipe and tube B429, castings B214.
  2. Structural steel, plates and shapes A36, plate and steel for forming A283 Grade C.
  3. Structural bolts, specifically called out on the Plans A-325.
  4. Other bolts, unless otherwise noted, A-307.
  5. Steel stud anchors for embedded plates, A-108, grade 1020, 60 ksi.
  6. Galvanizing, A123.
- B. Comply with the provisions of the following standards except as otherwise shown or specified.
1. AA Specifications for aluminum structures.
  2. AISC Specifications for design, fabrication and erection of structural steel for buildings.
  3. AWS code for welding in building construction.

#### 1.05 SUBMITTALS

- A. Submit shop drawings and manufacturer's descriptive literature as applicable for all metal fabrications in accordance with Section 01300. No items shall be fabricated prior to reviewing approval by Engineer. Minimum scale of drawings and elevations shall be 3/4 in. equals 1 ft., details enlarged to adequate size for clarity, show anchorage.
- B. Where certain equipment and the like require unique support, provide such members only after careful coordination of shop drawings for the equipment.

#### 1.06 PRODUCT HANDLING

- A. Use all means necessary to protect the Products of this Section before, during, and after installation and to protect the installed work and materials of all other trades.
- B. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.
- C. Coordinate delivery of metal fabrications with work of other Sections.

#### 1.07 FASTENERS

- A. Provide fasteners for all items under this Section. All nuts, bolts, washers, back up rings, etc. shall be 316 SS unless otherwise called out on the drawings or specified elsewhere herein.

- 1.08 Verify critical dimensions of the work on the job. Form items to accurate sizes and shapes, with sharp lines and angles. Punch and shear to leave smooth surfaces. Weld permanent connections, grind exposed welds smooth. Avoid screws and bolts where possible unless otherwise noted. When used and where exposed, countersink heads and draw up tight. Provide holes and connections for work of other trades.
- 1.09 Shop painting of ferrous items, except those galvanized, shall be as specified in Section 09900 - Painting.
- 1.10 Protect aluminum in contact with concrete and dissimilar material with 1/4" neoprene, or bitumastic coating.
- 1.11 Pipe support straps shall be 316 SS unless otherwise noted.
- 1.12 Metal pipe support fabrication shall be 316 SS unless otherwise noted.

## PART 2 - PRODUCTS

### 2.01 HANDRAIL & GUARDRAILS

- A. Post spacing shall be a maximum of 5 feet. Post and rails shall be a minimum of 1-1/2" diameter, schedule 40 aluminum pipe, alloy 6063-T6 or 6105-T5.
- B. Hand rail shall be made of pipe and fittings mechanically fastened together with stainless steel hardware.
- C. Toe board shall conform to OSHA standards. Toe board shall be a minimum of 4" high and shall be set 1/4" above the walking surface.
- D. Guard rails shall be designed to withstand a uniform horizontal load of 50 pound per foot with a simultaneous vertical load of 100 pound per foot applied to the top rail. In addition, guard rails, hand rails, and stair rails shall be designed to withstand a concentrated load of 200 pounds applied in any direction.
- E. Component aluminum hand rail system shall be designed and constructed in compliance with the requirements of OSHA and local standard building codes.
- F. All aluminum handrail components shall be clear anodized.

### 2.02 SHOP FABRICATED PRODUCTS

- A. Provide anchor bolts as shown as well as for fabricated and structural metal items. Do not paint bolts.
- B. Provide inserts and sleeves for concrete as shown and as required.

- C. Provide miscellaneous metal frames and supports fabricated of structural shapes and plates.
- 2.03 Unless noted otherwise on the drawings or specified differently in other sections, all miscellaneous metal fabrications shall be 316 stainless steel.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

### 3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.

### 3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components indicated on shop drawings.
- D. Perform field welding in accordance with AWS D1.1.
- E. Obtain Engineer approval prior to site cutting or making adjustments not scheduled.
- F. Verify that supports and anchors are correctly positioned.
- G. Verify that opening sizes and dimensional variations are acceptable to suit grading, railing, and stairs tolerances.

### 3.04 TOLERANCES

- A. Conform to ANSI/NAAMM A202.1.
- B. Maximum space between sections:  $\frac{1}{4}$  inch.
- C. Maximum variation from top surface plane of sections:  $\frac{1}{4}$  inch.

- 3.05 Perform cutting, drilling, flashing and fitting required for installation of metal fabrications. Set the work accurately, provide temporary bracing and anchors in formwork for items to be built into masonry and concrete. Field weld joints not shop welded because of size limitations.

END OF SECTION



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## SECTION 09900

### PAINTING

#### PART 1 - GENERAL

##### 1.01 SCOPE

- A. Furnish all labor, surface preparation and coating material, tools, rigging, lighting, ventilation, and other related items of equipment and materials necessary to clean, prepare, coat, cure and cleanup a complete coating system on all 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.
- B. The work includes field painting of exposed bare and covered pipes and ducts, hangers, exposed steel and iron work, and primed metal surfaces of equipment installed, except as otherwise indicated. Work shall also include, but not be limited to, coating/painting of new and existing floors and existing steel framing for crane rail.
- C. Paint all new and existing called out exposed surfaces normally painted in the execution of a new project. 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.
- D. Clean, prepare, coat, and cure all surfaces in strict accordance with the manufacturer's published recommendations and specifications.
- E. Perform all work by the use of skilled workpersons in a safe and productive manner using equipment and procedures consistent with good coating practices.
- F. Colors are indicated on the Painting Schedule in this section or shown on the drawings. If color or finish is not designated, the Engineer will select these from standard colors available for the materials system specified.

##### 1.02 PAINTING NOT INCLUDED

- A. The following categories of work are not included as part of the field-applied finish work, or are included in other sections of these specifications.
  - 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 unit is part of an assembly to be painted to match, i.e. - motor, or otherwise shown or specified, do not include painting when factory-finishing or installer finishing is specified.
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, foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts. 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 elsewhere. 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 plate, copper, bronze and similar finished materials will not require finish painting, unless otherwise specified.
5. Operating Parts and Labels: Moving parts of operating units, mechanical and electrical parts such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting unless otherwise specified.
  - a. Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.
6. Surfaces to receive chemical coatings as specified in Section 09910.
7. Other Surfaces: Do not paint sprinkler heads, fire detection heads, integrally colored stucco, brick masonry, cast stone, stone masonry, or architectural precast concrete, unless otherwise specified.

#### 1.03 RELATED SECTIONS SPECIFIED ELSEWHERE

- A. Section 01300 - Submittals

#### 1.04 REFERENCES

- A. ANSI/ASTM D16 - Definitions of terms relating to paint, varnish, lacquer, and related products.
- B. ASTM D4442-16- Test method for moisture content of wood.
- C. Steel Structures Painting Council (SSPC).

#### 1.05 DEFINITIONS

- A. Conform to ANSI/ASTM D16 for interpretation of terms used in this section.

## 1.06 QUALITY ASSURANCE

- A. Furnish all coating materials by a single manufacturer. Solvent, thinners, and other miscellaneous materials can be supplied by the same manufacturer or by a supplier approved by the manufacturer.
- B. Furnish a statement to the Engineer from the coatings manufacturer that materials to be used by the Contractor comply with the manufacturer's recommendations.
- C. The Engineer reserves the right to require qualification of the product manufacturer and applicator, including satisfactory completion of at least two (2) projects of this nature.
- D. Manufacturer's Inspection Meeting: After set-up for painting but before commencing work, conduct a meeting at the site among representatives of the paint manufacturer, contractor, painting contractor, and Engineer to inspect the facility and review procedures recommended by the manufacturer for the prevailing conditions.

## 1.07 REGULATORY REQUIREMENTS

- A. Comply with all federal, state, and local health and fire regulations when handling and applying paint and coating products.

## 1.08 SUBMITTALS

- A. Manufacturer's Data: Submit manufacturer's technical information including paint label analysis, surface preparation and application instructions for each material proposed for use. Indicate the surfaces to which each material is to be applied.
- B. Samples; Painting: Submit samples for Engineer's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.
- C. Manufacturer's Certificate: Submit a written certification from the paint manufacturer that materials furnished for the work meet or exceed specified requirements.
- D. Prepare a detailed painting schedule. List each Painting System to be used by Painting System Number, define extent and limits of each system and colors (by name and number) where appropriate.

## 1.09 PRODUCT DELIVERY AND STORAGE

- A. Deliver all materials to the jobsite in original, new and unopened packages and containers bearing manufacturer's name and label, and the following information;
  - 1. Name or title of material.
  - 2. Fed. Spec. number, if applicable.
  - 3. Manufacturer's stock number and date of manufacture.
  - 4. Manufacturer's name.

5. Contents by volume, for major pigment and vehicle constituents.
  6. Thinning instructions.
  7. Application instructions.
  8. Color name and number.
- B. Store paint materials and painting tools and equipment, including solvents and cleaning material, in a well ventilated, dry area away from high heat. Do not store in buildings or structures in use or being constructed, nor leave overnight therein. Follow manufacturer's recommendations for the safe storage of paints and solvents.
- C. Take precautions to prevent fire hazards and spontaneous combustion.

#### 1.10 SAFETY

- A. Make all necessary provisions regarding materials, equipment, personnel, procedures, and practices, to assure that the work is done safely and that the working area is maintained free of all health and safety hazards.
- B. Observe manufacturer's health and safety precautions when storing, handling, and applying coating materials and cleanup materials containing solvents and/or chemical ingredients.
- C. Direct personnel's attention to all product warnings and information given on the labels of all products.
- D. Ensure that personnel mixing and applying coating materials are equipped with adequate protective clothing and devices (including respirators).
- E. Permit no smoking in the working area.
- F. Permit no item which may produce sparks or open flames in the immediate working area.
- G. Post warning signs outside of the work to apprise personnel of the hazards in the area. Erect barriers where necessary.
- H. Return partially used coating materials that are to be retained to their original containers at the completion of each work day. Tightly reseal containers, wipe material spills, clean and return the containers to the designated storage area.
- I. Remove waste coating materials and contaminated disposable items from the job site and dispose of them at the completion of each work day. Dispose of all items and materials in strict accordance with local, state, and federal regulations.

## 1.11 JOB CONDITIONS

- A. Apply water-base paints 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 manufacturers printed instructions.
- B. Apply solvent-thinned paints 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 manufacturers printed instructions.
- C. Do not apply paint in 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.
- D. 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.
- E. Exercise caution when attempting to paint in windy conditions. The Contractor is responsible for all damage caused by wind blown paint.

## PART 2 - PRODUCTS

### 2.01 COLORS AND FINISHES

- A. Paint colors, surface treatments, gloss, and finishes are indicated or specified in the "schedules" of the contract documents. Color and gloss not indicated or specified shall match the Owner's existing color scheme.
- B. Final acceptance of colors will be from samples applied on the job.
- C. 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 manufacturer's, fabricators, suppliers and others where necessary on the characteristics of the finish materials to be used, to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required.

### 2.02 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.

### 2.03 ACCEPTABLE MANUFACTURER'S

- A. All coating references herein are to Tnemec Co., Inc., or Ameron. All coatings to be in contact with potable water must appear on the current Florida Department of Environmental Protection list of approved paint and protective coatings and be rated NSF approved for potable water.

### 2.04 PAINTING SYSTEMS

- A. Provide a minimum dry film thickness, noted as D.F.T., for the applications listed in the schedule of finishes.
- B. Touch-up shop-applied and field applied prime coats wherever damaged or bare and keep touched-up as necessary before and after installation or erection of the items, to maintain protection of the metal from rust and corrosion. Clean and touch-up with the same type of primer as initially used.
- C. Note: Color for all surfaces in contact with potable water to be white or ivory to conform to State of Florida, EPA, and FDA Regulations for contact with potable water. All potable water piping shall be Blue.

### 2.05 SCHEDULE OF FINISHES

- A. Steel, galvanized steel and non-ferrous metal

- 1. Exterior of pipe, equipment and miscellaneous fabrication for indoor or outdoor exposure:

System:	Epoxy / Polyurethane
First Coat:	Series 69 Polyamidoamine Epoxy Primer
D.F.T. (Mils):	3.0 - 5.0
Second Coat:	Series 69 Polyamidoamine Epoxy Topcoat
D.F.T. (Mils):	3.0 - 5.0
Third Coat:	Series 1074U Color Endura-Shield (Aliphatic Acrylic Polyurethane)
D.F.T. (Mils):	2.0 - 4.0
Min D.F.T. (Mils):	11.0

- 2. Exterior of interior structural tanks, pipe, and equipment for indoor applications:

System:	Epoxy
First Coat:	Series 69 Polyamidoamine Epoxy Primer
D.F.T. (Mils):	3.0 - 5.0
Second Coat:	Series 69 Polyamidoamine Epoxy Topcoat
D.F.T. (Mils):	4.0 - 6.0
Total Coats:	2.0
Min D.F.T. (Mils):	9.0

B. Concrete and Masonry

1. Interior (Concrete Block)

System: Epoxy  
Block Filler: Series 1254WB Masonry Filler  
D.F.T.: 100+ SF/Gal  
First Coat: Series N69 Hi-Build Epoxoline II  
D.F.T. (Mils): 4.0 - 6.0  
Second Coat: Series N69 Hi-Build Epoxoline II  
D.F.T. (Mils): 4.0 - 6.0  
Min. D.F.T. (Mils): 10.0

2. Exterior (Block)

System: Acrylic  
Block Filler: Series 54  
D.F.T.: 100+ SF/Gal  
First Coat: 156 - Color W.B. Enviro-Crete  
D.F.T. (Mils.): 4.0 - 8.0  
Second Coat: 156 - Color W.B. Enviro-Crete  
D.F.T. (mls): 4.0 - 8.0  
Min. D.F.T. (mls) 8.0 - 16.0

3. Exterior (Concrete and Stucco)

System: High Build Acrylic Emulsion  
First Coat: 156 - Color W.B. Enviro-Crete  
D.F.T. (Mils.): 4.0 - 8.0  
Second Coat: 156 - Color W.B. Enviro-Crete  
D.F.T. (Mils.) 4.0 - 8.0  
Min D.F.T. (Mils.): 10.0

4. Floor

System: Waterborne Epoxy  
First Coat: Enviro-Pox, Series 287  
D.F.T. (mls) 2.0 - 4.0  
Second Coat: Enviro-Pox, Series 287  
D.F.T. (mls) 2.0 - 4.0  
Total Coats: 2.0  
Total D.F.T. (mls) 4.0 - 8.0

5. Ceiling (Concrete)

System: Epoxy  
Primer: Series 201 Epoxoprime  
D.F.T.: 4.0-6.0  
First Coat: Series N69 Hi-Build Epoxoline II  
D.F.T. (Mils): 4.0 - 6.0  
Second Coat: Series N69 Hi-Build Epoxoline II  
D.F.T. (Mils): 4.0 - 6.0  
Min. D.F.T. (Mils): 10.0



C. Plaster and Wallboard

Interior Ceiling and Walls

System:	Epoxy-Polyamide
Primer:	Series 51-1204, PVA – Sealer
D.F.T. (Mils.):	1.0 – 1.5
First Coat:	Tnemec-Tufcoat, Series 114 H.B.
D.F.T. (Mils.):	4.0 - 6.0
Second Coat:	Tnemec-Tufcoat, Series 114 H.B.
D.F.T. (Mils.):	4.0 - 6.0
Total Coats:	3.0
Total Min D.F.T. (Mils.):	9.0

D. Plastic Pipe and Fiberglass Fabrications

1. Interior

System:	Polyamide Epoxy Topcoat / Aliphatic Acrylic Polyurethane
First Coat:	Series N69 Hi-Build Epoxoline II
D.F.T. (Mils.):	2.0 - 3.0
Second Coat:	Series 1074U Endura-Shield
D.F.T. (Mils.):	2.0 – 3.0
Total Coats:	2.0
Total D.F.T. (Mils.):	4.0

2. PVC and CPVC pipes, valves, conduits, and accessories (exterior):

System:	Polyamide Epoxy Topcoat / Aliphatic Acrylic Polyurethane
First Coat:	Series N69 Hi-Build Epoxoline II
D.F.T. (Mils.):	2.0 - 3.0
Second Coat:	Series 1074U Endura-Shield
D.F.T. (Mils.):	2.0 - 3.0
Total Coats:	2.0
Total Min D.F.T. (Mils.):	6.0

E. Wood

1. Exterior (Clean and Dry)

System:	Acrylic Latex
First Coat:	Series 10-99W Tnemec Primer
D.F.T. (Mils.):	2.0 - 3.5
Second Coat:	Series 6, Tneme-Cryl
D.F.T. (Mils.):	2.0 - 3.0
Third Coat:	Series 6, Tneme-Cryl
D.F.T. (Mils.):	2.0 - 3.0
Total Coats:	3.0
Min D.F.T. (Mils.):	7.0

F. Existing Exterior Surfaces (Previously Painted)

1. Exterior Metal

System:	Epoxy/Polyurethane
Spot Primer:	Series 135 Chembuild
D.F.T. (Mils.):	3.0 – 5.0
Tie Coat:	Series 135 Chembuild
D.F.T. (Mils.):	3.0 – 5.0
Topcoat:	Series 1074U Endura-Shield
D.F.T. (Mils.):	2.0 – 3.0
Min D.F.T. (Mils.):	6.5

2. Exterior (Concrete, Block, and Stucco)

System:	Acrylic
First Coat:	Series 6 Tneme-Cryl
D.F.T. (Mils.):	2.0 – 3.0
Second Coat:	Series 6 Tneme-Cryl
D.F.T. (Mils.):	2.0 – 3.0
Min D.F.T. (Mils.):	5.0

2.06 SCHEDULE OF COLORS:

These colors are provided for painting of piping, which has modified and furnished and installed. Not all piping listed may require painting. Building colors are to match existing.

A. Liquid Piping:

1. Potable water (finished) – blue

B. Electrical Conduits—Color to match background.

PART 3 - EXECUTION

3.01 FIELD OBSERVATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer. Do not paint over conditions detrimental to the formation of a durable paint bond and film.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application. Do not proceed with the work until unsatisfactory conditions have been corrected.
- C. Provide all necessary equipment, labor, rigging, lighting and other equipment to facilitate inspections.

- D. The Engineer may inspect the Work at any time for compliance with the requirements of the specifications.
- E. The Engineer reserves the right to approve each phase of the Work before further work is done, to halt all Work deemed to be improper or not in compliance with the specification, and to require the Contractor to promptly correct all improper practices or deficient Work.
- F. The Contractor is responsible for any expenses incurred in association with corrective measures required as the result of improper practices and/or defective or deficient work.

### 3.02 GENERAL REQUIREMENTS

- A. Provide adequate explosion – proof lighting sufficient to illuminate clearly the working area without shadows during all surface preparation and coating operations.
- B. Maintain adequate and continuous explosion – proof ventilation in confined areas during all surface preparation and coating operations and during all recoat and curing periods. Provide ventilation of sufficient capacity to maintain a clear atmosphere that is well below explosive and toxic limits. Arrange the ventilation system, including all fans and temporary duct work, so that no still air spaces exist in any area.
- C. Heating devices used to create and/or maintain temperature conditions in compliance with the specification requirements are to be explosion proof and of the type that do not exhaust sooty or oily residues or any other contaminants into the air. Heating devices are not to be used when existing temperature and humidity conditions may create dew point conditions.
- D. Use equipment that is explosion proof and non-sparking. Spray equipment must be recommended by or acceptable to the coatings manufacturer.
- E. Apply caulking material only after the last coat of paint has been applied and has dried hard. Caulking material used must be of a type that is compatible with the specified coating system.

### 3.03 SURFACE PREPARATION

- A. Perform preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate conditions.
- B. Surface preparation shall be conducted to prevent material from contaminating the existing potable water system.
- C. Fiberglass and PVC materials shall be solvent cleaned according to SSPC-SP1 and scarified by best practical means. Every precaution should be taken to ensure that NO sanding dust is drawn into the degasifiers. Painting contractor to furnish all necessary barrier, drapes, etc. to prevent contamination of the Finish Water.

### 3.04 MATERIAL PREPARATION

- A. Mix and prepare painting materials in accordance with manufacturer's direction.
- B. 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.
- C. 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 materials. Remove the film and if necessary, strain the material before using.

### 3.05 APPLICATION

#### A. General

1. Conform to articles "General Requirements" and "Surface Preparation" prior to beginning coating application.
2. Apply paint as specified and in accordance with the manufacturer's printed instructions. Unless otherwise recommended in the manufacturer's printed instructions or specified elsewhere (e.g. Bid Form, Painting System) use brushes for applying first coat on wood and use standard industrial spray equipment, either airless or conventional for applying first coat on metals other than sheetmetal and items fabricated from sheetmetal. For other coats on wood, metal and other substrates, use applicators and techniques best suited for the type of material being applied.
3. 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. Give special attention to insure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces.
5. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only before final installation of equipment.
6. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
7. Paint the back sides of access panels, and removable or hinged covers to match the exposed surfaces.
8. Finish exterior doors on tops, bottoms and side edges the same as the exterior faces, unless otherwise indicated or specified.
9. Sand lightly between each succeeding enamel or varnish coat.

10. Omit the field prime coat on shop-primed and touch-up painted metal surfaces which are not to be finish 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.
11. Putty nail holes and joints after prime coat is dry.
12. Change colors at corner of stop where colors differ between adjoining rooms or spaces and where door frames match wall colors.
13. Provide a finished coating system free of all runs, sags, cracks, blisters, pinholes, excessive or deficient fill thickness, or any other defects. Correct any such deficiencies by proper removal of the defect and/or recoating.
14. 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. Sandblasted surfaces are not to be left uncoated overnight.
15. 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.
16. Provide minor tinting to each coat of paint in order to differentiate between coats.

B. Minimum Coating Thickness

1. 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 the coating manufacturer.
2. Painting of Mechanical and Electrical Work

Limit painting of mechanical and electrical work to those items exposed in equipment rooms and occupied spaces, and on the exterior of buildings or structures.

C. Mechanical items to be painted include, but are not limited to, the following:

- a. Piping, pipe hangers, and supports
- b. Motor mechanical equipment and supports
- c. Accessory items

1. Prime Coats
2. Apply a prime coat of material, which is required to be painted or finished, and which has not been prime coated by others.

3. Clean and prime unprimed ferrous metals as soon as possible after delivery of the metals to the job site.
  4. 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.
  5. Completed Work
  6. Match approved samples for color, texture and coverage.
  7. Remove, refinish or repaint work not in compliance with specified requirements.
- F. Dry Film Gauge
1. Provide “Noroson Magnetic Dry Film Thickness Gauge” as supplied by the coatings manufacturer.

### 3.06 CLEAN-UP AND PROTECTION

A. Clean-up

1. 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.
2. Upon completion of painting work, clean window glass and other paint – splattered surfaces. Remove splattered paint by proper methods of washing and scraping, using care not to scratch or damage finished surfaces.

B. Protection

1. Protect open Roseland EST against damage from painting and finishing work.
2. Protect work of other trades, whether to be painted or not, against damage from painting and finishing work.
3. Protect surfaces that might otherwise be damaged by dripping, splashing, or spraying of paint. Correct any damage by cleaning, repairing or replacing and repainting as acceptable to the Engineer.
4. Provide “Wet Paint” signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after the completion of paint operations.
5. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

6. Repair of damage caused by overspray is the contractor's responsibility.

### 3.07 WARRANTY

- A. If within one year after the date of Substantial Completion, any Work is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER'S written instructions, either correct such defective Work, or, if it has been rejected by OWNER, remove it from the site and replace it with nondefective Work. If CONTRACTOR does not promptly comply with terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or the rejected Work removed and replaced, and all direct and indirect costs of such removal and replacement, including compensation for additional professional services, will be charged to the CONTRACTOR.

END OF SECTION

## SECTION 10400

### IDENTIFYING DEVICES

#### PART 1 - GENERAL

##### 1.01 SCOPE

- A. Furnish and install identification devices. This work includes all services, materials, labor, tools and appliances as required. This includes interior and exterior piping and equipment. Provide identification devices for the following:
  - 1. Instrumentation and Instrument Panels
- B. All new equipment and piping as shown on the PID drawings shall have identifying devices as described herein.

##### 1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Section 11930 - Pumps – General
- B. Section 11932 - Horizontal Split Case Pumps
- C. Section 13441 - Instrumentation Components
- D. Section 16000 - Electrical General Requirements
- E. Section 16681 - Variable Frequency Drives

##### 1.03 SUBMITTALS

- A. Submit sample of each type identification of device per Section 01300. Submit manufacturer's detailed technical data for materials, fabrication and installation, including catalog of anchors, hardware, fasteners and accessories.
- B. Submit complete schedule of labels, including quantity, lettering text, size, color, per Section 01300.

#### PART 2 - PRODUCTS

##### 2.01 PIPE IDENTIFIERS

- A. Paint all pipe as specified in Section 09900 or Construction Drawings.
- B. Provide wrap type identifiers similar to Seton "Setmark" on all process pipe equal to or smaller than 6" diameter.
- C. Provide identifying decals similar to Seton "Roll Form" on all process pipe larger than 6" diameter.
- D. Label pipe at maximum 20' spacing, or at least one label visible in runs of less than 20'.
- E. Provide flow direction arrows on all pipe labels.



- F. Provide labels on both sides of pipeline, unless label on back side of pipe would not be visible.

## 2.02 MECHANICAL AND ELECTRICAL COMPONENTS

- A. Provide engraved laminated identifying labels for all types of components scheduled below. Label to be similar to "Seton Setonite". For single line of text: 1-1/2" label height, 5/8" legend letter height, 1/16" stroke. For double line: 2" high, 5/8" letter. Provide identifying numbers in 1/4" high letters below legend.
- B. Switch labels to be similar, 3/4" high, 1/2" lettering.

## 2.03 VALVES

- A. Provide engraved 316 stainless steel valve tags similar to Seton Style SBT for all valves.
- B. Attach with stainless steel jack chain.
- C. Conform to P & ID drawings for identifying numbers.

## PART 3 - EXECUTION

### 3.01 SCHEDULES

- A. Provide labels on all new piping, control valves, mechanical and electrical components and vessels.
- B. Provide pipe identifiers on all new piping for the following pipelines (as a minimum). Field verify all pipe sizes:
  - 1. Pump Station Piping
- C. Provide identifying labels for the following mechanical components, as a minimum. All rotating equipment shall be included.
  - 1. Booster Pumps
- D. Mechanical and Electrical Components
  - 1. All pumps, motorized valves and other major equipment.
  - 2. All interior and exterior control panels, (electrical, hydraulic, chemical, instrument, annunciation, control, lighting).
  - 3. All switches except lighting.

END OF SECTION

SECTION 11280  
CONTROL VALVES

PART 1 - GENERAL

1.01 SCOPE

- A. This section includes control valves and operators for various open/close valves including but not limited to inlet control valve and flow control valve.
- B. Other control valves shall be provided as shown on the drawings and specified herein.

1.02 RELATED WORK

- A. Section 05500 – Miscellaneous Metals
- B. Section 09900 – Painting
- C. Section 10400 – Identifying Devices
- D. Section 15100 – Piping and Valves
- E. Division 16 -- Electrical

1.03 QUALITY CONTROL

- A. Coordinate electrical power requirements with applicable systems to assure adequate support for equipment. Ensure power supply type is compatible with actuators prior to ordering equipment.
- B. Coordinate with instrumentation and control supplier to assure proper control signals.
- C. Equipment and materials of similar type shall be the product of the same manufacturer and match existing components.

1.04 SUBMITTALS

- A. Provide data on valve performance data for all valves including sizes, complete material breakdown of components, type and noise levels at various flows for all valves, and complete electrical schematics which depict specific field wiring requirements.
- B. Provide shop drawings and product data in accordance with Section 01300.

PART 2 - PRODUCTS

2.01 FILL INLET CONTROL VALVE (ICV-2004)

- A. The inlet control valve shall be a 6” flanged, reduced port, single seat v-control ball valve designed to attach to two (2) 150 PSI ANSI rated flanges. The valves will be operated by an electric actuator, and valve and body shall be constructed of 316 stainless steel.

<b>ICV-2004</b>	
Valve Size	6”, reduced port
Setting	Adjustable Range: 35 psi to 50 psi
Maximum upstream pressure	70 psi
Minimum upstream pressure	35 psi
Maximum downstream pressure	50 psi
Minimum downstream pressure	35 psi
Minimum Flow	500 gpm
Maximum Flow	2,000 gpm

- B. Materials

Body – 316 stainless steel  
Disc – 316 stainless steel  
Stem – 316 stainless steel  
Seat – TFE  
Stem Seal - TFE

- C. The valve shall mount between ANSI Class 150 flanged reducers. The valve shall be as manufactured by KTM or approved equal, V-Port ball valve, reduced port, and HCR ball coating. Valve shall be bubble tight, rated for 150 psi on both sides of valve.
- D. Valve actuators shall be electrically-powered rotary operators, 110V single phase, NEMA 4X, Auma Type SA multi-turn Series, Type SG quarter-turn Series, or EIM Type Tec 2 (ACM Futronic II controls module) or approved equal. The actuators shall be mounted to the valve with 316 stainless steel yoke. The actuator enclosure shall be double sealed, watertight to NEMA 4X. The actuator shall be provided with a manual declutch lever and handwheel. The torque capability of the actuator shall not be less than 115% of the torque required for the valve.
- E. The actuators shall be equipped with the following devices: integral illuminated, digital valve position indication showing 1% increments in valve position with closed and open valve limit symbols; three LEDs for local indication, red-open, yellow-intermediate, green closed; datalogger which logs operational data and valve/actuator torque profiles; and adjustable open/closing times.

- F. The actuators shall have wiring to include the following: control circuit transformer/integral reversing contactors; integral local control and local/remote selectors; four user configurable indication contacts; monitor relay with changeover contact; automatic phase rotation correction; and continuous local indication in 1% increments by LCD display.
- G. Local controls shall be provided on the actuators: one for Local/Stop/Remote selection, pad-lockable in each position, and the other for Open/Close control.
- H. Valve position during normal operation shall be within 20% - 80% open position. Valve shall include noise/cavitation reduction hardware.
- I. Operation

In AUTO mode, the fill inlet control valve (ICV-2004) will be PID controlled and modulate to maintain a target upstream pressure (PIT-2004). Should the tank level be full, the valve will close and remain closed until the tank level drops to a preset value (LIT-2014).

The upstream pressure PID control will include an inverse PID, such that as the upstream pressure drops (PIT-2004), the valve closes in order to maintain that pressure. Inversely, as the pressure increases, the valve opens to maintain and achieve the target pressure. The ICV-2004 shall also have a MANUAL mode where it can open/close to a preset position.

The following setpoints and conditions apply in AUTO mode.

Status	Control Function	Initial Setpoint	Control Location
Low System Pressure	Close ICV	35 psi	PIT-2004
EST Fill Value	Modulate ICV	35 psi to 50 psi	PIT-2004
High EST Level	Close ICV	51 ft	LIT-2014

2.03 BYPASS VALVES (CV-2006, CV-2007)

- A. The North and South Bypass control valves shall be lug-style butterfly valve designed to fit between 150 PSI ANSI rated flanges, size as shown on the drawings. The valves will be operated by an electric actuator, and shall be constructed of 316 stainless steel.

B. Materials

Body – ductile iron, epoxy-coated  
 Disc - 316 stainless steel  
 Stem - 316 stainless steel  
 Seat - TFE

## Stem Seal - TFE

- C. The valve shall mount between ANSI Class 150 DI van-stone style flanges. The valve shall be as manufactured by Keystone, Model K-Lock, Flow Seal or approved equal. Valve shall be bubble tight, rated for 150 psi on both sides of valve.
- D. Valve actuators shall be electrically-powered rotary operators, 120V single phase, NEMA 4, Limitorque, MX Series, worm gear operator with valve dial position indicator or approved equal. The actuators shall be mounted on the valve with 316 stainless steel yoke. The actuator enclosure shall be epoxy-painted cast aluminum, NEMA 4 rated. The actuator shall be provided with a manual declutch lever and handwheel. The torque capability of the actuator shall not be less than 115% of the torque required for the valve, and the operating time shall not be less than 30 seconds nor more than 60 seconds.
- E. The actuators shall be equipped with the following devices: 8 limit switches to indicate open and closed position. Limit switches shall be SPDT type, NEMA 4 enclosure, spring return roller lever and a L-O-R selector switch with pushbutton, indicating lights and integral controls. Actuator shall be 3-wire automatic control and inching control in the manual or local position. Actuators shall be equipped with anti-condensation heaters and thermal overload thermostats.

## PART 3 – EXECUTION

### 3.01 SPARE PARTS

- A. Furnish the following spare parts to Owner:
  - 1. Motor for each type actuator.
  - 2. One complete internal actuator board assembly as recommended by valve manufacturer.
  - 3. Two spare gaskets for actuator body for each type frame.

END OF SECTION

SECTION 11930  
PUMPS - GENERAL

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The work covered by this section and the related sections consists of providing all labor, material, equipment and performing all construction required to install pumps and motors, including all accessories as specified and shown on the drawings.

1.02 RELATED SECTIONS

- A. Section 11932 – Horizontal Split Case Pumps
- B. Section 16000 – Electrical General Requirements
- C. Section 16050 – Basic Materials and Methods
- D. Section 16681 – Variable Frequency Drives

1.03 PUMP PERFORMANCE DATA

- A. Certified pump performance data (curves) are to be submitted to the Engineer for pumps prior to pump installation unless noted otherwise. Performance data must be the results of the actual pump assemblies with drivers before shipment. Also report amperage and voltage of each power leg, efficiency and horsepower.

1.04 QUALITY ASSURANCE

- A. Provide shop drawings in maintenance material in accordance with Section 01300.
- B. Provide operation and maintenance material and record drawings in accordance with Section 01730.
- C. Provide manufacturer's certification of correct installation after manufacturer's inspection.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.01 PUMPS

- A. Install all equipment in strict conformance with the manufacturer's specifications and industry standards. Perform all work in a workmanlike manner.
- B. Manufacturer's representative for pumps shall inspect installation for correctness and compliance with manufacturer's specifications.

- C. No piping connecting any of the equipment will be jacked, pried or forced in to position in any way. All piping must mate perfectly with the equipment it is attaching prior to installation of flange bolts or other connecting devices.
- D. Store spare parts in strict accordance with manufacturer's recommendations. Notify the owner in writing of any special storage maintenance required, and provide such maintenance until final acceptance of contract.
- E. Pump and piping installed shall be disinfected in accordance with Indian River County Utilities requirements, and AWWA standards, and Section 02675 Pressure Testing and Disinfection prior to being placed in service.
- F. Field test pumps for conformance to specified operating conditions. Record initial flow, head, voltage and amperage for each power leg, ramp time to speed, full load speed. Adjust tolerances, if necessary and retest. Test pump and motor for amplitude and frequency of vibration. Measure noise (dBA) adjacent, at 10 ft., at 50-ft. Pump shall be tested at the shut-off pressure, the design point and other points as required by the Engineer. Tests shall be performed to the satisfaction of the Engineer and results included in the Operations and Maintenance Manual.

END OF SECTION

SECTION 11932

HORIZONTAL SPLIT CASE PUMPS

PART 1 - GENERAL

1.01 SCOPE

- A. Furnish all labor, materials, equipment and incidentals required to install three (3) new horizontal split case pumping units complete with drive motors, couplings, bases, variable frequency drives and pressure control system. All material shall be 316 stainless steel unless otherwise noted. The pumping units specified herein shall be supplied by a single Manufacturer.
- B. These Specifications are intended to give a general description of what is required but do not cover all details which will vary in accordance with the requirements of the equipment furnished. They are, however, intended to cover the furnishing, shop testing, delivery and complete installation and field testing of all materials equipment and appurtenances for the complete pumping system herein specified, whether specifically mentioned in the Specifications or not.
- C. For all units there shall be furnished and installed all necessary and desirable accessory equipment and auxiliaries whether specifically mentioned in these Specifications or not. This installation shall incorporate the highest standards for the type of service shown on the drawings including field testing of the entire installation and instruction of the regular operating personnel in the care, operation and maintenance of all equipment.
- D. It is the expressed requirement of these specifications that the Manufacturer / supplier of the pump equipment, shall supply the variable speed drive equipment which is connected to the pump motor supplied for this project as a single source responsibility for the pump systems supplied.

1.02 RELATED SECTIONS

- |    |                                    |               |
|----|------------------------------------|---------------|
| A. | Submittals                         | Section 01300 |
| B. | Flushing, Testing and Disinfection | Section 02670 |
| C. | Pumps – General                    | Section 11930 |
| D. | Vibration and Alignment            | Section 13080 |
| E. | Electrical General Requirements    | Section 16150 |
| F. | Variable Frequency Drives          | Section 16681 |
| G. | Electric Motors                    | Section 16690 |

1.03 PUMP PERFORMANCE DATA & CERTIFIED TEST RESULTS

- A. Factory testing in accordance with the standards of the Hydraulic Institute shall be required for each pump.



- B. Certified pump performance curves shall be submitted for approval by the Engineer on all pumps prior to shipment from manufacturer. The certified pump performance curves shall be submitted, including head, capacity, brake horsepower, and pump efficiency for each pump supplied. Certified data shall be provided to indicate the NPSH required by the pump at the design point as specified.
- C. The pump shall be tested through the specified range of flow, and head/capacity/efficiency curves plotted at maximum output speed. During each test, the pump shall be run at each head condition for sufficient time to accurately determine discharge, head, power input, and efficiency. The pump will be tested with a suction head (including vapor pressure, velocity head friction loss and static suction head) as required to demonstrate the NPSH required by the pump at the design point as specified.
- D. If any pump tested fails to meet any specification requirement it will be modified until it meets all specification requirements. If any pump tested fails to meet the efficiency requirements at any of the listed flow or head conditions as specified and all reasonable attempts to correct the inefficiency are unsuccessful, the pump(s) shall be replaced with unit(s) which meet the specified requirements. Performance data must be the results of project pump and motor assemblies. Also report amperage and voltage of each power leg, efficiency, horsepower and NPSH.
- E. One motor shall be furnished with certified test results. The motor shall be subjected to a complete factory test consisting of full load heat run, percent slip, running light current, locked rotor current, breakdown torque (calculated), starting torque, winding resistance, high potential, efficiencies at 100, 75 and 50 percent of full load, and bearing inspection. The Engineer/Owner reserves the right to witness these tests and shall be informed prior to tests to allow for travel time.

#### 1.04 OPERATION

- A. The pumps will take suction from a manifold pipeline that supplies water from the Roseland EST or directly from the IRCU potable water system. The pumps will operate on variable frequency drives to maintain a desired pump suction (upstream) pressure and discharge (downstream) pressure.

#### 1.05 SUBMITTALS

- A. The pump manufacturer will submit data and specifications for the pumping unit and will include but not be limited to the following.
  - 1. Name of Manufacturer
  - 2. Type and Model
  - 3. Design Rotative Speed
  - 4. Type of Bearings
  - 5. Size of Shafting
  - 6. Size of Suction Connection
  - 7. Size of Discharge Connection
  - 8. Weight of Pump

9. Pump performance curves showing capacity versus head, NPSHR, pump efficiency, and pump BHP plotted to scales consistent with performance requirements.
- B. Provide submittals in accordance with Section 01300.
- C. Provide O & M manuals in accordance with Section 01730.
- D. Provide manufacturer's certification of correct installation after manufacturer's inspection and start up.

#### 1.06 REFERENCES & STANDARDS

- A. The pumps shall be manufactured and tested in accordance with the most current Hydraulic Institute standards, ANSI/HI 2.1-2.5 - 1994 and ANSI/HI 2.6-1994.
- B. Electric motors shall conform to the latest standards of IEEE, ANSI, and NEMA except as otherwise specified herein

#### 1.07 SPARE PARTS

- A. The following spare parts shall be furnished:
  1. Four mechanical seal assemblies
  2. Eight complete sets of gaskets, "O" rings, etc.
- B. Spare parts shall be suitably packaged, labeled precisely as to the contents, and delivered to the Owner as directed.

### PART 2 - PRODUCTS

#### 2.01 GENERAL

- A. The equipment covered by these Specifications is intended to be standard pumping equipment of proven ability as manufactured by reputable manufacturers having at least five (5) years of experience in the production of such equipment. The equipment furnished shall be designed, constructed, and installed in accordance with the best practice and methods, and shall operate satisfactorily when installed as shown on the drawings.
- B. All parts shall be so designed and proportioned as to have liberal strength and stiffness and to be especially adapted for the work to be done. Ample room and facilities shall be provided for inspection, repairs and adjustment.
- C. The Manufacturer shall be fully responsible for the design, arrangement, and operation of all connected rotating components of the assembled pumping unit to ensure that neither harmful nor damaging vibrations occur at any speed within the specified operating range. Design shall include all supporting sole plates and fabricated steel base plate for mounting the units.

- D. Pump shall be rigidly and accurately anchored into position, precisely leveled and aligned, so that the completed installation is free from stress or distortion. All necessary foundation bolts, plates, nuts and washers shall be furnished and installed by the Contractor and conform to the recommendations and instructions of the equipment Manufacturer. Anchor bolts, nuts, and washers shall be of Type 316 stainless steel. Grouting under bases after the equipment is set is included as work under this Section.
- E. Stainless steel nameplates giving the name of the Manufacturer, the rated capacity, head, speed, and any other pertinent data shall be attached to each pump.
- F. Stainless steel nameplates giving the name of the Manufacturer, serial number, model number, horsepower, speed, voltage, amperes and all other pertinent data shall be attached to each motor.
- G. All pumps shall be designed and built for 24-hour continuous service at any and all points within the specified range of operation, without overheating, without cavitation, and without excessive vibration or strain.
- H. Mechanical equipment, including drives and electric motors shall be supplied and installed in accordance with applicable OSHA regulations. Type 316 stainless steel guards shall be installed on all rotating assemblies.
- I. All lubrication fittings shall be brought to the outside of all equipment so that they are readily accessible from the outside without the necessity of removing covers, plates, housings, or guards. Fittings shall be buttonhead type. Lubrication fittings shall be mounted together wherever possible. Pressure grease-lubricated fittings shall be the "Zerk Hydraulic" type or the "Alemite" type. Housings of grease-lubricated bearings shall be automatically exhausted to the atmosphere to prevent excessive greasing.

## 2.02 PERFORMANCE

- A. The horizontal split-case type booster pumps shall be manufactured by Peerless Model 8AE15 or approved equal.
- B. Each pump must meet the following design conditions.

## BOOSTER PUMP DESIGN REQUIREMENTS

<u>ITEM/DESIGN CONDITIONS</u>	<u>CRITERIA</u>
Maximum Motor Full Load Speed (RPM)	1,170
Motor to be Supplied (HP)	50 (Max)
Pump Design Speed (RPM)	MOTOR FULL LOAD SPEED
Suction Size, Minimum (Inches)	10"
Discharge Size, Minimum (Inches)	8"
Minimum Pump Shut-off Head (Feet)	75.8'
Primary Capacity (GPM)	2,000
TDH at Primary Capacity (Feet)	60'
Minimum Efficiency at Primary Capacity	83%
Intermediate Capacity (GPM)	2,500
TDH and Intermediate Capacity (Feet)	52'
Minimum Intermediate Efficiency	80%
Maximum NPSHR at Intermediate Point (Feet)	12'

- C. The maximum NPSHr shall not exceed 35 feet across the entire pump performance curve.
- D. The test performance data must be the results of the actual pump equipment to be delivered.

### 2.03 PUMP CONSTRUCTION

- A. Pump Casings
  1. The pump case shall be of cast iron construction ASTM A48, Class 30, having a tensile strength of not less than 30,000 pounds per square inch.
  2. Casings shall be free from blow holes, sand pockets or other imperfections. They shall be given a hydrostatic pressure test to at least 1-1/2 times the maximum pump shut-off head.
  3. The interior and exterior surfaces of the casings shall be smooth with matching flanges and the internal wetted areas shall be coated with TNEMEC, FC-20, NSF approved epoxy paint, 12 mils DFT minimum on any coated areas. Impellers

shall not be coated.

4. The horizontal casing joint shall be a scraped or machined fit, requiring a gasket not more than 0.015 inch thick.
5. Suction and discharge flanges shall be faced and drilled ANSI Class 125 Standard. There shall be 1/4-inch I.P.T. tapped holes in both the suction and discharge flanges of all pumps for test gauge connections.
6. The top half of each case at the topmost part shall have a bossed pipe tap opening for mounting air release valve specified under Division 15. Pipe taps shall be not less than 1/2-inch I.P.T.
7. The casing at both suction inlets to the impeller shall be protected with bronze renewable wearing rings. They shall be of one-piece construction, held rigidly in slots in the case and shall not be held in place by the clamping action of the case alone.

#### B. Impellers

1. The impeller shall be ASTM B-584, C95800, nickel aluminum bronze, enclosed double suction type of one-piece construction. Impeller shall be machined outside and smoothly finished on the internal water passages and shall be balanced.
2. Impellers shall be protected from wear at both suction inlets with renewable bronze wearing rings. These rings shall be fastened to the impeller such that they cannot loosen in service.
3. Impeller material must be ASTM B-584, C95800, nickel aluminum bronze, capable of pumping chlorinated potable water with a free chlorine residual of a minimum of 5 ppm. Silicon brass materials are unacceptable. Impellers shall not be coated.

#### C. Bearings

1. The weight of the pump shaft and impeller assembly shall be carried on bearings at each end of the pump shaft. Bearings shall be grease lubricated, designed for an AFBMA average life of 10 years for any point within the pump operating conditions specified.
2. The outboard bearing of each pump shall be designed to accept any thrust loads and shall function so that the impeller rotor will be centered in the end play (axial movement) of the wearing ring. Thrust bearing shall be double row, no exceptions.

#### D. Shafts

1. Pump shafts shall be of a high grade hardened steel A1S1 C1045. It shall be

protected from wear at the stuffing boxes by renewable 316 series, stainless steel sleeves, on which the pump mechanical seals shall ride. Sleeves shall be fastened to the shaft such as to prevent leakage between the sleeve and the shaft.

#### E. Stuffing Boxes

1. The pump stuffing boxes shall be sufficiently deep for not less than five (5) rings of graphite square braided packing or mechanical seals. They shall be satisfactory for 20 feet of positive head and 15 feet of negative head.
2. Pumps shall be equipped with single, inside, John Crane Type 21, Mechanical seals, with carbon and ceramic faces by the manufacturer. Metallic faces are not acceptable. Elastomers shall be EPDM.
3. Stuffing box gland shall be of cast iron A48. Gland bolts shall be of 316 series, stainless steel properly sized and designed for the intended service.
4. Drip pockets shall be provided in the bearing brackets under the packing glands to catch all drip from pump stuffing boxes. These drip pockets shall be with tapped drain connections and drip from these pockets shall be piped to waste by the contractor. In no case shall waste from these drip pockets be allowed to drip on bed-plate.

#### F. Base plates

1. Each unit, motor and pump shall be mounted on a continuous fabricated steel or cast iron bed-plate. Fabricated steel bed-plate shall be of the box type construction with internal web reinforcing for rigidity and with a moisture collecting drip rim.
2. The bed-plates shall be constructed of steel plates and shaped with rounded corners and all welded joints ground smooth. Bed-plates shall be designed so as not to exceed the dimensions shown on the drawings.
3. The drip rim shall collect condensation moisture from the pump. The drip rim shall extend on both sides of the bed-plate from the drive end to the pump end and across the pump end with a slope not less than 1/8-inch per foot. The depth of the drip rim shall be not less than 1-1/4 inches. At the lowest point of the drip rim on the pump end there shall be 3/4-inch pipe tap for drainage piping.
4. Bed-plates shall be of such design and have sufficient grout holes that they can be filled with grout after the units are leveled and aligned.

#### G. Couplings

1. Couplings shall be Falk T-series, steelflex, type, selected by the manufacturer for the pump unit power rating.

#### H. Coatings

1. The pump assemblies shall be factory coated with Epoxy prime coatings by TNEMEC, compatible with the final site coatings to be applied by the contractor.

## 2.04 MOTORS

- A. The motors shall be horizontal squirrel-cage induction type as specified in Section 16150. The motor nameplate horsepower rating must not be exceeded at any head-capacity point on the pump curved.
- B. Guaranteed minimum efficiency for each unit shall be furnished by the motor manufacturer to the Owner.
- C. Drive motors must be designed and manufactured in accordance with the latest revised edition of NEMA MGI. The motor will be squirrel- cage induction, NEMA Design B, single speed type. The motors must conform to the following:

Synchronous Speed	1,200
Horsepower	50 hp
Voltage, Phase & Frequency	460 V, 3 phase, 60 Hz
Mounting	Horizontal
Enclosure	TEFC
NEMA Design	B
Service Factor	1.25
Duty Cycle	Continuous
Bearing Lubrication	Sealed Bearing

- D. The motors shall be 1,200 rpm, 50-hp, premium efficiency with a 1.25 service factor. The motors shall be manufactured by U.S. Motors, Nidec, Hitachi or approved equal. Unless otherwise specified, the motors shall meet the following requirements.
  - a) Rated for continuous duty @ 40 deg. C ambient temperature.
  - b) Class F insulation with Class B temperature rise.
  - c) Clamp type grounding terminal shall be located inside conduit box.
  - d) 120 volt space heater.
  - e) Motor thermal protection in accordance with Electrical Specifications.
- E. All motors shall be built in accordance with latest NEMA, IEEE, ANSI and AFBMA standards where applicable. Motors shall conform to all requirements stipulated in Division 16 – Electrical.
- F. Bearings shall be anti-friction, oil-lubricated with external reservoirs. Bearings shall have an ABMA L-10 life of 100,000 hours. Motors must be designed to accept all loads imposed by pump during starting and running.
- G. Motor shall be guaranteed by the manufacturer for a period of two years from date of acceptance by the Owner against defects in workmanship or materials.

## PART 3 - GUARANTEES

### 3.01 GENERAL

- A. The pump and its components will be complete with a manufacturer's warranty for defects in materials and workmanship for a period of one year from the time the pump is placed into operation.

### 3.02 PRODUCT HANDLING

- A. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.

### 3.03 PERFORMANCE

- A. The manufacturer will warrant that the performance of all pumps will conform with manufacturer's certified pump performance curves. The pumps must operate within the tolerances of the Standards of the Hydraulic Institute. Curves published for similar pumps by another manufacturer will not be acceptable for this purpose.

### 3.04 SHOP PAINTING

- A. Before exposure to weather and prior to shop painting, all surfaces shall be thoroughly cleaned, dry and free from all mill-scale, rust, grease, dirt and other foreign matter. All nameplates shall be properly protected during painting. Motor shall be painted per specifications.

### 3.05 INSTALLATION

- A. Install all equipment in strict conformance with the manufacturer's specifications and industry standards. Perform all work in a workmanlike manner.
- B. Manufacturer's representative for pumps and valves shall inspect installation for correctness and compliance with manufacturers specifications and submit written certification that equipment is ready to be placed in service.
- C. No piping connecting any of the equipment will be jacked, pried or forced in to position in any way. All piping must mate perfectly with the equipment it is attaching prior to installation of flange bolts or other connecting devices.

### 3.06 START-UP

- A. The pump manufacturer shall have a qualified representative mate the pump to the motor and align the assembly. Manufacturer must provide a qualified representative to certify the pump performance.
- B. After initial start-up under the supervision of a qualified representative of the pump manufacturer, a preliminary running-in period will be provided for the Contractor to make field tests and necessary adjustments. The pumps will then operate for a period concurrent with the acceptance test.



- C. Field test pumps for conformance to specified operating conditions. Record initial flow, head, voltage and amperage for each power leg. Adjust tolerances, if necessary and retest. Confirm that the amplitude and frequency of vibration during pump operation is within the tolerances of the Standards of the Hydraulic Institute. Measure noise (dBA) adjacent to pump, and at 10 feet and 50 feet away.
- D. At the end of the specified period of operation, the pumps will be accepted if, in the opinion of the Engineer/Owner, the pumps have operated satisfactorily without excessive power input, wear, lubrication, or undue attention required for this operation, and if all rotating parts operate without excessive vibration or noise at any operating head.
- E. Pump and piping installed shall be disinfected in accordance with Section 02670 Pressure Testing and Disinfection prior to being placed in service.

### 3.07 OPERATIONS AND MAINTENANCE TRAINING

- A. The Contractor shall provide the services of qualified factory service representatives to instruct the Owner's personnel in the operation and maintenance of the pump and motor units, including step-by-step troubleshooting with necessary test equipment. Instruction shall be specific to the model of equipment furnished. This service shall consist of a one day visit for each type of similar pump and motor.
- B. The technical representative shall have at least two years of experience in pump equipment training and instruction. Training sessions shall be scheduled not less than two weeks in advance. Training materials shall be provided to each of the Owner's personnel in attendance and shall remain with the trainees.
- C. All costs for transportation, lodging, subsistence, and other incidental costs for the manufacturer's representative during the installation, testing, and instruction shall be borne by the Contractor at no cost to the Owner.

END OF SECTION

## SECTION 13080

### VIBRATION AND ALIGNMENT

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

It is the intent of this section to set forth the testing required to be performed to ensure that alignment and vibration is within the specified tolerances. The testing shall be performed and corrective action taken for all equipment/motor installations which equal or exceed 20 horsepower. The Contractor will be fully responsible for all costs associated with the testing, corrective action and re-testing whether or not the initial tests prove the installation was within specified tolerances. If the testing indicates that the equipment does not meet specified tolerances, corrective action shall be taken and the equipment re-tested until acceptable results are obtained.

##### 1.02 TOLERANCES:

- A. The vibration due to unbalance does not exceed hydraulic institute (maximum velocity of 0.4 inch/second) NEMA standards.
- B. The vibration shall not be destructive to the equipment in any way. Velocity due to any factor other than unbalance shall not exceed 0.08 inch/second velocity.

##### 1.03 TESTING FIRM REQUIREMENTS

One firm shall perform the vibration test, alignment, and corrective action. Multiple firms to perform this work will not be acceptable. The qualifications of the company to perform the testing shall be submitted to the Engineer for approval. Qualifications shall include the following.

- A. Names, experience, and individual qualifications.
- B. List of previous customers, (last two years), including telephone numbers.
- C. References for similar work.

#### PART 2 - PRODUCTS

##### 2.01 VIBRATION AND ALIGNMENT

Vibration analysis shall be performed on all installed pumps and motors (20 horsepower or larger only). The report of the analysis will include the following:

- A. Vibration Profiles (vibration profile shall be generated by a recorder. Hand held recorders used to hand generate charts or graphs are not acceptable).
- B. Machine generated vibration tolerance nomograms and severity charges shall provide a

visual hard record copy of all frequencies. Charges for velocity and displacement shall be submitted.

C. Instructions for reading the report data.

D. List problem areas, etc., due to heat, vibration, and alignment.

## PART 3 - EXECUTION

### 3.01 VIBRATION AND ALIGNMENT REPORTS

Vibration reports will be submitted before substantial completion or pump/motor service start up which ever occur first. All vibration profiles are to be submitted irrespective of results. Vibration profiles will be repeated until the equipment/motor conform to Part I requirements.

### 3.02 VIBRATION TEST

The Engineer shall witness all vibration tests. The Contractor shall give the Engineer seven days written notice prior to a vibration test. Vibration reports shall be submitted in accordance with Section 01300, Submittals.

### 3.03 CORRECTION OF VIBRATIONS PROBLEMS INDICATED BY VIBRATION REPORT

All on site corrective action in the form of balancing, alignment shall be performed by the personnel performing the vibration testing and are subject to the approval of the Engineer.

END OF SECTION

## SECTION 13120

### PRE-ENGINEERED BUILDING

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION OF THE WORK:

- A. The work covered under this section shall include furnishing all labor, materials, equipment and services required to fabricate and install a pre-engineered building system as shown on the drawings. The pre-engineered building shall be designated "Electrical Building" and shall include all electrical equipment as shown on the contract plans, a fabricated steel base, forced ventilated, and enclosed in a preassembled modular structure for a complete pre-engineered building.

##### 1.02 APPLICABLE CODES, STANDARDS AND SPECIFICATIONS: The work included under this section shall be in strict accordance with the following codes and standards:

- A. AISC Specifications for the Design, Fabrication and Erection of Structural Steel Members, recent edition, for all structural section or welded plate sections.
- B. AISI Specifications for the Design of Cold-Formed Steel Structural Members, recent edition, for cold-formed steel structural members.
- C. American Welding Society "Structural Welding Code"
- D. Metal Building Manufacturers Association Recommended Design Practice Manual.
- E. 2017 Florida Building Code latest edition for factory built modular buildings with third party design approval and State issued Seal attached to inside door

##### 1.03 QUALITY ASSURANCE:

- A. The building Supplier shall have installed pre-engineered building systems on ten (10) or more projects which have been completed for each of the last five (5) years minimum. The building system shall satisfy all applicable codes. The entire building system shall be fabricated by the same manufacturer.
- B. The building manufacturer shall provide the Contractor with a scaled template drawing of the building to facilitate structural base slab construction. Template drawing will include dimensions for all penetrations required for base slab construction.
- C. The electrical equipment installation and the integration of component electrical parts as shown on the contract plans shall be the responsibility of the building supplier.

1.04 SUBMITTALS: Submittals shall be in accordance with Section 01300 and include the following:

- A. Submit shop drawings signed and sealed by a licensed Florida Professional Engineer for the design, fabrication, and assembly of the modular structure. Indicate on the shop drawings the lifting eye locations and method of lifting.
- B. Submit all electrical loading and sizing calculations, per NEC guidelines, for installed conduit, wire, and equipment.
- C. Submit catalog cut sheets for all architectural (e.g., doors, windows, door hardware), Mechanical including heating, cooling, ventilating, and air conditioning equipment, electrical equipment, and appurtenances.
- D. Provide the locations and details of wall and floor block-out openings for electrical power and signal conduits, equipment, and other utility services entering and exiting through the building side walls and foundation-floor.
- E. Submit a detailed floor plan and interior elevations showing the dimensioning and locations of all HVAC, power, signal and control conduits, electrical equipment, panels, ATS, wall and floor mounted power and control panels, transformers, heating, cooling, ventilating, and air conditioning equipment, and other utilities and items located within the Electrical Building.
- F. Submit evidence of Supplier's experience.
- G. Samples and Supplier's literature on proposed building system, roofing system and materials shall be submitted for approval and approved by the Engineer prior to fabrication and delivery of materials.
- H. The Contractor shall be responsible for providing detailed and fully coordinated pre-engineered electrical building shop drawings to the Engineer for approval prior to installation.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be delivered in manufacturer's original, unopened containers. All components and parts shall be clearly marked and identified.
- B. All materials shall be stored in a dry, covered storage or on platforms with weatherproof covering.
- C. Continuous protection shall be provided for materials against wetting and moisture absorption.

1.06 MANUFACTURER:

- A. The equipment specified herein shall be the end product of one pre-engineered building manufacturer for conformance with the specifications. The electrical building enclosure shall be manufactured and constructed by Engineered Fluid, Inc., Patterson/Munipac, or USEMCO.

1.07 WARRANTY:

- A. The manufacturer shall provide the Owner with a written 25-year warranty for the coatings provided and a written 20-year weather tightness warranty. The warranties shall provide full coverage of labor and material costs to perform repair due to watertightness or color fading failures over the 20 and 25-year warranty periods.
- B. The manufacturer of the metal roof systems shall furnish to the Owner a warranty covering materials and finish for a period of 20 years from the date of acceptance. The installer of the roof system shall provide a warranty covering installation and workmanship for a period of 3 years from the date of acceptance.

PART 2 – PRODUCTS

2.03 BUILDING ENCLOSURE

- A. Building Exterior Dimensions: As indicated in the Drawings.
- B. Clear Interior Ceiling Height: 10 feet – 0 inch (measured vertically from finished floor to ceiling at interior face of sidewall)
- C. Coordinate building design with electrical equipment specified in Division 16 and as shown in the Drawings.
- D. Coordinate arrangement, mounting, and support of electrical equipment to facilitate service, maintenance, and repair or replacement of electrical components, to provide ease of disconnecting the equipment with minimum interference to other installations and to clear connecting cables, wireways, and cable trays of obstructions and of the working and access space of other equipment.
- E. The Electrical Building shall be designed to meet the loading requirements of the “Florida Building Code” (currently adopted edition). The minimum design loads shall be as indicated in the Drawings.
- F. Codes and Standards - The structure design and manufacture shall, as a minimum, conform to ASCE (American Society of Civil Engineers) current edition of "Minimum Design Loads for Buildings and Other Structures". Building shall be manufactured and built to satisfy current editions of the National Electrical Code (NEC).
- G. Building shall comply with MBMA (Metal Building Manufacturers Association) "Recommended Design Practices Manual"

- H. The electrical building shall be constructed in a factory assembled prefabricated building affixed to a steel deck structure supporting the station equipment. The completed assembly shall be one piece when delivered and require only off loading, installation on the site-built foundation, connection to electrical service and programming of controls and instrumentation by the project integrator. Truss roof and building exterior may be field installed by the manufacturer. Building minimum dimensions are shown on the contract plans.
- I. The electrical building manufacturer shall supply plans and calculations which shall be stamped by a Registered Professional Engineer in the State of Florida and shall be responsible for obtaining all building permits and certificates of occupancy required for the facility. The building manufacturer shall be responsible for obtaining any state building approvals and third-party inspections if required by the State of Florida or local municipality.
- J. The electrical building shall be provided with a cast-in-place reinforced concrete foundation slab with floor slab cutouts located below the panels, ATS, and variable frequency drives of all cables and conduit to equipment located outside the building. Refer to the drawings for the location of the equipment. The Contractor shall coordinate the cutout locations with the requirements of Divisions 16 and requirements of this Section. Conduits and cables passing through the building walls are not acceptable.
- K. Contractor shall be responsible for filling the floor cutouts with non-shrink grout upon completion of installation of cables and conduits through the cutouts.
- L. Provide two UL Classification 2-10-B, C; 10-pound carbon dioxide fire extinguishers complete with pressure/fill gauge and wall mounting bracket. Mount on interior wall face each fire extinguisher and at opposing ends of the building.
- M. Hot rolled steel to meet as a minimum standard ASTM –A36, and all galvanized steel to meet as a minimum standard ASTM A -653.
- N. Building Substructure:
1. Base/floor system substructure shall be made up of steel plate and standard structural steel shapes. The substructure shall be designed to support the building live and dead loads plus the burden imposed by loading, transporting and unloading of this equipment.
  2. All steel plates used in the substructure shall meet or exceed the requirements of ASTM-A36.
  3. The structural shapes (channels and angles) shall be of the thickness/weight as shown on the shop drawings for this item and shall meet or exceed the requirements for ASTM A-36.

4. The structural rectangular or square tubing shall be of the wall gauge as shown on the shop drawings for this item and shall meet or exceed the requirements for ASTM A500 Grade B.
5. Building shall be installed on cast-in-place floor slab constructed by the Contractor as shown in the Drawings.

O. HVAC:

1. Provide one exterior wall mounted, factory-assembled, pre-charged, prewired, tested, ready-to-operate, 5-ton cooling capacity, 10 EER rated minimum, galvanized zinc coated cabinet, air-conditioning unit with thermostat complete with conductors and conduits. Capacity and EER certified in accordance with ANSI/ARI Standard 390.
2. Complete unit shall be Bard Manufacturing Company, Model WA5S3C00BPSXXX, or approved equal.

P. Coating System:

1. All surfaces of the exposed steel structure, interior and exterior, shall be grit blasted equal to commercial blast cleaning (SSPC-SP6). Products listed for Tnemec may also be similar products by other manufacturer's including Carboline or Sherwin Williams.
2. Following grit blasting, all weldments will be pretreated by hand with brush using Tnemec Series 61 Hi-Build Epoxoline, gray in color, coating to provide additional corrosion protection.
3. The full protective coating shall take place immediately after surface preparation.
4. The protective coating shall be Tnemec Series 61 Hi-Build Epoxoline, gray in color, consisting of a two-component, high solids, amine-cured epoxy system formulated for high build application having excellent chemical and corrosion resistant properties.
5. The epoxy system shall be self-priming and require no intermediate coatings.
6. The protective coating shall provide in two (2) applications for a total dry mil thickness of 8.0 mils.
7. All floor area shall receive an additional surface coating of "non-skid" Tnemec Series 61 Hi-Build Epoxoline, gray in color, including areas that will be covered by floor matting. The total dry mil thickness shall provide a 14.0 mil coverage.
8. Coating shall be warranted for a minimum of ten (10) years.



- Q. Perimeter Angle System - Building base shall have a hot rolled steel angle framework, welded, primed and painted, with minimum deflection of L/240. Base shall be pre-drilled for anchoring to the structural steel base.
- R. Framework - The building shall have a complete, internal, self-supporting, structural steel frame. The building framework shall include 8 to 16 gauge, cold-formed, galvanized steel structural members. Building framework to have a flush wall, post and beam format with girts and purlins, and full trusses on both end walls. Wall and ceiling structural support system are to be designed to provide load carrying capability for anticipated equipment loads using 16 gauge galvanized steel hat channels behind liner panel for reinforcement as needed, with locations shown on approval drawings.
- S. Roof System:
1. The roof shall be fully insulated and fabricated with panels to support a trussed roof system to be installed by the electrical building supplier or field installed by the Contractor. The ceiling panels shall be covered by a single piece EPDM rubber membrane to provide a waterproof covering. The membrane shall be white and a minimum of 40 mils. The station manufacturer shall provide a structural member around the circumference of the top of the station for the site application of the trussed hip roof to be applied after the station is set on its foundation.
  2. The trussed roof shall be 5/12 pitch with 8 to 14 gauge solid web hot rolled steel trusses. The roof shall be coordinated with the electrical building manufacturer and shall be a pre-engineered truss roofing system, provided, permitted, and installed by a certified, State Licensed roofing contractor, registered and licensed in the State of Florida.
  3. Materials shall conform to the following: Roof panels - The roof sheathing shall be covered with a 26 gauge metal panel system to form a standing seam roof as shown. The panels shall have a Galvalume® substrate with a Kynar 500® finish. The panels shall meet UL Standard 2218, Class 4 impact resistant and Class A fire resistant rating. The system shall be complete with fascia and soffit. The ridgeline of the roof shall be covered end to end with a broken edge panel open along the sides to create a roof vent along both sides of the entire ridge line. The top of the broken edge panel along the ridge line shall cover over the top of the standing seams to provide a finished appearance.
    - a. Fascias - Shop formed, pre-finished flat 22 gage steel with smooth surface with interlocking joints.
    - b. Soffit panels - Shop formed pre-finished flat 12" wide by 22 gage steel with smooth surface with interlocking joints.

- c. Hold-down Clips - Concealed anchorage system, standard with the roofing manufacturer, designed to permit thermal movement and to assure positive and negative loading in compliance with L90.
  - d. Trim, Flashing, and Seam Covers - Same material, finish, and color as the as adjacent sheet products.
  - e. Finish - Roof panels, fascia metal, soffit panels, trim, seam covers, flashing, and appurtenances shall have a 70 percent "Kynar 500" fluoropolymer coating; both prime coat and finish coat shall be oven baked. Color from manufacturer's full color line shall be selected after award of contract.
  - f. Rigid Thermal Insulation - R=19, rigid insulation; Celotex "Thermax" with plain factory finish, Schuller "Ultragard", RMax "Therमारooф Plus".
  - g. Building Felt - ASTM D226 No. 15, asphalt-saturated nonperforated organic roofing felt.
  - h. Fasteners - Self-tapping stainless steel screws for metal to metal connections.
- T. Insulation - Exterior walls shall have a minimum of 3.5" fiberglass bat insulation and a vapor barrier. The ceiling shall have a minimum of 6" insulation and a vapor barrier. In addition to the insulation in the walls and ceiling, an additional 1" fiberglass insulation blanket shall be installed over the entire building framework and under the exterior wall and roof panels as a thermal break. The insulation system shall provide a minimum of R19 in the walls, R-21 above the ceiling.
- U. Exterior Trim - The exterior trim package shall include stepped or boxed eave, rake, fascia, base, corner, jamb, and header trim in, 26 gauge Galvalume material with owner's choice of standard KYNAR colors.
- V. Interior Finish - The building's interior walls and ceiling shall be lined with flush-fit 22 gauge, roll-formed liner panels, with concealed fasteners and a baked-on white polyester finish over G-90 galvanized substrate. The building interior shall include a complete matching trim system including base, jamb, header, and ceiling trim. Liner to be reinforced with 14 gauge hat channels mounted vertically as needed for heavy wall mounted items.
- W. Closures - Matching, pre-molded, closed cell elastomeric closures provided by the siding and roof panel manufacturer shall be installed according to the manufacturer's recommendations at the eave line, beneath the roof panels, and where the trim meets the wall panels.
- X. Exterior wall surfaces of the building shall be covered with vertical cement board siding with a simulated stucco texture. The siding product shall be Hardie Panel by James Hardie Building Products or equal. Installation shall comply with the manufacturer's recommendations. The building exterior shall be primed at the factory and finish painted at the site as indicated on the table below. Follow paint manufacturer's written product preparation recommendations and application instructions.

Building Exterior, Above Grade, Cement Board, Stucco Finish			
Mfr.	Carboline	Tnemec	Sherwin Williams
Prime	Sanitile 100, Waterproofing Primer 80 to 100 SF/Gal.	Epoxoblock WB 1254, Waterproofing Primer 80 to 100 SF/Gal.	Loxon XP, Waterproofing Primer, 90-115 SF/Gal.
Finish	Carbocrylic 3350, Acrylic, semi-gloss, 2 coats, 2.0 to 3.0 mils DFT each.	Tneme-Cryl, Acrylic, semigloss, 2 coats, 2.0 to 3.0 mils DFT, each.	Pro-Ind DTM Acrylic, semigloss, 2 coats, 2.5 to 4.0 mils DFT, each.

Y. Doors and Hardware:

1. Doors shall be heavy duty (0.063") aluminum with a minimum R-12 insulated hollow core. All door hardware shall be stainless steel. Provide panic exist device. Screws, bolts and fasteners shall be stainless steel. The door shall be supplied with weather-stripping on all four sides and a wiper gasket. Doors and frames shall be anodized medium bronze finish. Provide door arrangement (single or double) and door sizing to facilitate service, maintenance, and repair or replacement of electrical components and comply with the requirements of the Florida Building Code
2. Hardware (stainless steel) for doors shall be cylindrical lockset (Corbin-Russwin only- no substitutions), dead-bolt; keyed, low profile rim device type panic interior openers, with cylinder lock entry and thumb latch exterior trim, by Von Duprin or equal;.crash chain, and stop and hold. Four (4) keys shall be furnished with each lock. The keying system shall be compatible with Owners present system wide keying system.
3. Each door shall have three (3) stainless steel tamper-proof pinned butt hinges.
4. Doors shall be supplied with an aluminum drip cap, extending 3 inches past door edge, above the door to divert rain from the door opening. An extruded aluminum sill plate shall be provided.

Z. Safety Floor Matting

1. All walkway areas (that space from the entrance to the control panel and the entire NEC clearance area) shall be covered with Nyracord industrial safety matting.
2. The mat shall be a heavy duty, ½ inch minimum thickness Nyracord compound (rubber blend with fiber reinforcement) of open slot design with a ribbed safety pattern to promote sure footing. The underside of the safety

mat shall also be ribbed (in one direction only) to permit aeration and drainage.

3. The safety mat shall not be glued to the floor surface.

## PART 3 – EXECUTION

### 3.01 GENERAL:

Installation of the pre-engineered building shall be completed by competent personnel having previous experience as specified in Section 1.03.

### 3.02 INSTALLATION:

Contractor shall complete the installation in strict accordance with manufacturer's recommendations and under no circumstance shall any field modifications be completed without prior written approval from the building manufacturer and the Engineer.

Before delivery of building, the building's cast-in-place reinforced concrete foundation-floor slab shall be constructed by the Contractor in accordance with the Drawings. All under slab conduits shall be installed at the depths required, and extended to a minimum of 18 inches above the building's finished floor elevation. The placements and locations of these conduits are of the utmost importance, as openings are cast in the floor slab of the building for the follow-up installation of and connections to electrical gear, sections, panels, transformers, etc. Once the concrete foundation-floor slab is constructed, the Contractor shall contact the building manufacturer for a site inspection and final measurements prior to building placement.

### 3.03 PROTECTION:

Adjacent structures shall be protected from damage and defacing during the installation of the pre-engineered building.

### 3.04 MATERIAL ISOLATION:

Wherever aluminized or aluminum products come into contact with concrete surfaces, provide coatings or other methods, as approved by the Engineer, to isolate the surfaces from each other.

## MANUFACTURER'S SERVICES

Provide manufacturer's representatives at site for installation assistance, inspection, and certification of proper installation, equipment testing, startup assistance, and training of Owner's personnel for specified component, subsystem, equipment, or system. The building manufacturer shall be responsible for delivery of the building and shall provide representative to offload and set building in place. The building manufacturer's representative shall be present at the site for at least 1 person-day, travel time excluded, for installation inspection, check-out, clean-up, and certification.

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## SECTION 13441

### INSTRUMENTATION COMPONENTS

#### PART 1 - GENERAL

##### 1.01 SCOPE

This section provides for instrumentation system components. The instrumentation components shall be furnished, installed, tested and calibrated complete, as described in this section, relevant other sections and as shown on the drawings.

##### 1.02 RELATED SPECIFICATIONS

- A. Section 11930 – Pumps – General
- B. Section 15100 – Piping and Valves
- C. Section 16050 – Basic Materials and Methods

##### 1.03 QUALITY CONTROL

- A. Instrumentation components shall conform to ISA standards.

##### 1.04 SUBMITTALS

- A. Submittals shall conform to Section 01300.
- B. Provide component mounting and/or installation details as per manufacturers requirements.

##### 1.05 MANUFACTURER CONTINUITY

- A. Wherever possible, all components shall be furnished from one manufacturer in order to facilitate installation, calibration, system function and Owner operation and maintenance.
- B. All components furnished herein shall be compatible with other portions of the control system specified elsewhere.

#### PART 2 - PRODUCTS

##### 2.01 FLOW DEVICES

###### A. FLANGED TUBE FLOW METER

The flow meter systems shall be of the low wattage, electromagnetic induction type that are calibrated for use with pulsed DC coil excitation and microprocessor-based, digital display transmitters with menu driven internal calibration functions that do not require the use of an external calibrator.

The minimum calibration span shall be 0.5 ft/sec and the maximum calibration span shall be 45 ft/sec for the 4-20 MADC output. The digital or pulse output accuracy shall be +0.15% of flow rate for line sizes from 1/2 to 36 inches for flow velocities from 0.5 to 45 ft/sec. The 4 to 20 MADC output accuracy shall be +0.03% of the reading in addition to the above 0.15% accuracy. The transmitter display shall be configurable in engineering units in any range from 0 - 999. The transmitter enclosure shall be NEMA 4X cast aluminum with an epoxy finish or FRP and shall be separate from the flow tube with mounting hardware for wall or 2" pipe mounting. There shall be a minimum of three (3) 1/2" NPT threaded holes in the transmitter for separation of AC supply, current output and pulse output wiring.

The power supply shall be 120 VAC, 60Hz and the consumption shall be 15 watts or 30VA maximum. The outputs shall be 4 - 20 MADC, internally powered, into 0 - 500 OHMS and 0 - 2000 pulses per second at 100% input pulse output, internally powered into 0 - 300 OHMS. The outputs may also be configured for external power supplies with the 4 - 20 MADC output into 0 - 1800 OHMS when powered by a 50VDC supply and the pulse output rated up to 280 MA when powered by a 40VDC maximum supply. The transmitter shall be Foxboro Model IMT25-SDADB11M-C Tagged FIT

The magnetic flow tubes shall be flanged body unless otherwise shown on the drawings. All flow tubes shall be wet calibrated to verify their specified accuracy traceable to the U.S. National Institute of Science and Technology (NIST). The enclosures shall be NEMA type 4X for watertight and corrosion-resistant protection, with a 304 stainless steel flow tube housing, cast aluminum junction/terminal box and epoxy paint. All signal, power and output cables shall be furnished and installed by the instrumentation contractor to interconnect the flow tube and remote mounted transmitter. Provide 316 SS grounding rings for all flow tubes.

The flanged body flow tubes shall have Polyurethane liners, 316 S.S. electrodes and ANSI Class 150 or 300 R.F. steel flanges. The flow tubes shall be Foxboro 9300A Series with an example model code of 9316A-SIBA-ACJ-GM with Grounding Rings for a 16" Class 150 flow tube.

## 2.02 PRESSURE GAUGES

Pressure gauges shall be liquid-filled, bourdon tube gauges for line or panel mounting, as required. Gauges shall have bourdon tubes of 316 stainless steel, and 316SS connectors. Cases shall be stainless steel, with acrylic or shatter proof glass windows. Gauges shall be 4-1/2" diameter, with 1/2" MNPT bottom mount connections. Scales will be black on white background, 270 deg. span, appropriate to the application. Normal reading shall be at 1/2-2/3 of full scale. Gauge range shall be 0-100 psig as required by the stream which it is monitoring.

All gauges shall be installed with snubbers, isolation tees for testing, isolation ball valves and be connected with 316 stainless steel tubing unless otherwise noted.

Pressure gauges shall be as manufactured by Ashcroft, or U.S. Gauge.

## 2.03 PRESSURE TRANSMITTERS (DIRECT)

The direct pressure transmitters used to monitor pressure losses shall have solid state circuitry and shall be of the two-wire type. Transmitters shall be suitable for operation in ambient temperatures from -40° to 185° F, process temperature -40° to 250° F and relative humidity from 0 to 100%. All transmitters shall be constructed of corrosion-resistant Stainless Steel including isolating diaphragms, drain/vent valves, flanges and adapters. O-rings shall be Viton material. The transmitter shall be silicone oil filled and have an aluminum NEMA 4X housing. Transmitter shall have overrange protection up to 4500 psig on both ports. The transmitters shall be equipped with a 2" scale meter for local indication. Accuracy shall be .075% of calibrated range with repeatability of 0.1 percent. The transmitter output shall have 4 – 20 mA dc analog signal user selectable linear or square root, with a superimposed digital signal, using HART protocol. The analog output shall be adjustable remotely with a field communicator or control system. Zero and span adjustments shall also be available on the transmitter. Transmitter shall include stainless steel panel mounting brackets and 3-valve manifold. The transmitter shall have zero elevation and suppression regardless of output specified. The transmitters shall be factory calibrated from 0-100 psi. Transmitters shall be Model 3051 CD as manufactured by Rosemount.

## 2.04 PRESSURE SWITCHES

Pressure switches shall be watertight die cast aluminum enclosures, NEMA 4, with Teflon/stainless steel actuator seals applicable to its exposed environment. Switching elements shall be narrow dead band type SPDT, 125 VAC, 15A. Switches shall be manufactured by United Electric. Engineer to provide factory setpoint valves.

## 2.05 FLOW SWITCHES

The flow switch shall have a lower body which holds a flow vane and one magnet and shall actuate a separate magnet housed in an adjoining electrical housing above. The upper and lower housing shall be constructed of stainless steel with NPT threads. The electrical housing shall be removable for inspection or replacement without shutting down the pipeline, and be constructed of stainless steel.

The flow switch shall be a normally open contact and shall be actuated with a minimum flow of 200 gpm. The vane shall be stainless steel 11/16" wide by .020" thick. The switch shall be mountable in the horizontal position in a 1½" tapping saddle.

The electrical switches shall be an SPDT single snap action microswitch rated for 5 amp, 120/250 VAC, 60 Hz. Switches shall be W.E. Anderson, Model No. V4, or approved equal.

## PART 3 - EXECUTION

### 3.01 DRAWINGS AND DATA



- A. Complete fabrication, assembly, and installation drawings; wiring and schematic diagrams; and details, specifications, and data covering the materials used parts, devices, and accessories forming a part of the equipment furnished shall be submitted in accordance with submittals section. Submittal data shall be grouped and submitted in three separate stages. Each stage submittal shall be substantially complete. Individual drawings and data sheets submitted at random intervals will not be accepted for review. Instrument tag numbers indicated on the contract drawings shall be referenced where applicable.

### 3.02 INSTALLATION

- A. Installation shall be in complete accordance with manufacturer's instructions and recommendations.
- B. All electrical connections shall be made in conformance with the requirements of Division 16, Electrical.
- C. Once installation is complete, touch up damaged paint with manufacturer supplied paint.

### 3.03 START-UP AND TEST

- A. Contractor shall make adjustments required to place system in proper operating condition. Contractor shall field test and calibrate the equipment to assure that the system operates in accordance with these Specifications and to the satisfaction of the Engineer. The instruments shall be calibrated using standards whose accuracies are traceable to the National Institute of Standards Technology.
- B. Manufacturer's representative shall check and approve the installation before operation and assist Contractor in performing field tests and in calibration of the equipment.
- C. Contractor and system supplier shall provide the services of a factory-trained operating specialist for an eight-hour period for the instruction of the Owner's operating personnel.
- D. Unless otherwise noted, all instrumentation shall be coupled to the specific process with  $\frac{1}{2}$ " 316 S.S. tubing.

END OF SECTION

SECTION 15000

BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The general provisions of the Contract, including conditions of the Contract and Division 1 of the Specifications, apply to this Section.

1.02 SCOPE OF WORK

- A. The work of this Section consists of all labor, materials, equipment, transportation, and facilities necessary to provide a complete and satisfactory system ready to use. Whenever the words "Contractor" appears in this division, they refer to the Contractor for work specified in that Section. The Contractor shall examine all drawings and all sections of the specifications and shall be responsible for ascertaining to what extent other drawings and sections affect work herein specified. All errors, omissions, or code violations shall be reported to Engineer and Owner prior to commencement of work.

1.03 DEFINITION OF THE WORK

PIPING: As used herein, is defined as pipe, fittings, valves, flanges, unions, specialties and accessories and appurtenances necessary for, or incidental to, a complete system.

DUCTWORK: As used herein, is defined as all air delivery and recirculation and exhaust ducts whether of sheet metal or other material, and includes all connections, accessories and appurtenances necessary for and incidental to a complete system.

PROVIDE: As used herein, is defined as to furnish and install.

CONCEALED WORK: As used herein refers to piping, ductwork, and accessories above ceilings and within walls, partitions, shafts or service spaces, not normally exposed to view and enclosed on all sides by finish materials. Access to piping and ductwork would demolish finish materials.

CONCEALED BUT ACCESSIBLE: As used herein refers to piping, ductwork and accessories accessible above or through suspended ceilings, in walls at access panels or in chases with access door.

EXPOSED WORK: Refers to piping or equipment normally exposed to view within rooms or open areas.

#### 1.04 QUALITY ASSURANCE

- A. Codes and Standards: All work must be performed in accordance with the requirements of all pertinent federal and state codes; but if in contradiction to the plans or specifications, the proposed changes must first be referred to the Architect/Engineer for review and approval. Base bid shall include the more stringent of the contradicting methods.
- B. All work shall comply with but not limited to the latest edition codes as the followings:
  - Standard Mechanical Code
  - Standard Plumbing Code
  - Standard Gas Code
  - SMACNA -Sheet Metal and Air Conditioning Contractors National Association
  - ASHRAE -American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
  - OSHA - Occupational Safety Hazards Act
  - NEC - National Electric Code
  - NFPA - National Fire Protection Association
  - NFPA - Life Safety Code
  - ARI - Air Conditioning and Refrigeration Institute
  - ANSI - American National Standards Institute

#### 1.05 COORDINATION OF WORK AND DRAWINGS

- A. Each contractor and subcontractor shall be responsible for coordinating the installation of his equipment/labor with the general contractor and work of other trades.
- B. The layout on the drawings is necessarily diagrammatic but shall be followed as closely as actual construction and as other work will permit. Changes from these drawings required to make this work conform to the building construction or other work of other trades shall be made by the Contractor without additional cost to the Owner but only with the prior approval of the Architect/Engineer and Owner. All major changes shall be shown on the shop drawings and submitted before changes are made.
- C. Contractor shall check all electrical supply and control connections of his equipment furnished under this Section of the specifications to insure proper operation of the equipment.
- D. Submittal of bid shall indicate the Contractor has included all required allowances in his bid. No allowances shall be made for any error resulting from Contractor's failure to visit job site and to review drawings.

## PART 2 - PRODUCTS

### 2.01222.12 MATERIALS

- A. Materials and equipment shall be new, unused, standard current products from manufacturers regularly engaged in the production of such equipment and shall bear label of the Underwriters' Laboratory for the intent use or shall be materials approved by the code enforcing agent.
- B. All hardware and accessory fittings shall be a type designed, intended or appropriate for use and compliment item with which they are used. They shall have corrosion protection suitable for atmosphere in which they are installed. All such hardware shall be U.S. standard size.
- C. Store and protect all materials from injury. Materials and equipment shall be kept clean and dry, free from deterioration by elements. Damaged materials shall not be installed.
- D. Follow installations directions and recommendations of material and equipment manufacturers.
- E. Equipment of a similar nature shall be identical (same manufacturer) throughout entire project and shall fit in the allocated spaces provided, complying with all clearances and codes.
- F. Finishes on equipment which have been scratched or marred shall be touched-up to match original finish or shall be completely refinished.

### 2.02222.22 SUBSTITUTIONS

- A. All proposed substitutions will be in accordance with Section 01600.

## PART 3 - EXECUTION

### 3.01333.13 JOB CONDITIONS

- A. The Contractor shall provide drop cloths, or any other materials necessary to protect floors, walls, furniture, equipment, etc. from soil or damage.
- B. Any damage to the building or its contents incurred by the installation and/or testing of the systems installed shall be repaired promptly at no charge to the Owner.

### 3.02333.23 EXECUTION

- A. Any air conditioning system component installed by Contractor that does not meet specification performance shall be replaced with no additional charge to Owner.

- B. When selecting a system component such as, pumps, fans that are less than 5% of design a next larger size must be secured.
- C. Each component shall meet or exceed performance specifications listed in the contract documents. Components with a lesser degree of performance documented in the final Test and Balance Report will not be accepted.
- D. A standard wiring color code shall be established for each electrical and control component of the system and all similar devices shall be wired identical maintaining the established coloring throughout the entire project.
- E. Air conditioning system components shall conform to federal, state and local sound emission guidelines. Any component which proves to be in violation shall be replaced or properly attenuated to comply with codes at no additional cost to Owner.
- F. Complete control wiring & pneumatic diagrams shall be included in accordance with Section 01700.
- G. Provide a schematic wiring diagram for each component of HVAC system including controls (pneumatic/electronic) located in mechanical room shall be mounted on wall at eye level in each mechanical room.

3.03333.33 WARRANTY

- A. The warranty for all mechanical equipment (whether manufacturer's or contractor's warranty) shall comply with Section 01700 in the General Conditions.
- B. The mechanical contractor shall repair or replace any component of the HVAC system which proves to be defective.
- C. The contractor shall respond the same day after being notified and repairs shall be completed in a timely manner.

END OF SECTION

SECTION 15100  
PIPING AND VALVES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish and install all piping, fittings, and valves as shown on the drawings and specified herein. In general, include all piping from tie-ins to and from equipment as shown on the drawings, including all piping appurtenances for a complete, operating piping system as specified herein.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Section 01300 – Submittals
- B. Section 01720 – Project Record Drawings
- C. Section 01730 – Operating and Maintenance Manuals
- D. Section 02200 – Utility Excavation, Trenching and Backfilling
- E. Section 02670 – Flushing, Testing and Disinfection
- F. Section 05500 – Miscellaneous Metals
- G. Section 09900 – Painting

1.03 REFERENCES

- A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in. Drop.
- B. ANSI/ASTM D2466 - Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- C. ANSI/AWWA C104 – Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
- D. ANSI/AWWA C105 – Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems
- E. ANSI/AWWA C110 – Standard for Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. for Water and Other Liquids.
- F. ANSI/AWWA C111 – Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- G. ANSI/AWWA C115 – Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray Iron Treaded Flanges.

- H. ANSI/AWWA C150 – Standard for the Thickness Design of Ductile-Iron Pipe.
- I. ANSI/AWWA C151 – Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
- J. ANSI/AWWA C153 – Standard for Ductile-Iron Compact Fittings, 3 In. Through 24 In. and 54 In. Through 64 In. for Water Service.
- K. AWWA C210 – Standard for Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines.
- L. AWWA C220 – Standard for Stainless-Steel Pipe, 4 In. and Larger.
- M. AWWA C504 – Standard for Rubber-Seated Butterfly Valves.
- N. AWWA C508 – Standard for Swing-Check Valves for Waterworks Service, 2 In. Through 24 In.
- O. AWWA C509 – Standard for Resilient-Seated Gate Valves for Water Supply Service.
- P. AWWA C511 – Standard for Reduced-Pressure Principle Backflow-Prevention Assembly.
- Q. AWWA C512 – Standard for Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
- R. AWWA C600 – Standards for Installation of Ductile-Iron Water Mains and Their Appurtenances.
- S. AWWA C605 – Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.
- T. AWWA C606 – Standard for Grooved and Shouldered Joints.
- U. AWWA C900 – Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In. for Water Distribution.
- V. AWWA C901 – Standard for Polyethylene (PE) Pressure Pipe and Tubing, ½ In. Through 3 In. for Water Services.
- W. ASTM D1785 - Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- X. ASTM D2855 - Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
- Y. ASTM D3139 - Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.

- Z. ASTM F437-82 - Threaded Chlorinated Poly Vinyl Chloride (CPVC) Plastic Pipe Fittings, Schedule 80.
- AB. ASTM F439-87 - Standard Specification for Socket - Type Chlorinated Poly Vinyl Chloride (CPVC) Plastic Pipe Fittings, Schedule 80.
- AD. ASME/ANSI B16.5 –1996 – Pipe Flanges and Flanged Fittings.
- AE. ASME/ANSI B 31.3 – 1996 – ASME Code for Pressure Piping.
- AF. ASME/ANSI B 16.9 – Pipe Fittings.

#### 1.04 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide data on pipe fittings, valves, and accessories.
- C. Manufacturer's Certificate: Certify that pipe, fittings, and valves meet or exceed respective ANSI, AWWA, and/or NSF Standards.

#### 1.05 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of piping mains, valves, connections, top of pipe and/or invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

#### 1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with Indian River County Water, Wastewater, and Reclaimed Water Utility Construction Standards, where applicable.
- B. Fabricated piping shall meet all ASME code requirements as specified herein.
- C. Valves: Manufacturer's name and pressure rating marked on valve body.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store valves in shipping containers with labeling in place.

### PART 2 - PRODUCTS

#### 2.01 GENERAL

Although they may not be specifically shown on the drawings or called for elsewhere in the Technical Provisions, the Contractor shall include the cost of all fittings, piping supports, and miscellaneous appurtenances needed to provide a secure, workable pipe and valve system. Equipment suction and discharge piping and other exposed piping shall be supported by reinforced concrete pedestals, piers, adjustable pipe supports,



thrust restraints, hangers, and tie rods as necessary to insure a stable installation. Adjustable pipe supports or piers shall be arranged to relieve attached equipment of all strain due to the weight of the pipe, fittings, valves, and the contents of the pipe.

## 2.02 PRODUCT LIST

All products shall conform to the Indian River County Water, Wastewater, and Reclaimed Water Utility Construction Standards, latest edition, unless specifically specified herein.

## 2.03 PIPE

- A. Ductile Iron Pipe: Ductile iron pipe and fittings shall conform to AWWA C150, C151 and C153, Class 250 (minimum).
1. Joints: Buried pipe shall be AWWA approved push-on or mechanical joint pipe (AWWA/ANSI C111/A21.11). Exposed joints shall be AWWA approved flanged joint pipe, in accordance with ANSI/AWWA C115, or as detailed on the drawings. Victaulic joints shall be grooved in accordance with ANSI/AWWA C606 and shall utilize Victaulic Style 31 ductile iron couplings with EPDM gaskets.
  2. Fittings: Buried fittings shall be AWWA approved mechanical joint fittings. Exposed fittings shall be flanged fitting or as detailed on the drawings. Conform to AWWA C153.
  3. The internal surface of all piping and fittings shall be cement mortar lined and seal coated in accordance with AWWA C104, A21, unless other noted on plans.
  4. Restrained joint pipe shall be ductile iron Class 53, American Cast Iron Pipe Co., "Flex-Ring", "Lok-Ring", or mechanical joint coupled as manufactured by American Cast Iron Pipe Company, "Mega-Lug", Star Grip Series 3000/4000 or approved equal. Restrained joint pipe shall be constructed on all new water mains adjacent to all bends, crosses, tees, etc., where a change in direction occurs. Refer to manufacturer's Design Standards for restrained pipe lengths. All fittings 16" and larger shall be restrained and shall include 3 full pipe lengths of restrained pipe and beyond fittings.
  5. All gaskets to be manufactured from EPDM. Flanged gaskets to be Toruseal as manufactured by American Ductile Iron Company.
  6. All hardware, bolts, washers, nuts and etc. for aboveground joints to be 316 stainless steel.
- B. Stainless Steel Tubing: Tubing for sizes 1-inch and smaller shall be seamless austenitic stainless, grade TP 316L conforming to ASTM MA-632. Furnish Swagelok 316 stainless compression fittings, or equal.
- C. HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS
- a. All HDPE pipe shall meet and be installed in accordance with Indian River County Utility Standards.

- b. Polyethylene pipe and fittings shall be high-density polyethylene (HDPE) ASTM PE 3408/4710 ductile iron pipe minimum size for municipal piping systems. Pipe shall be DIP size SDR 11 or as otherwise noted on the plans and conform to AWWA C906 standards.
- c. Pipe shall meet NSF requirements for POTABLE WATER APPLICATIONS.
- d. Polyethylene pipe and fittings shall be joined by the heat butt fusion process to produce a homogenous, sealed, leak tight joint unless otherwise noted as a flanged connection. Fusion process shall meet the requirements of ASTM D-3261. At the point of fusion, the outside diameter and minimum wall thickness shall meet the outside diameter and minimum wall thickness specifications of ASTM F-714. Polyethylene fittings shall be made from the material meeting the same requirements as the pipe. Polyethylene fittings shall be fabricated by the same manufacturer of the pipe. The piping shall be homogenous throughout and free of visible cracks, holes, voids, foreign inclusions, fillers or other deleterious defects and shall be identical in color, density, melt index, and other physical properties throughout.
- e. All flanged connections shall be installed with performance pipe Back-up Rings and shall be AWWA C207 Class D. Back-up rings shall be constructed of 316 stainless steel. All flanged connections shall have a full face EPDM flange gasket. Bolts shall be standard steel for underground applications and 316 Stainless Steel for above ground applications.
- f. All HDPE MJ Adapters (DIPS) shall be a DIPS Bell MJ Adaptor with a retaining gland, stainless steel reinforcing collar, gland ring, standard MJ gasket, and extra-long Tee-head bolts. The gland ring shall be ductile iron, C110, heavy body gland ring. Twist-off nuts, sized same as tee-head bolts, and shall be used to insure proper actuating of restraining devices.
- g. The manufacturer shall certify that samples of the manufacturers' production pipe have been tested in-house, in accordance with ASTM D-2837, and validated in accordance with the latest revisions of PPI ASTM D-2837 and validated in accordance with the latest revisions of PPI TR-3.

## 2.04 BUTTERFLY VALVES

- A. Butterfly valves in ductile pipelines shall be ductile iron body, bronze disc, resilient replaceable (EPDM) seat, lug style unless otherwise specified in Construction Drawings, and in conformance with AWWA C504 and rated for 150 psi working pressure. Buried valves shall be mechanical joint with 2-inch square nut. Exposed valves shall be lug style or flanged joint with operator as specified. Valve shall open when the stem is turned counterclockwise. Valve seats, lining and seals shall be constructed of EPDM.
- B. Actuators:
  - 1. Valves 6" and below not used for throttling - notched plate and handle.
  - 2. Valves larger than 6" on for throttling - gear unit with handwheel.
- C. Valves shall be manufactured by Dezurik, Pratt or equal.

## 2.05 PVC PIPE

- A. Schedule 80 PVC Pipe
  - 1. Rigid PVC (polyvinyl chloride) compound used in the manufacturer of schedule 80 pipe shall be Type I, grade 1 as identified in ASTM D1784. The pipe shall be NSF rated for potable water.
  - 2. PVC schedule 80 shall meet the requirements of ASTM standard D1785 for physical dimensions and tolerances.
  - 3. The marking on PVC Schedule 80 pipe shall meet the requirements of ASTM D1785 and state the material designation code, nominal pipe size, schedule of pipe, pressure rating in psi for water at 73° F., the ASTM designation number D1785 and the NSF seal for potable water.
  - 4. Fittings used shall be PVC Schedule 80 and solvent welded in accordance with ASTM D1785.
  - 5. Small Diameter PVC Pipe: PVC pipe smaller than 4-inch shall be schedule 80 PVC plastic pipe with solvent weld fittings in accordance with ASTM D-1785.

## 2.06 PLASTIC BALL VALVES

- A. Ball valves 1/2 " through 2" shall be double true union type, PVC (same material as pipe) fitted for intended service unless otherwise noted. Valves shall be solvent welded to piping system unless otherwise noted. Valves shall be Nibco Chemtrol, style TU.

## 2.07 STAINLESS STEEL VALVES (less than 2" size)

- A. Shut off valves for seal water, gauges, instruments, etc. shall be Nupro 316 stainless or equal.

## 2.08 CHECK VALVES

- A. Check Valves

Check valves shall be flanged, globe style, silent check valves. The valve shall be cast-iron body, bronze seat, bronze disc and stainless steel spring and screws. Valve seat shall be Viton. The silent check valve shall be fully automatic, spring loaded and double guided. The valve shall be class 150, 600 Series manufactured by APCO

## 2.09 AIR RELEASE VALVE

- A. Air release valves shall be the type to automatically exhaust large quantities of air during filling and allow air to re-enter when draining or subject to a negative pressure.
- B. Valve shall be 1" with N.P.T. threaded inlet and outlet. The valve body shall be cast iron. The float, internal float guides and trim shall be 316 stainless steel. The seat shall be EPDM.
- C. Air release piping shall be type 316 stainless steel tubing and be routed to exhaust air/water to the ground.
- D. Valve shall be manufactured by Crispin, Valmatic or approved equal.

## 2.10 PIPE COUPLINGS

- A. Couplings shall be EPDM gasketed, sleeve-type, with diameter to fit existing pipe. Coupling shall include a steel middle ring, follower rings, wedge-section gaskets and truck head type steel bolts. Couplings shall be manufactured by Dresser, or equal.

## 2.11 TAPPING SLEEVE & VALVE

- A. Tapping sleeve shall be 304 stainless steel with flanged outlet and 304 stainless steel bolts. Sleeve shall be JCM #432, Smith/Blair (Rockwell) #662, Ford Fast, or equal. All sleeves shall have a minimum working pressure of 150 psi. All taps shall be machine drilled, no burned taps will be allowed.
- B. Tapping valves shall be resilient seat type with a flanged joint on the inlet side and a mechanical joint on the discharge side of the valve. Tapping valves shall have a 2-inch operating nut. Working pressure rating shall not be less than 200 psi. Gaskets between the flange faces of the tapping sleeve and tapping valve shall be 1/8" minimum thickness of neoprene rubber. Tapping valves shall be M&H Style #3751, American #865, Mueller #687, Clow or equal.

## 2.12 THRUST RESTRAINT

- A. All bends, tees, crosses, reducers and dead ends shall be restrained through an approved means of mechanical joint restraint. All branch valves shall be restrained with MEGALUGS or approved equal or anchor tees. Any line terminated as a construction phase that is a known future extension shall have a plugged valve placed at the end and restrained with MEGALUGS or approved equal. Thrust restraints shall be placed in accordance with the detail shown in the construction plans.

## 2.13 SAMPLE POINTS

- A. All sample points shall be type 316 stainless steel construction with smooth nose.

## 2.14 EXPANSION JOINTS

- A. Expansion joints shall be constructed of EPDM with 316 stainless steel split retaining ring, 316 stainless steel gussets, and 316 stainless steel control rods with compression sleeves. Expansion joint pressure rating shall be 250psi rated. Expansion joints shall be Invincible 501 as manufactured by Mercer Rubber Co. or approved equal.

## 2.15 HOSE BIBBS

- A. Hose bibbs for potable water shall be ¾" hose thread, similar to NIBCO, with screw on backflow or vacuum breaker device.

## 2.16 RESILIENT SEATED GATE VALVES:

- A. Resilient seated gate valves shall conform to AWWA C509-87. Valves shall provide bidirectional bubble tight sealing at 150 psi differential. Valves shall be as manufactured by American Cast Iron Pipe Company, Mueller, Kennedy or M&H. Above grade valves shall be equipped with a geared handwheel operator.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Verify that building service connection and municipal utility water main size, location and invert are as indicated.

### 3.02 PREPARATION

- A. Where applicable, ream pipe and tube ends and remove burrs.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.

### 3.03 BEDDING

- A. Excavate trench and install pipe bedding as specified in Section 2200, Earthwork.

### 3.04 SURFACE CONDITIONS

#### A. Inspection

1. Prior to all Work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this work may properly commence.
2. Verify that all equipment may be installed in accordance with all pertinent codes and regulations, the original design, shop drawings, and the reference standards.

#### B. Discrepancies

1. In the event of discrepancy, immediately notify the Engineer.
2. Do not proceed with installation in area of discrepancy until all such discrepancies have been fully resolved.

### 3.05 PIPE INSTALLATION - GENERAL

- A. Take all precautions necessary to insure that pipe, valves, fittings, and other accessories are not damaged in unloading, handling, and installation. Examine each piece of material just prior to installation to determine that no damage has occurred. Remove any damaged material from the site and replace with undamaged material.
- B. Exercise care to keep foreign material and dirt from entering pipe during storage handling and installation. Close ends of in-place at the end of any work period to preclude the entry of animals and foreign material.
- C. All pipe shall be laid in a dry trench.
- D. Use only those tools specifically intended for cutting the size and material and type pipe involved. Make cut to prevent damage to pipe or lining and to leave a smooth end at right angles to the axis of the pipe.

### 3.06 TAPPING WATERMAINS

- A. Tapping sleeves shall not be installed within 3' of any joint or fitting. Before installation of tapping tee, the area to be tapped and the tapping tee shall be cleaned with potable water. After all sand, dirt, and debris have been removed from the main, the tapping tee, the tapping valve and the area where the tapping tee is to be installed on the existing main shall be swabbed with a chlorine or bleach solution with at least 100 ppm of chlorine. After the tapping tee is attached to the main, the gate valve shall be closed and tapping tee and gate valve assembly shall be pressured tested at 150 psi for a minimum of 15 minutes with water. The Engineer

or Owner's representative shall witness the pressure test. No visible leaks or loss of pressure shall be evident. After pressure testing, the main may be tapped. Only shell type cutters shall be used. The coupon from the hole that is cut shall be delivered to the Owner.

### 3.07 VALVES AND VALVE BOXES

- A. Install valves with operator stems in the vertical plane through the pipe axis and out of the plane of flow. Locate valves where shown on Drawings. Thoroughly clean before installation. Check valves for satisfactory operation.
- B. Equip all underground valves without gearing or operator switch valve boxes. Set box in alignment with valve stem centered on valve nut. Set the valve box to prevent transmitting shock or stress to the valve. Set the box cover flush with the finished ground surface or pavement.

### 3.08 PIPE PENETRATIONS

- A. Use sleeves where pipes, valve stem extensions, or equipment parts pass through poured in place concrete or masonry walls or slabs. Sleeves shall be either cast iron or fabricated steel wall pipe with intermediate flange seep ring of sufficient size to allow sealing around pipe and clearance for valve stems or equipment. Extend vertical sleeves through slabs 1-inch above top surface.
- B. Provide "Link Seal" pipe to wall closures manufactured by Thunderline Corporation, Wayne, Michigan, where shown on drawings or otherwise required. Seals shall be modular mechanical type, consisting of interlocking synthetic rubber links shaped to fill annular space between pipe and wall opening.
- C. Where new pipe must penetrate existing concrete walls of water bearing structures or into the top slab of potable water bearing structures, core drill to smooth inside finish and install with Link Seal. Seal any rebar exposure.
- D. Where new pipe must penetrate concrete wall on non-water bearing concrete structures, drill penetration in neat, workmanlike manner, install pipe, grout in place with non-shrink grout, and refinish surface to match adjacent.

### 3.09 THRUST RESTRAINT

- A. Provide reaction anchors of concrete blocking, metal harness, retainer gland type or restrained joint type at all changes in direction of pressure pipelines and as shown on drawings.
- B. Concrete reaction anchors shall bear against undisturbed earth and shall be of the size and shape necessary to resist service conditions of the pipe.
- C. Use metal harness restraints as shown on drawings.
- D. Where retainer glands are used, extreme care shall be taken so that each set screw is tightened as recommended by the manufacturer before the pipe is backfilled and

tested. Retainer glands shall not be used on non-metallic pipe, or on any pipe 10-inch or smaller.

### 3.10 PRESSURE TESTING AND DISINFECTION

- A. Flush, test, and disinfect system in accordance with Section 02670.

### 3.11 FIELD QUALITY CONTROL

- A. Compaction testing shall be performed in accordance with Section 2200.
- B. If tests indicate Work does not meet specified requirements, remove work, replace, and retest at no cost to Owner.
- C. Frequency of Tests: Minimum of one test per pipe branch.

END OF SECTION



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SECTION 15140

SUPPORTS AND ANCHORS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Pipe, duct, and equipment hangers, supports, and associated anchors.
- B. Equipment bases and supports.
- C. Sleeves and seals.
- D. Flashing and sealing equipment and pipe stacks.

1.02 REFERENCES

- A. ANSI/ASME B31.1 - Piping.

1.03 QUALITY ASSURANCE

- A. Supports for Sprinkler Piping: In conformance with NFPA 13.
- B. Supports for Standpipes: In conformance with NFPA 14.

1.04 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Indicate hanger and support framing and attachment methods.

PART 2 - PRODUCTS

2.01 PIPE HANGERS AND SUPPORTS

- A. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: 316 Stainless steel, adjustable swivel, split ring.
- B. Hangers for Pipe Sizes 2 to 4 Inches: 316 Stainless steel, adjustable, clevis.
- C. Wall Support for Pipe Sizes to 3 inches 316 Stainless steel unistrut pipe clamps and channel.
- D. Vertical Support: 316 Stainless steel riser clamp.
- E. Floor Support for Pipe Sizes to 4 Inches: 316 Stainless steel adjustable pipe saddle, double locknut nipple, floor flange, and concrete pier or 316 Stainless steel support.

- F. Copper Pipe Support Hanger to be plastic coated.
- G. Shield for Insulated Piping 2 Inches and Smaller: 18 gage stainless steel shield over insulation in 180 degree segments, minimum 12 inches long at pipe support.
- H. Shields for Vertical Copper Pipe Risers: Sheet lead.

## 2.02 HANGER RODS

- A. 316 stainless steel Hanger Rods: Threaded both ends, threaded one end, or continuous threaded.

## 2.03 INSERTS

- A. Inserts: Malleable iron case of 316 stainless steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

## 2.04 FLASHING

- A. Metal Flashing: 26 gage galvanized steel.
- B. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.
- C. Caps: Steel, 16 gage at fire resistant elements.

## 2.05 SLEEVES

- A. Sleeves for Pipes through Non-fire Rated Floors: Form with 18 gage aluminum.
- B. Sleeves for Pipes through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Form with steel pipe or 18 gage galvanized steel.
- C. Sleeves for Pipes through Fire Rated and Fire Resistive Floors and Walls, and Fireproofing: Prefabricated fire rated sleeves including seals, UL listed.
- D. Sleeves for Rectangular Ductwork: Form with galvanized steel.
- E. Fire Stopping Insulation: Glass fiber type, non-combustible.
- F. Calk: Acrylic sealant of quality specified in Section 07920.

## 2.06 FABRICATION

- A. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- B. Design hangers without disengagement of supported pipe.

- C. Provide copper plated hangers and supports for copper piping. Prevent direct contact of dissimilar metals.

2.07 FINISH

- A. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

PART 3 - EXECUTION

3.01 INSERTS

- A. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- B. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
- C. Where concrete slabs form finished ceiling, provide inserts to be flush with slab surface.
- D. Where inserts are omitted, drill through concrete slab from below and provide thru-bolt with recessed square steel plate and nut above slab.

3.02 PIPE HANGERS AND SUPPORTS

- A. Support horizontal piping as follows:

<u>Pipe Size</u>	<u>Max.Hanger Spacing</u>	<u>Hanger Diameter</u>
1/2 to 1-1/4 inch	6'-6"	3/8"
1-1/2 to 2 inch	10'-0"	3/8"
2-1/2 to 3 inch	10'-0"	1/2"
4 to 6 inch	10'-0"	5/8"
PVC (All Sizes)	6'-0"	3/8"

- B. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
- C. Place a hanger within 12 inches of each horizontal elbow.
- D. Use hangers with 1-1/2 inch minimum vertical adjustment.
- E. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.
- F. Where several pipes can be installed in parallel and at same elevation, provide multiple or clevis hangers.
- G. Support riser piping independently of connected horizontal piping.

### 3.03 EQUIPMENT BASES AND SUPPORTS

- A. Provide equipment bases of 6" thick reinforced concrete type for all Air Handling Units and Condensing Units.
- B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.
- C. Construct support of steel members. Brace and fasten with flanges bolted to structure.
- D. Provide rigid anchors for pipes after vibration isolation components are installed.

### 3.04 FLASHING

- A. Provide flexible flashing and metal counterflashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.
- B. Flash vent and soil pipes projecting 3 inches minimum above finished roof surface with lead worked one inch minimum into hub, 8 inches minimum clear on sides with 24 x 24 inches sheet size. For pipes through outside walls, turn flanges back into wall and calk, metal counterflash and seal.
- C. Flash floor drains in floors with topping over finished areas with lead, 10 inches clear on sides with minimum 36 x 36 inch sheet size. Fasten flashing to drain clamp device.
- D. Seal plumbing fixtures watertight to adjacent materials.
- E. Provide acoustical lead flashing around ducts and pipes penetrating equipment rooms, installed in accordance with manufacturer's instructions for sound control.

### 3.05 SLEEVES

- A. Set sleeves in position in formwork. Provide reinforcing around sleeves.
- B. Extend sleeves through floors one inch above finished floor level. Calk sleeves full depth and provide floor plate.
- C. Where piping or ductwork penetrates floor, ceiling, or wall, close off space between pipe or duct and adjacent work with fire stopping insulation and calk seal air tight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
- D. Install chrome plated steel escutcheons at finished surfaces.

END OF SECTION

## SECTION 16000

### ELECTRICAL GENERAL REQUIREMENTS

#### PART 1 – GENERAL

##### 1.01 RELATED DOCUMENTS

- A. The general provisions of the Contract, including General Conditions, apply to all the Work specified in the Electrical 16000 Sections.

##### 1.02 LAWS, PERMITS, FEES AND NOTICES

- A. Secure and pay all permits, fees and licenses necessary for the proper execution of the Work. Submit all notices and comply with all laws, ordinances, rules and regulations of any public agency bearing on the Work. CONTRACTOR shall be licensed electrical CONTRACTOR in the county of construction.

##### 1.03 DEPARTURES

- A. If any departures from the Contract drawings or specifications are deemed necessary, details of such departures and the reasons therefore shall be submitted to the ENGINEER for advance written approval, prior to departure.

##### 1.04 GUARANTEES

- A. Furnish written guarantee covering all materials, workmanship, labor and equipment for a period of one (1) year from the date of acceptance as described in the Contract General Conditions.
- B. The OWNER reserves the right to operate and use all materials and equipment failing to meet the requirements of the Contract documents until such unacceptable materials and equipment are replaced or repaired to the satisfaction of the ENGINEER.

##### 1.05 AS-BUILT INFORMATION

- A. A set of “red-lined” electrical drawings shall be carefully maintained at the job site. Actual conditions are to be put on the drawings in red on a daily basis so the drawings will continuously show locations and routes of cable trays, conduits, pull-boxes, circuit numbers, and other information required by the ENGINEER.

#### 1.06 JOB SITE VISIT

- A. Visit the project site before submitting a bid. Verify all dimensions shown and determine the characteristics of existing facilities which will affect performance of the Work, but which may not be shown on drawings or described within these specifications.

#### 1.07 CLEANUP

- A. Maintain a continuous cleanup during the progress of the Work and use appointed storage areas for supplies. The premises shall be kept free from accumulations of waste materials and rubbish.

#### 1.08 CUTTING AND PATCHING

- A. Cut and prepare all openings, chases and trenches required for the installation of equipment and materials. Repair, remodel and finish in strict conformance with the quality of workmanship and materials in the surroundings. Obtain written permission from the ENGINEER for any alterations to structural members before proceeding.

#### 1.09 MAINTENANCE

- A. Render all necessary measures to ensure complete protection and maintenance of all systems, materials and equipment prior to final acceptance. Any materials or equipment not properly maintained or protected to assure a factory new condition at the time of final acceptance shall be replaced immediately at no additional cost to the OWNER.

#### 1.10 WATERPROOFING

- A. Whenever any Work penetrates any waterproofing, seal and render the Work waterproof. All Work shall be accomplished so as not to void or diminish any waterproofing bond or guarantee.

#### 1.11 TESTS

- A. Conduct an operating test of equipment prior to the ENGINEER's approval. The equipment shall be demonstrated to operate in accordance with the requirements of these specifications. The tests shall be performed in the presence of the ENGINEER or an authorized representative. The electrical CONTRACTOR shall furnish all instruments, electricity and personnel required for the tests.

#### 1.12 SUMMARY OF ELECTRICAL WORK

- A. Provide all labor, materials, tools, supplies, equipment and temporary utilities to complete the Work shown on the drawings and specified herein. All systems are to be completely installed and fully operational. Specifically the Work includes, but is not necessarily limited to:

1. Electrical and I&C equipment associated with the Booster pump station.
2. Provide coordination with FPL.
3. Provide lightning protection system.
4. Provide grounding system.
5. Install fiber systems.

#### 1.13 CODES AND STANDARDS

A. General Applicable provisions of the following codes and standards and other codes and standards required by the State of Florida and local jurisdictions are hereby imposed on a general basis for electrical Work (in addition to specific applications specified by individual Work sections of these specifications):

1. U.L.: Electrical materials shall be approved by Underwriters' Laboratories, Inc. This applies to materials which are covered by U.L. standards. Factory applied labels are required.
2. National Electrical Code.
3. OSHA: Standards of the Occupational Safety and Health Administration are to be complied with.
4. NEMA: National Electrical Manufacturers Association Standards are to be met wherever standards have been established by that agency and proof is specifically required with material submittals for switchboards, motor control centers, panelboards, cable trays, motors, switches, circuit breakers and fuses.
5. ANSI: America National Standards Institute
6. NESC: National Electrical Safety Code
7. Any and all local codes.

#### 1.14 ELECTRICAL TEMPORARY FACILITIES

A. The electrical CONTRACTOR shall include in his bid the cost of furnishing, installing, maintaining and removing all materials and equipment required to provide temporary light and power to perform his Work during construction and until Work is completed.

B. Safety



1. All reasonable safety requirements shall be observed to protect workers and the public from shock and fire hazards. Ground fault interrupters shall be employed in accordance with codes.
2. Ground wires are required in all circuits. Ground poles are required on all outlets. All metallic cases shall be grounded.
3. Raintight cabinets shall be used for all equipment employed in wet areas.

#### 1.15 EXCAVATING FOR ELECTRICAL WORK

- A. General – Not needed

#### 1.16 ELECTRICAL SUBMITTALS

- A. Submittals for Approval

1. Refer to Contract General Conditions for additional instructions on the General Conditions and this section, the more stringent requirements shall apply.
2. Shop Drawings and Manufacturer's data sheets are required for all electrical materials.
3. Submittals will not be accepted for partial systems. Submit all materials for each specification section at one time. Submittals must be arranged, correlated, indexed and bound in orderly sets for ease of review.
4. Samples are to be supplied for any substitute as requested by the ENGINEER.
5. The following numbers of copies are required:

Shop drawings	6 sets
Samples	1 each
Manufacturer's data	6 sets
Certifications	6 sets
Test reports	6 sets
Warranties/Guarantees	6 sets

6. Submit shop drawings, Manufacturer's data and certifications on all items of electrical Work prior to the time such equipment and materials are to be ordered. Order no equipment or materials without approval from the ENGINEER. Submittals will not be accepted for partial system submittals; submit all data at one time. Submittals will be promptly returned, approved, approved as noted, or not approved. Items "approved as noted" must be changed to comply with the ENGINEER's comments and need not be resubmitted for "approved" status.

Items “not approved” are not suitable, requiring complete new submittals.

7. Time delays caused by rejection of submittals are not cause for extra charges to OWNER or time extensions. CONTRACTOR shall be responsible for investigating existing systems or shop drawings in order to fully integrate the new equipment into the system. Adequate shop drawings may or may not exist for all existing systems.

B. Operation and Maintenance Manuals

1. Submit to the ENGINEER five (5) copies of all Manufacturer’s service installation and operation manuals, instructions and bulletins. These manuals shall be subject to review of the ENGINEER. If acceptable they shall be forwarded to the OWNER. If not acceptable they shall be returned to the CONTRACTOR for revision and resubmittal. Manuals shall contain, but not be limited to, the following:
  - a. Brief description of system and basic features.
  - b. Manufacturer’s name and model number for all components in the system.
  - c. List of local factory authorized service companies.
  - d. Operating instructions.
  - e. Maintenance instructions
  - f. Trouble shooting instructions
  - g. Manufacturer’s literature describing each piece of equipment.
  - h. Power and control wiring diagrams
  - i. Parts lists

## 1.17 ELECTRICAL PRODUCTS

### A. Standards Products

1. Unless otherwise indicated in writing by the ENGINEER, the products to be furnished under this specification shall be the Manufacturer's latest design. Units of equipment and components of the same purpose and rating shall be interchangeable throughout the project. All products shall be newly manufactured. Defective equipment or equipment damaged in the course of installation or test, shall be replaced or repaired in a manner meeting with the approval of the ENGINEER at no additional expense to the OWNER.

### B. Delivery, Storage and Handling

1. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels and similar information needed for distinct identification; adequately packaged or protected to prevent deterioration during shipment, storage and handling. Store in a dry, well ventilated, indoor space, except where prepared and protected by the Manufacturer specifically for exterior instructions for storage locations.

### C. Substitutions

1. Comply with instructions in the Contract General Conditions and Special Conditions and obtain pre-approval of the ENGINEER regarding substitutions.

## 1.18 SKILLED ELECTRICAL CRAFTSMEN

- A. CONTRACTOR shall employ and staff the project with skilled Craftsmen experienced in the project requirements.
- B. As a minimum, a Licensed Journeyman Electrician shall be present on the project at all times.
- C. Other skilled persons shall be present as the project requirements dictate including Manufacturers representatives, start-up technicians, ENGINEERS, etc.

## 1.19 DRAWINGS AND SPECIFICATIONS

- A. Refer to the drawings for additional requirements. There are requirements indicated on the drawings which are not noted in the specification.
- B. Bidders, suppliers, equipment vendors, General CONTRACTOR, Sub Contractors and other similar entities are required to read all the Contract documents including drawings and specifications.

## 1.20 SCHEMATIC NATURE

- A. Plan views are schematic in nature and meant to show the schematic arrangement of equipment and conduit.
- B. CONTRACTOR shall provide the OWNER/ENGINEER with an 11 x 17 (min) drawing (to scale) of the final layout of the equipment and conduit routing for approval. This drawing shall include measurements for all NEC required clearances and separations for equipment and conduit. Refer to other spec sections for conduit routing requirements.

## 1.21 APPROVED SHOP DRAWINGS

- A. Use approved shop drawings for lay out of equipment. The Contract documents will vary from the shop drawings. Inform the ENGINEER immediately if there are lay out issues or inadequate space for equipment or clearances. Land conduits in openings of enclosures per the approved shop drawings, do not use the Contract drawings.
- B. Housekeeping pads, equipment racks and the like shall be based on the approved shop drawings.

## 1.22 CLEARANCES

- A. It shall be the CONTRACTOR's responsibility to meet N.E.C. clearances about equipment.

## 1.23 ROUTING

- A. Conduit routing is schematic in nature. Conduit routing is shown for clarity on the Contract drawings. See other spec sections for additional conduit routing requirements.

## 1.24 FUTURE FACILITIES

- A. Where future facilities are indicated, conduit routing shall account for such facilities.

## 1.25 DRAWINGS FURNISHED BY CONTRACTOR

- A. OWNER shall be provided all CONTRACTOR furnished drawings. Such drawings include, but are not limited to: Control panels, MCC.s, VFD.s, switch boards, instrumentation details, ATS, redline mark-up of the Contract drawing and the like.
- B. Drawings shall be furnished for review and approval. No materials shall be provided without the ENGINEER's approval.
- C. Final drawings shall be furnished or as field modified accounting for any changes made during start up.

1.26 HOMERUNS

- A. CONTRACTOR shall coordinate home runs between plan views. Where any conduit is shown in any plan view it shall be installed the entire length may be required.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

## SECTION 16050

### BASIC MATERIALS AND METHODS

#### PART 1 – GENERAL

##### 1.01 SUBMITTALS

- A. Submit data sheets on all items per Section 16000.

##### 1.02 CODES AND STANDARDS

- A. General applicable provisions of the following codes and standards and other codes and standards required by the State of Florida and local jurisdictions are hereby imposed on a general basis for electrical Work (in addition to specific applications specified by individual Work sections of these specifications):
  - 1. U.L.: Electrical materials shall be approved by the Underwriters' Laboratories, Inc. This applies to materials which are covered by U.L. standards. Factory applied labels are required.
  - 2. NEC: National Electrical Code
  - 3. OSHA: Standard of the Occupational Safety and Health Administration are to be complied with.
  - 4. NEMA: National Electrical Manufacturers Association Standards are to be met wherever standards have been established by that agency, and proof is specifically required with material submittals for switchboards, motor control centers, panelboards, cable trays, motors, switches, circuit breakers, and fuses.
  - 5. ANSI: American National Standards Institute
  - 6. NESC: National Electrical Safety Code

#### PART 2 – PRODUCTS

##### 2.01 GROUNDING MATERIALS

- A. All ground rods shall be 20 foot 5/8" copperclad, unless otherwise indicated.
- B. Ground wires shall be soft drawn copper sized per National Electrical Code, unless otherwise indicated.

## 2.02 CONDUIT

### A. PVC Conduit

1. PVC conduit shall be Schedule 80 or Schedule 40 unless otherwise noted and shall be U.L. approved. Comply with Federal Spec WC-1094 and NEMA TC-1.

### B. Flexible Conduit

1. All flexible conduits shall be liquidtight, made of corrosion resistant plated steel with extruded polyvinyl covering and watertight connectors.

### C. Refer to schedule in drawing for location requirements.

## 2.03 CABLE, WIRE AND CONNECTORS

### A. 600 Volt Power Wiring

1. Individual conductors shall be rated for 600 volts and shall meet the requirements below:
  - a. Conductors shall be stranded.
  - b. All wire shall be brought to the job in unbroken packages and shall bear the date of manufacturing; not older than 12 months.
  - c. Type of wire shall be THWN except where required otherwise by the Contract drawings.
  - d. No wire smaller than No. 12 gauge shall be used unless specifically indicated.
  - e. Conductor metal shall be copper.
  - f. All conductors shall be meggered after installation. Megger testing shall exceed 50 mega ohms.
2. Multi-conductor cables shall be type TC UL 1277 THWN, PVC jacketed 600V with conductor and quantities as indicated.

### B. Instrumentation and Control Cable

1. Process instrumentation wire shall be 16 gauge, single twisted pair, 600V., aluminum tape shielded, polyvinyl chloride jacketed, as manufactured by Houston Wire and Cable HW-106 or an approved equal.

### C. Control Cable

1. Multi-conductor control cable shall be stranded copper 14 gauge, 600V. THWN insulated overall shielded with PVC jacket, as manufactured by Houston Wire and Cable HW-153 or an approved equal.

#### 2.04 TERMINATIONS AND SPLICES (600 VOLTS AND LESS)

- A. Terminations of power cable shall be by means of U.L. approved connectors. All connectors shall meet U.L. 486B and shall be compatible with the conductor material.
- B. Terminate all control and instrumentation cable with screw-clamp type terminal blocks.
- C. Splicing of power, control, or instrumentation wiring will not be allowed except by written approval of the ENGINEER. Where splicing is allowed, splices shall be made with approved compression connectors, and splices shall be made waterproof regardless of location.

#### 2.05 BOXES

- A. Boxes for wiring devices, switches and receptacles installed outdoors shall be weatherproof fiberglass with polycarbonate cover plates.

#### 2.06 PULL BOXES AND SPLICE BOXES

- A. Location
  1. Units used outdoor or in a damp or corrosive environment shall be 316 ss or fiberglass unless otherwise indicated on plans.
  2. Units used indoors in dry and clean A/C environments shall be NEMA 1.
- B. Size
  1. Units shall be sized per NEC as minimum.
- C. Required Units
  1. Plans depict minimum requirements. Additional units shall be provided as may be required to complete raceway systems.

#### 2.07 MOUNTING AND SUPPORTING ELECTRICAL EQUIPMENT

- A. Furnish and install all supports, hangers, and inserts required to mount fixtures, conduits, cables, pull boxes, and other equipment.



- B. Support system used indoors in clean, dry and air conditioned areas shall be galvanized steel. All other areas shall be 316 ss with ss fasteners.
- C. Perforated straps and wires are not permitted for supporting electrical devices. Anchors shall be of approved types.
- D. All supports, hangers, hardware, etc. used outdoors or in in non-air conditioned indoor areas or in hazardous areas shall be non-ferrous, corrosion resistant or 316 stainless steel. Supports shall be selected to avoid galvanic reactions. Support devices shall be submitted for approval.
- E. Provide trapeze, bridge systems or wall bracketed cantilevered system to support the raceway system.
- F. Spacing of support systems shall be per NEC. Provide spacing of conduits according to the NEC and the materials used. For PVC conduit, refer to NEC table 347-8.
- G. Plans depict minimum requirements. Provide additional units as required to complete raceway system.

## 2.08 DUCT SEAL

- A. Provide Garvin Industries' duct seal or an approved equal
- B. Provide and install duct seal at all conduit ends for all new conduit installations.
- C. Duct seal shall be used to seal around junction boxes, control panels and the like,. It shall be a permanently soft, non toxic compound. It shall also not affect other plastic materials or corrode metals.
- D. Duct seal shall be applied to the MCP, RIO-3 and RIO-4. Apply to each penetration but not more than 20-2" conduits per panel.

## PART 3 – EXECUTION

### 3.01 GROUNDING

- A. Provide ground system as indicated on the drawings and as required by the National Electrical Code.
- B. All raceways require grounding conductors. Metallic raceways are not adequate grounding paths. Bonding conductors through the raceway systems shall be continuous from main switch ground buses to panel ground bars of the panelboards, and from panel grounding bars of panelboards and motor control centers to branch circuit outlets, motors, lights, etc. **THESE GROUND CONDUCTORS ARE REQUIRED**

THROUGHOUT THE PROJEC REGARDLESS OF WHETHER CONDUIT RUNS SHOW GROUND CONDUCTORS ON THE DRAWINGS.

- C. All connections made below grade shall be of the exothermic type.
- D. The grounding system test shall not exceed a 48 hour span dry resistance of 10 ohms. Additional grounding to meet this requirement shall be installed at no extra cost. Grounding and bonding connections shall not be painted.

### 3.02 CONDUIT

#### A. Locations:

Conduits shall be used as follows:

1. Refer to schedule on drawings.

#### B. Installation

1. Conduits subjected to rough handling or usage shall be removed from the premises.
2. Conduits must be kept dry and free of water or debris with approved pipe plugs or caps. Care shall be given that plugs or caps be installed before pouring of concrete.
3. Where conduits pass through exterior concrete walls or fittings below grade, the entrances shall be made watertight.
4. Infurred ceilings, conduit runs shall be supported from structure, not furring.
5. Conduits entering panelboards, pull boxes, or outlet boxes shall be secured in place by galvanized locknuts and bushings, one (1) locknut outside and one (1) locknut inside of box with bushing on conduit end. The locknuts shall be tightened against the box without deforming the box. Bushings shall be of the insulating type.
6. Field conduit bends shall be made with standard tools and equipment manufactured especially for conduit bending.
7. Where embedded conduits cross expansion joints, furnish and install offset expansion joints or sliding expansion joints. Sliding expansion joints shall be made with straps and clamps.
8. Exposed runs of conduits shall be installed with runs parallel or perpendicular to walls, structural members or intersections of vertical planes and ceilings, with right angle turns consisting of symmetrical bends. No attempts are made in plans to show

required pull boxes, gutters, etc. necessary for the construction of the raceway system but the CONTRACTOR shall provide these raceways as may be required.

9. Conduits in structural slabs shall be placed between the upper and the lower layers of reinforcing steel, requiring careful bending of conduits. Conduits embedded in concrete slabs shall be spaced not less than eight (8) inches on centers or as widely spaced as possible where they converge at panels or junction boxes. Conduits running parallel to slab supports, such as beams, columns and structural walls shall be installed not less than 12 inches from such supporting elements. To prevent displacement during concrete pour, saddle supports for conduit, outlet boxes, junction boxes, inserts, etc., shall be secured.
10. Conduit runs shall always be concealed except where indicated on plans.
11. Pull lines shall be installed in all empty conduits. All pull wires shall be identified with conduit number at each end.
12. Where conduits are run individually, they shall be supported by approved pipe straps secured by means of toggle bolts or tapcons on hollow masonry; tapcons on concrete or solid masonry; machine screws or bolts on metal surfaces and wood screws on wood construction. The use of perforated straps or wires will not be permitted.
13. Wire shall not be installed until all Work of any nature that may cause damage is completed, including pouring of concrete. Mechanical means shall not be used in pulling in wires No. 8 or smaller.
14. Underground conduits not under concrete slabs are to be buried at least two (2) feet below finished grade for circuits rated 600 volts or less, except under traffic areas where motor vehicles may cross. Under traffic areas, conduits are to be buried at least three (3) feet below finished grade.
15. All conduits shall be cleaned by pulling a brush swab through before installing cables.
16. All conduits shall be sealed at each end with electrical putty. Special care shall be taken at all equipment where entrance of moisture could be detrimental to equipment. Approved backing gauze is required prior to the installation of conduit putty.
17. A maximum of two (2) feet of flexible conduit shall be used at connections of all motors, transformers, motor operated valve and gates, instruments and other items of equipment where vibration is

present. It shall be supported where required with stainless steel bands.

20. PVC conduit shall be supported to walls and slabs using carlon snap strap conduit wall hangers. Two hole PVC conduit clamps shall not be permitted.

### 3.03 WIRES, CABLES AND CONNECTIONS

- A. Cables pulled into conduits shall be pulled using pulling eyes attached to conductors.
- B. Shields shall be grounded at only one termination point.

### 3.04 BOXES

- A. Installation of boxes shall be in accordance with the National Electrical Code requirements.
- B. Boxes shall be mounted plumb and level in accessible locations and mounting shall be secure, vibration resistant and galvanically compatible. Hardware shall be used that is specifically intended for the purpose. When mounted in corrosive, damp or wet locations, stainless steel hardware shall be utilized.

### 3.05 WIRING DEVICES

- A. Wiring devices shall be installed in device boxes approved for the application. All connections shall be made with screw terminals. Wiring devices shall be Leviton or approved equal.
- B. Wire devices on UPS systems shall be isolated ground, colored orange.
- C. Cover plates shall be provided as follows except as otherwise noted.
  1. Interior finished area – brushed aluminum
  2. Wet areas – gasketed plastic with flip cover.
- D. Receptacles installed outdoors, below grade, or in areas other than clean and dry environments shall be GFI and weatherproof. Receptacles shall be weatherproof with cords plugged in.
- E. All receptacles shall be GFI protected.

### 3.06 SUPPORTING DEVICES

- A. All items shall be supported from the structural portion of the building and studs, except standard ceiling mounted lighting fixtures and small devices

may be supported from ceiling system where permitted by the ENGINEER. However, no sagging of the ceiling will be permitted. Supports and hangers shall be types approved by Underwriters' Laboratories.

- B. All floor-mounted devices (switchboards, motor control centers, transformers, etc.) shall be securely anchored to the floors. Where recommendations are made by Manufacturer, these recommendations shall be followed.

### 3.07 CLEANING

- A. All electrical equipment enclosures shall be thoroughly cleaned before acceptable by the OWNER. As a minimum, CONTRACTOR shall remove all debris including stripped wire insulation, dirt, and debris.

END OF SECTION

SECTION 16202

GENERATOR, WEATHER PROOF ENCLOSED,  
BASE TANK, REACH-IN

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. Work included:

1. All of the equipment described in this section shall be supplied by a single equipment Supplier regularly engaged in that business. The Contactor shall provide installation, testing and startup. The Contractor shall be responsible for coordinating with the Equipment Supplier for the delivery, storage and release of equipment.
2. The work covered by this portion of the specifications consists of supplying a weatherproof enclosed, diesel electric generator with a subbase tank, mounted on a skid for standby continuous use. All necessary equipment and accessories as specified shall be provided and any additional equipment required for a completely functional system shall be supplied.
3. Those items which are to be provided by the Equipment Supplier are listed herein. The Contractor shall provide all other equipment, piping, electrical and miscellaneous appurtenances necessary for a complete and operating system, whether or not any specific component is shown or specified.
4. The Supplier shall provide the unit completely assembled at the jobsite. The Contractor shall handle, store, install and make electrical connections to the equipment.
5. The Contractor shall conduct start up testing and commissioning of the unit. The Supplier shall provide all labor materials and documentation for startup.
6. The system shall meet all National and Local code including environment codes.
7. The unit shall be located on the top of a wellfield. Include all environment requirements.
8. Provide fuel system.

## 1.02 MANUFACTURER

- A. The unit shall be completely built, tested and shipped by one manufacturer who has been regularly engaged in the manufacturing of such equipment. The manufacturer and local dealer shall be limited to the following:
1. Caterpillar
  2. No equal
  3. Cummins

## 1.03 CODES

- A. All equipment shall be provided per the requirements of the following codes as applicable for the intended use and installation.
1. NFPA 70, latest edition (National Electrical Code).
  2. NFPA 110, Emergency and Standby Power Systems, latest edition.
  3. UL 2200, the complete generator set assembly including engine generator set, base tank, weatherproof "reach in" enclosure and all related equipment shall be UL listed.
  4. UL 2085, protected, Standard double wall steel fuel containment tanks, FDEP approved.
  5. Federal emission requirements, as may be applicable for the installation. Supplier shall be responsible for the generator meeting the proper tier requirements.
  6. FLORIDA BUILDING CODE (latest edition)
    - a. Attention is drawn to chapter 16, section 1626 – high-velocity hurricane zones-impact tests for wind-borne debris.
    - b. Enclosures and systems shall be provided with certifications and labels as the authority having jurisdiction may require.
  7. Coordinate with the building department and provide all labor and material to satisfy them.
  8. FDEP
    - a. All system and materials shall comply with FDEP and shall be provided with approval labels as may be required.
  9. Emissions Standards
    - a. The unit shall meet emissions standards as may be required. It shall be the Supplier's responsibility to meet the tier level.

10. Unit shall be provided for tier level for prescribed use. Unit shall be standby only. Unit shall be tier 3 as minimum.

#### 1.04 SUBMITTALS

A. Provide 8 copies of shop drawings. As a minimum include:

1. Engine manufacturer, model number, power output parameters, plans and elevations of the units, entrance points for power, control and fuel, storage and foundation requirements.
2. Engine Generator/Exciter control cubical.
3. Fuel consumption rate curves at  $\frac{1}{4}$ ,  $\frac{2}{4}$ ,  $\frac{3}{4}$ ,  $\frac{4}{4}$  loads.
4. Exhaust mufflers and vibration isolators.
5. Battery charger, batteries and battery racks.
6. Diesel Storage Sub-Base Tank and fuel connection points.
7. Cooling water requirements of radiator.
8. Engine cooling air requirements and radiator fan capacity.
9. Electrical diagrams including schematic and interconnection wiring diagrams for all equipment to be provided.
10. Legends for all devices on all diagrams.
11. Sequence of operation, explanations of all portions of schematic wiring diagrams.
12. Provide load calculations including starting and running kVA.
13. Transient voltage response calculation, no voltage transient shall dip below 25%.
14. Enclosure drawings including scanned plans, elevations and other drawings as may be required by the Engineer.
15. Provide installation instruction and details.

B. The specified kW shall be for continuous electrical service during interruption of the normal utility source. These ratings must be substantiated by manufacturers standard published curves. Special ratings or maximum ratings are not acceptable.

C. O&M Manuals

1. Three sets of O&M manuals shall be provided, including parts manuals.



## 1.05 WARRANTY

- A. Equipment furnished under this section shall be guaranteed against defective parts and workmanship under terms of the manufacturer's and dealer's standard warranty. But, in no event shall it be for a period of less than five (5) years from the date of the Owner's acceptance of the unit.

## PART 2 – PRODUCTS

### 2.01 ENGINE

- A. Engine shall be watercooled 4 cycle inline or vee type compression ignition diesel. It shall meet specifications when operating on No. 2 domestic burner oil. The engine shall be equipped with fuel, lube oil, coolant, exhaust system, silencer, fuel transfer pump, fuel priming pump, fuel water separator, service run time meter, engine driven water pump, engine driven alternator for batteries, batteries, instrument/control panel including: lube oil pressure gauge, tachometer, system voltage, jacket water temperature gauge, system diagnostics code display, other auxiliary equipment as may be required for proper operation of the units. Provide jacket water heaters.
- B. An electronic governor system shall provide automatic isochronous frequency regulation. Unit shall be electronic.
- C. The engine/generator set shall be mounted on a structural steel sub-base and shall be provided with suitable quad spring vibration isolators.
- D. Safety devices for protection of the units shall be provided as per the generator supplier and shall minimally include: shutoffs for high water temperature, low oil pressure, overspeed and engine overcrank.
- E. Guards shall be provided over all exposed moving parts per OSHA.

### 2.02 ALTERNATOR

- A. The AC generator shall be synchronous, four pole, 2/3 pitch, revolving field, drip-proof construction, single pre-lubricated sealed bearing, air cooled by a direct drive centrifugal blower fan, and directly connected to the engine with flexible drive disc. All insulation system components shall meet NEMA MG1 temperature limits for Class H insulation system. Actual temperature rise measured by resistance method at full load shall not exceed 80°C.
- B. The generator shall be capable of delivering rated output (kVA) at rated frequency and power factor at any voltage not more than 5 percent above or below rated voltage.
- C. A permanent magnet generator (PMG) shall be included to provide a reliable source of excitation power for optimum motor starting and short circuit performance. The PMG and controls shall be capable of sustaining circuit performance. The PMG and controls shall be capable of sustaining and

regulating current supplied to a single phase or three phase fault at approximately 300% of rated current for not more than 10 seconds.

- D. The subtransient reactance of the alternator shall not exceed 12 percent based on the standby rating of the generator set.
- E. Space Heater – Alternator shall be provided with 120V, 100W max. space heater interlocked with generator run relay.
- F. Windings shall be Class “H” epoxy impregnated.
- G. Temperature rise at rated load shall not exceed NEMA MG 1-22.40 definition.

#### 2.03 COOLING SYSTEM

- A. Radiator – An engine mounted radiator with blower type fan shall be sized to maintain safe operation at 122 degrees Fahrenheit maximum ambient temperature.
- B. The engine cooling system shall be pretreated by the engine supplier for the inhibiting of internal corrosion.
- C. The radiator shall exhaust through the enclosure.

#### 2.04 DIESEL STORAGE TANK, BASE MOUNTED

- A. A 500 (minimum) gallon double walled base mounted fuel tank shall be provided and mounted integral with the unit as recommended by the manufacturer. It shall have the structural integrity to support the engine-generator set along with the associated vibrations. Minimum features shall include all welded construction, a lockable fuel filter cap, fuel gauge, low fuel alarm, leak detection alarm, fuel line check valve, fittings for fuel supply, return, fill and vent. The tank shall be supplied by the engine-generator set manufacturer and be factory installed. Tank shall be UL 2085 listed, protected, with rupture basin. Unit shall be FDEP approved.
- B. Float switches shall be Morrison Brothers, Co. or an approved equal.
- C. High level switch shall provide Form “A” contacts for:
  - 1. Remote annunciation.
  - 2. Local alarm at generator control panel.
- D. Low fuel level switch shall provide Form “A” contact for:
  - 1. Remote annunciation.
  - 2. Local alarm at generator control panel and shut down to prohibit starving the engine.
- E. Interstitial switch shall provide Form “A” contact for remote annunciation.

- F. Provide sensors as may be required.
- G. Provide additional requirements as may be noted or indicated.

## 2.05 EXHAUST SILENCER

- A. Exhaust Silencer – Critical type critical grade silencer, muffler companion flanges, and flexible braided stainless steel exhaust fittings properly sized shall be furnished according to the manufacturer's recommendations. A silencer rain cap with counter weight shall be provided.
- B. Silencer shall be located within the enclosure.
- C. Exhaust silencer and flex shall have insulation blankets installed.

## 2.06 AUTOMATIC STARTING SYSTEM

- A. Starting Motor – A DC electric starting system with positive engagement drive shall be provided. The motor voltage shall be as recommended by the engine manufacturer.
- B. Automatic control – Fully automatic generator start/stop controls in the generator control panel shall be provided. Controls shall provide shutdowns for low oil pressure, emergency stop, high water temp, engine overspeed, low coolant level, overcrank, internal fault shutdown. Controls shall include a 30 second cranking cycle with lock out. Lock out shall have remote reset capability.
- C. Batteries – A lead acid storage battery set of the heavy duty special starting type shall be provided. Battery voltage shall be compatible with the starting system. Battery set shall be rated for no less than 172 amp hours. Free standing corrosion resistant battery racks and necessary cables shall be provided. Batteries shall be unit mounted.
- D. Battery Charger – Current limiting battery charger shall be furnished to automatically recharge the batteries. Charger shall be the float charging type furnished to properly charge the batteries. It shall include overload protection, silicone diode full wave rectifiers, voltage surge suppressor, DC ampmeter, DC voltmeter, fused AC input. Input power shall be 120V single phase. A battery charger fail alarm contact shall be provided. Charger shall be unit mounted.

## 2.07 BATTERIES

- A. Provide units sized for the project needs.
- B. Include DC fused power for:
  - 1. The enclosure, lighting
  - 2. The ATS
  - 3. Shunt trip of equipment as indicated.

4. Other elements as may be indicated.
5. Provide plastic battery tray.

## 2.08 GENERATOR CONTROL PANEL

### A. Generator Set Control

1. The generator set shall be provided with a microprocessor-based control system that is designed to provide automatic starting, monitoring and control functions for the generator set. The control system shall also be designed to allow local monitoring and control of the generator set and remote monitoring and control as described in this specification.
2. The control shall be mounted on the generator set. The control shall be vibration isolated and prototype tested to verify the durability of all components in the system under the vibration conditions encountered.
3. The generator set mounted control shall include the following features and functions:

### B. Generator set A/C output metering

1. The generator set shall be provided with a metering set including the following features and functions:
  - a. Frequency meter
  - b. 3 phase volt meter
  - c. 3 phase ampmeter
  - d. Amp and voltage selector switches
  - e. Auto starting controls, as noted.
  - f. Voltage level adjustment rheostat
  - g. Individual fault indicators for low oil pressure, high water temperature, over speed and overcrank.
  - h. Provide signal isolation equipment as required, especially regarding the start/stop signal.
  - i. Ground fault indicator pilot light, with ground fault sensing CT and monitoring relay.
  - j. Emergency shut off pushbutton
  - k. Pre-alarms for high water temperature and oil low pressure shall be provided.

C. Generator Set Alarm and Status Display

1. The generator set shall be provided with alarm and status indicating lamps to indicate non-automatic generator status and existing warning and shutdown conditions. The lamps shall be high intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. The generator set control shall indicate the existence of the following alarm and shutdown conditions on an alphanumeric digital display panel:

ALARM

Low oil pressure  
Oil pressure sender failure  
Low coolant temperature  
High coolant temperature  
Engine temperature sender failure  
Low DC voltage  
High DC voltage  
Weak battery  
Low fuel-daytank  
Ground fault  
Over load  
Low coolant level

SHUTDOWN

Low oil pressure  
High coolant temperature  
Fail to crank  
Fail to start/overcrank  
Overspeed  
High AC voltage  
Low AC voltage  
Under frequency  
Over current  
Short circuit  
Emergency stop  
Low coolant level

WARNING

Over current

2. Provide form "A" contacts for each of the above to be used in SCADA system.
  3. Provide common fault alarm.
- D. Remote annunciator shall be provided as part of the equipment per NFPA and installed by the Contractor.
- E. Unit shall work with new ATS. All labor and material shall be provided to coordinate the installation. Coordinate all work.

- F. The following signals shall be provided from the generator control panel to the remote PLC.
1. Generator running, Form "A", output
  2. Generator fault, Form "A", output
  3. Generator battery fail, Form "A", output
  4. Generator not in Auto, Form "A", output
  5. Generator main line breaker open, Form "A", output
  6. Sub-base tank, high level, Form "A", output
  7. Sub-base tank, low level, Form "A", output
  8. Sub-base tank, interstitial leak detected, Form "A", output
  9. Sub-base tank, fuel level, 4-20 MADDC, output

## 2.09 GENERATOR RATINGS

- A. The generator rating shall be as indicated by the drawings, .8 PF, and shall also start and operate the following. All loads are considered fully loaded. Supplier shall take special care in sizing the generator. The motors are slow speed, high amp draw. Supplier shall submit load calculations showing the starting and running of the following generator load. Include all the load indicated in the drawings.

## 2.10 MAIN CIRCUIT BREAKER

- A. Unit shall be provided with a 100% rated main line circuit breaker molded case, interrupting rating exceeding the generator output and as indicated.
- B. Unit shall be provided with VDC shunt trip wired to generator shutdowns, along with auxiliary contacts as required.
- C. A break glass kill switch shall be provided and wired to shunt trip the main service and prohibit the engine from starting. Generator battery VDC excitation shall be provided to the kill switch.
- D. Provide Form "A" contact to indicate the trip condition.

## 2.11 FLUIDS

- A. Unit shall be provided with all fluids, fully fuelled and ready for immediate use.

## 2.12 GENERATOR ENCLOSURE

- A. A weather resistant, aluminum sound attenuated, prepainted, maintenance free aluminum, enclosure designed as a reach-in to mount to sub-base tank shall be provided to house the engine/generator and accessories. It shall consist of a roof, side walls, and end walls of one-piece, stressed skin, semi-monocoque construction. Enclosure shall be as manufactured by Phoenix Product, AMPS or an approved equal.
- B. The system shall include a cooling and combustion air inlet silencer system, an equipment enclosure section, and a cooling air discharge silencer section. It shall be sound attenuated.

- C. Provide sound attenuation system. The maximum sound at 21 feet from the unit shall be 65 dba.
- D. Roof and wall structural members shall be extruded aluminum 6063-T6 alloy. Wall panels of 0.040" mill-prepainted aluminum and roof panel 0.040" mill finish aluminum shall be hard-riveted to framing. Aluminum sheet, pop-riveted to a steel frame is not acceptable. Roof bows shall be cambered to aid in rain runoff. A minimum of six colors shall be available for enclosure exterior. Color shall be selected by Owner. Provide paint chip for selection with submittals.
- E. Insulation in walls and roof shall be semi-rigid, thermo-acoustic, thickness as required to meet the noise criteria specified. Lining shall be perforated, mill-finish aluminum. Self-adhesive foam and loose or bat-type insulating materials will not be accepted.
- F. Lifting provisions shall be provided at or near the enclosure roof, with capacity suitable for rigging the enclosure. Estimated enclosure weight shall be provided on submittal drawings.
- G. Reach in access doors shall be fabricated of the same materials as the enclosure walls. They shall be reinforced for rigidity, gasketed, and set in a welded frame to ensure proper operation. Handles shall be key lockable, all doors keyed alike. Doors and/or hinged louver panels should be provided in sufficient quantity to allow access for all necessary maintenance and operation, coordinated with generator set manufacturer. All handles, hinges, hardware and fasteners shall be 316 stainless steel.
- H. Enclosure manufacturer shall provide all necessary hardware to internally mount the specified exhaust silencer(s) and maintain the weather resistant integrity of the system.
- I. Provide:
  - 1. Battery charger
  - 2. Jacket water heaters
  - 3. Alternator heater
  - 4. Observe with N.E.C. code clearance shall be provided at the control panel, main breaker and the like.
  - 5. Wire shall be sized per code and installed within schedule 80 PVC conduit.
- J. 2-48" fluorescent strip lights with W/P switch, powered from batteries.
- K. The enclosure design shall be such that it is made to withstand hurricane wind forces, based on 150 MPH minimum or the latest Florida Building Code wind load requirements, whichever provides the greater wind load design. The enclosure shall exceed the Miami-Dade projectile requirements. The shop

drawings shall include stamped drawings by a State of Florida registered Engineer with wind load calculations that meet these requirements. The calculations shall also include hold down requirements (bolt type, size, number, spacing and embedment depth) for the enclosure/tank assembly to resist 18-inches of submergence/buoyancy due to storm surge (with fuel tank empty).

- L. Detailed shop drawings shall be submitted for approval. Drawings shall indicate: Conduit entrance points, fueling locations, fuel gages, etc.
- M. Base tank and enclosure shall be painted to match as selected by the Owner. Furnish paint selection chart.
- N. Provide panelboard with terminals for all internal equipment. Observe all NEC requirements.

## PART 3 – EXECUTION

### 3.01 TESTS

- A. The unit shall be tested at rated frequency and voltage.
- B. Following installation, the following tests shall be performed by the system manufacturer's local dealer representative(s) in the presence of the Owner's Engineer or designated appointee:
  - 1. Pre-start checks:
    - a. Oil level
    - b. Water level
    - c. Tank fuel level
    - d. Battery connection and charge condition
    - e. Engine to control interconnects
    - f. Engine generator intake/exhaust obstructions
- C. Supplier shall provide onsite operation tests
  - 1. Load – One hour operation at 80% of full load rating. Two hours operation at 100% of full load rating. After the first half hour stabilization period at full load, the following shall be recorded at fifteen minute intervals:
    - a. Voltage, amps and frequency.
    - b. Fuel pressure, oil pressure and water temperature.
    - c. Exhaust gas temperature at engine exhaust outlet.
    - d. Ambient temperature



- e. Kilowatts
  - f. Power factor
  - g. kVARS
  - h. Generator temperature
2. Test shall utilize resistive load banks for the full load. Minimum load shall be equal to the nameplate rating of the engine/generator set in kW. Generator supplier shall supply all load banks equipment necessary for connecting generator to load banks. Supplier shall provide all labor and material to perform test.
  3. Proper operation of controls, engine shutdown and safety devices shall be demonstrated.
  4. Should these tests indicate that the equipment does not meet the specified performance requirements, National Electrical Code and local codes, the cost of all corrective measures shall be borne by the Supplier.
  5. Provide certified test report to Engineer.

### 3.02 STARTUP AND INSTRUCTION

- A. Before start up, the Supplier shall provide the services of an on site technician to confirm proper connection of external equipment. If acceptable to the Supplier and the Owner, the unit may be start up tested.
- B. At no additional cost to the Owner, the generator Supplier shall provide start up assistance and coordination as required.
- C. Operating and maintenance procedures shall be explained to the Owner's personnel by the dealer's factory trained representative.
- D. A minimum of one manday shall be provided for instructing the Owner's staff in the care and maintenance of the unit. Training shall be provided by the Supplier.
- E. Proper operation of controls, engine shutdown and safety devices shall be demonstrated.

### 3.03 SYSTEM SERVICE CONTRACT

- A. Supplier shall make available to the Owner, this standard service contract which the Owner may or may not choose to exercise. This contract is separate from the warranty requirements contained herein.

### 3.04 SCHEDULE OIL SAMPLING

- A. The Supplier of the equipment must provide a quarterly oil sampling analysis for a period of one year form the date of acceptance. This scheduled oil sampling

shall be of the atomic absorption spectrophotometry method as opposed to the spectrographic analysis method and shall be accurate to within a fraction of one part per million for the following elements:

1. Iron
  2. Chromium
  3. Copper
  4. Aluminum
  5. Silicon
  6. In addition the sample shall be tested for the presence of water, fuel dilution, and antifreeze.
- B. All equipment needed to take oil samples shall be provided in a kit at the time of acceptance and shall include the following:
1. Sample gun kit (1)
  2. Bottles (4)
  3. Mailers (4)
  4. Written instructions (1)
- C. Immediate notification shall be provided to the Owner when analysis results shows any critical reading. If readings are normal, a report stating that the equipment is operating within established requirements shall be provided.
- D. This scheduled oil sampling program shall be made available to the Owner beyond the mandatory one (1) year specified above and shall be optional for the Owner to continue that program after that time period has elapsed.

END OF SECTION

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SECTION 16250

AUTOMATIC TRANSFER SWITCH

PART 1 – GENERAL

1.01 Section includes

- A. Automatic transfer switches (ATS) with delayed transition.

1.02 References

- A. Transfer switches shall be designed and manufactured to the latest revision of UL-1008 and shall be provided with a UL label.

1.03 Submittals

- A. Submittals shall be provided in accordance with the general conditions but not less than six (6) copies.
- B. Detailed fully engineered drawings shall be provided. Standard product data sheet will be rejected.

1.04 Qualifications

- A. To be considered for approval, a manufacturer shall be specialized in manufacturing products specified in this Section with a minimum of ten (10) years documented experience.

1.05 Warranty

- A. Manufacturer shall warrant specified equipment to be free from defects in materials and workmanship for one (1) year from date of installation.

1.06 Integration

- A. Units shall be provided to fully integrate with the standby generator system . Coordination shall be required.
- B. See the drawings for additional requirements.

PART 2 – PRODUCTS

2.01 Model

- A. Model shall be Cutler Hammer, Lake Shore or an approved equal.
- B. The switch shall be of the automatic power sensing, delayed transition type. The switch shall be UL approved standard 1008, rated to carry full

name plate current at all times. A manual handle shall be provided for emergency operation from the deadfront inner panel.

- C. Provide pilot devices or pilot LED.s.
- D. Unit shall have dead front inner panel for manual operation.
- E. Units shall be rated NEMA 4X unless otherwise indicated.
- F. ATS Minimum Features
  - 1. Voltage sensing on all three phases on normal and emergency sources with automatic low voltage and phase loss detection. Adjustable over/under frequency sensor shall be provided on the emergency source.
  - 2. Adjustable time delay after line failure before engine start, 0-5 minutes.
  - 3. Automatic transfer to generator when voltage is present.
  - 4. Adjustable time delay on retransfer when normal power is available, 2-30 minutes. Push button to cancel time delay on return to normal.
  - 5. Adjustable time delay for engine running unloaded after transfer to normal source, 2-30 minutes.
  - 6. 4-Pilot lights or LED.s
    - a. Green for switch in normal position.
    - b. Red for switch in emergency position.
    - c. Green for normal power available.
    - d. Red for emergency power available.
  - 7. 4-Position selector switch, maintained, front door mounted on outside or keypad
    - a. Off – Switch position remains constant, generator shall not crank.
    - b. Auto – Normal automatic control.
    - c. Test – Test operation of the transfer system and standby generator by simulating line power loss. System shall remain in the test mode until selector switch is returned to the auto mode which will allow normal retransfer, logic

and/or time delays shall be provided to allow switch mode change without undesired actions.

- d. Engine test – start engine without ATS transfer.
8. Status contacts (form A) wired to terminals for inputs to PLC:
- a. Switch in normal position.
  - b. Switch in emergency position.
  - c. Normal voltage present.
  - d. Emergency voltage present.
9. Engine start contact (Form A) wired to terminals for engine start.
10. Short circuit withstand rating shall be 65,000 amps, unless otherwise noted.
11. Provide adjustable time delay for transition period in the neutral position with the pole of the switch de-energized.
12. Unit shall be front accessible only and wall mounted.
13. Provide lugs for cable connections.
14. Unit shall be U.L. labeled.
15. Installation Contractor shall be responsible for all field power and control wiring.
16. Provide sunshield on the top.
17. Provide digital multi-meter Cutler Hammer IQ 200 Series with front panel display volts, amps, kW etc. or equal. Provide Ethernet output and connections to SCADA. Provide software including drivers as may be required. Provide potential and current transformers as may be required.
18. Provide electronic control.
19. Provide keypad and sunlight use display.

## PART 3 – EXECUTION

### 3.01 INSTALLATION

- A. Install ATS in accordance with manufacturers written instructions and the National Electrical Code.

### 3.02 FIELD QUALITY CONTROL

- A. Inspect ATS visually.
- B. Perform several manual operations.
- C. Verify circuit continuity and megger each conductor. Minimum megger valve shall be 50 mega-ohms.
- D. Check tightness of all connections using calibrated torque wrench per manufacturers recommended torque values.

### 3.03 ADJUSTING

- A. Adjust time delay setting to values as required for proper operation of the power system. Provide settings per Owner's instructions.

### 3.04 TESTING

- A. Test manual operation of the unit under load. Test all automatic features of ATS including transfer from normal to emergency and from emergency to normal, remote generator start control. Provide testing in the presence of the Owner and Engineer.

### 3.05 TRAINING

- A. Provide a minimum of four (4) hours training.

### 3.06 PROGRAMMING

- A. Program switch features per Engineer/Owner requirements.
- B. Provide typewritten listing of final parameter setting with O&M manuals.

END OF SECTION

## SECTION 16681

### VARIABLE FREQUENCY DRIVE

#### PART 1 – GENERAL

##### 1.01 WORK INCLUDED

- A. Provide a complete U.L. listed Variable Frequency Drive (VFD) systems as specified within and as indicated on the drawings. System shall be provided complete with all necessary accessories and appurtenances as required for a completely functional system ready for immediate use.
- B. Units shall be provided as specified below and with additional requirements as indicated on plans.
- C. Like items of equipment provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance, operation and maintenance.
- D. See CONDITIONS OF THE CONTRACT and Division 1, GENERAL REQUIREMENTS, which contain information and requirements that apply to the Work specified herein and are mandatory for this project.
- E. Drive shall have ampacity to serve the motor requirements. Coordinate with motor.
- F. Drives shall be provided by the I&C manufacturer and integrated into the pump control system.
- G. Include pump vendor protective devices as may be needed.

##### 1.02 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of Section 01300 – Submittals.
- B. Fully Engineered shop drawings specific for this project shall be submitted to the Engineer for review and comment. Vendor shall clearly indicate his conformance to the requirements of this specification. Along with standard literature, a detailed schematic and assembly drawings shall be provided. A recommended statement shall be provided. Vendor shall not release the unit for manufacture without approved shop drawings.
- C. Complete set of Operation and Maintenance Manuals shall be submitted.
- D. Warranty information shall be submitted.



### 1.03 QUALITY ASSURANCE

- A. All equipment furnished under this specification shall be new and unused, shall be the product of a manufacturer having a successful record of manufacturing and servicing the equipment specified herein for a minimum of five (5) years.

### 1.04 WARRANTIES

- A. Provide a full warranty covering labor, materials, the services of a factory authorized technician including all expenses for a period of one year, to begin after Owner's start-up and acceptance of the drive. During this period, manufacturer shall repair any failures associated with the drive.

### 1.05 NAMED MANUFACTURERS

- A. Yaskawa
- B. No equal

## **PART 2 PRODUCTS**

### 2.01 VARIABLE FREQUENCY DRIVE (VFD)

- A. Provide a separate fully engineered Variable Frequency Drive (VFD) system for use with the pump/motor shown on plans. Power input shall be 480 volts, 3 phase; the drive shall include.
  - 1. Minimum drive inverter amps of output shall not be less than the amps as listed in Table 430-150 of the latest issue of the National Electrical Code.
  - 2. Minimum drive overload capability shall not be less than 110% of the output rated amps for 60 seconds.
  - 3. Coordinate with pump vendor requirements to verify speed and torque requirements
  - 4. Coordinate with vendors and equipment suppliers regarding constant or variable torque applications and RPM of the driven loads. Provide units per applications.
  - 5. Include pump protective equipment as may be required.
  - 6. See the drawings for additional requirements.
- B. As a minimum, include the following features:
  - 1. Exterior front cabinet door mounted equipment shall be as follows:
    - a. Hand-Off-Auto selector switch.

- b. Programmer/Monitor/Display Module and required appurtenances. Display shall indicate speed in percent.
  - c. Padlockable outside handle connected to disconnect the power supply to the unit before opening door. A defeater shall be provided.
  - d. Engraved legend plate shall be provided for all devices.
  - e. Run time meter hours, non-resettable, Electro-Mechanical Engler 200 Series or an approved equal.
2. Main disconnect with current limiting fuses or circuit breaker connected to the padlockable door handle. Interrupting ratings shall match or exceed the values indicated in the main power service equipment. Min. value shall be 65,000 AIC or as otherwise indicated.
  3. Control power transformer with control circuitry and control logic as specified and as indicated on plans. Control power transformer shall be oversized for motor heat.
  4. Drive shall be provided with the capabilities to ride through brown outs and to restart on power loss and return after time delay.
  5. Discrete output contacts shall be provided and wired to labeled terminal strip. Contacts shall be required as indicated per plans; one form "C" contact shall be provided. Additional slave relays shall be provided as required. The units shall be hardwired for all control elements. Also, the drive shall be Ethernet connected for information exchange.
  6. Provisions to receive hardwired 4-20 mA DC signal for remote speed reference. Signal isolation shall be provided in the drive.
  7. Joslyn lightning arrestors, Surgitron, 1454-01 or an approved equal wired to the line side of the disconnect.
  8. 6-spare fuses of each size and type used shall be provided.
  9. Provide drives with I/O as indicated
  10. Provide output filters, Transcoil or an approved equal.
  11. Units shall meet or exceed the requirements of IEEE 519. Provide additional labor and materials as may be required. Submit calculations for review and approval.
  12. VFD controls shall include special equipment as may be required by pump and motor supplier including but not limited to sensor and additional pilot devices as required to fully implement, overtemp signals into the drive.

## C. Operation

### 1. Hand-Off-Auto mode selector

#### a. Discrete control, see the drawings

- (i) Hand: The drive ramps up to the speed reference per the local potentiometer or keypad setting.
- (ii) Off: Drive ramps down and no power is applied to the motor. While in the off position, the drive is not permitted to run.
- (iii) Auto: Drive start/stop control is from the remote device. Upon receiving a start command, the drive ramps up to the remote speed reference. Upon receiving the stop command, the drive shall ramp down to zero output.

#### b. Speed control, see the drawings

- (i) The speed reference shall be from the local potentiometer or keypad while the local H-O-A is in the hand mode and from speed command signal while in the automatic mode.
- (ii) Adjustable minimum and maximum speed settings shall be provided.
- (iii) Separate adjustable ramp slopes settings shall be provided for both acceleration and deceleration.

## D. Enclosure

1. Dimensions are critical. Drawings indicate maximum space requirements. Unit shall fit in allowed enclosure.

## E. Technology

1. VFD units shall use 18 pulse with isolation transformers and Transcoil output filters for units 100 hp and greater.
2. VFD units shall use 6 pulse with line reactors and Transcoil output filters for units less than 100 hp.

## 2.02 INTERFACING

- A. Units shall be connected with the communication cable. See the drawings.
- B. Units shall use hard wired control and status indication. See the drawings.

- C. Unit shall interface with remote controller. See the drawings.

## PART 3 – EXECUTION

### 3.01 GENERAL

- A. Install equipment in a workmanlike manner utilizing craftsmen skilled in the particular trade. Provide work which has a neat and finished appearance.
- C. Coordinate work with the Owner, the Contractor and work of other trades to avoid conflicts, errors, delays and unnecessary interference with operation of the existing plant during construction.
- D. Follow manufacturers' installation instructions explicitly, unless otherwise indicated. Wherever any conflict arises between manufacturers' instructions, and these Contract Documents, follow Engineer's decision, at no additional cost to the Owner. Keep a copy of manufacturers' instructions on the jobsite available for review at all times.

### 3.02 MANUFACTURER'S SERVICES

- A. Provide the services of a factory authorized service technician to start up, test and place in service the unit. This service shall be extended, as required, at the manufacturer's expense, if problems arise with the drive unit.
- B. Provide separate from the start up, one (8) hour on site training. This time shall be at the convenience of the Owner. Minimum training instructions shall include the following:
  - 1. Routine Maintenance
  - 2. Programming, including entering the programming mode, changing set points interpreting fault information.
  - 3. Trouble shooting
  - 4. Fault corrections and resetting actions.
- C. Programming
  - 1. Program VFD features per project requirements.
  - 2. Provide typewritten listing of final parameter setting with O&M manuals.

### 3.03 CLEAN-UP

- A. Keep the premises free from accumulation of waste material or rubbish. Upon completion of work, remove materials, scraps and debris from premises and from interior and exterior of all devices and equipment. Touch-up scratches, scrapes, or chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the type, color, consistency and type of surface of the original finish.

END OF SECTION

SECTION 16690

ELECTRIC MOTORS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Contractor shall provide all equipment required for a complete and functional system. Contractor shall receive, handle, install and assist in checkout of the units. Contractor shall coordinate all furnished equipment.
- B. This Section specifies the quality criteria, design standards, materials and installation procedures not otherwise specified, required for electric motors furnished under these Contract Documents.
- C. Units shall be provided by the pump manufacturer.

1.02 CONTRACTOR'S RESPONSIBILITY

- A. Furnish and submit shop drawings, operation and maintenance manuals, etc. as per the general conditions. In addition, the submission shall include the following technical information:
  - 1. Motor Efficiency
  - 2. Motor Torque Speed Curves from zero to full load speed.
  - 3. Nameplate data
- B. The above information shall be supplied as part of the submittal on the equipment which the motor drives.
- C. Contractor shall coordinate with motor and VFD suppliers. Motor full load amps shall be provided to VFD supplier.

1.03 STANDARDS

- A. Electric motors shall conform to the latest standards of IEEE, ANSI and NEMA except as otherwise specified herein.

1.04 CONDITIONS OF SERVICE

- A. Electric motors shall be designed and manufactured to operate under the following conditions except for specific variations stated in other sections of these specifications.
  - 1. Continuous Duty
  - 2. Altitude below 3300 feet.

3. Ambient temperature 0 to 40°C maximum.
4. Voltage variation plus or minus 10 percent.
5. Unit shall be suitable for starting and running with power and control equipment provide for it.

#### 1.05 TESTING

- A. Motors less than 50 hp: Each motor shall be subjected to a standard short commercial test including the following:
  1. Running light current
  2. Locked rotor current
  3. Secondary voltage at collector rings (wound rotor motors).
  4. High potential
  5. Winding resistance
  6. Bearing inspection
- B. Motors 50 through 100 hp: Each motor shall be subjected to the above tests and shall be furnished with certified test results.
- C. Efficiency: Motors rated 25 through 100 hp shall be individually tested for efficiency.
- D. Test Reports: Seven (7) copies of all certified test results shall be submitted to the Engineer for approval. Single copies of witnessed test raw data shall be submitted to the Engineer immediately upon completion of such tests.

#### 1.06 TOOLS AND SUPPLIES

- A. Furnish all special tools necessary to disassemble, service and adjust the equipment.

#### 1.07 APPLICATION

- A. This Section applies to pump/motor assembly, not specifically submersible pumps.

### PART 2 – PRODUCTS

#### 2.01 GENERAL

- A. The driven equipment manufacturer shall be responsible for supplying

the motor and shall factory mount the motor to ensure proper coordination.

- B. Review plans and other specifications. Provide motor suitable for starting method.
- C. Where motors are used with Variable Frequency Drive systems, they shall be provided as inverter duty, premium efficiency.

## 2.02 MANUFACTURER

- A. The motor shall be a Totally Enclosed Fan Cooled, TEFC, Inverter duty, US Motors, TECO/Westinghouse.

## 2.03 DESIGN OF MOTORS

- A. Horsepower: The driven equipment manufacturer shall be responsible for sizing the motors in coordination with the driven equipment so that the nameplate rated horsepowers are not exceeded and motors are not required to operate within their service factor at any point within the driven equipment operating range. For variable speed application, the motor shall be designed for operation at the rated maximum speed and at reduced speeds down to 30% without overloading. The Engineer reserves the right to reject driven equipment which requires motors larger than the minimums specified in the other Sections of these Specifications or to require the Contractor to bear additional costs if larger electrical equipment is required.
- B. Temperature Rise: Motors shall conform to standards of NEMA Class F Insulation System with a Class B rise unless otherwise listed in the other parts of these Specifications.
- C. Voltage and Current: Fractional horsepower motors (less than ½ hp) shall be 115/208V or 115/230V, 60 hz single phase. Motors ½ horsepower through 600 horsepower shall be 460 volts, 60hz, 3-phase.
- D. Service Factor: Unless otherwise specified, service factor shall be a minimum of 1.15.
- E. Speed: As specified with equipment.
- F. Torque: At least 20 percent greater than the maximum full load torque requirements of the driven equipment throughout the full operating range of the driven equipment from start to full load.
- G. Efficiency:
  - 1. Motors in the range of 1 hp to 200 hp, inclusive shall be designed specifically for energy efficiency and high power factor. In accordance with NEMA Standard MG 1-12.53b, each motor shall meet the minimum guaranteed efficiency for



specified nameplate efficiency. All motor efficiency test shall be performed utilizing the NEMA preferred test method IEEE 112 Method B, Dynameter.

2. Motors 200 hp and larger shall have a minimum efficiency, at full load, of 95% and a minimum power factor of 85%.
3. Motors above 20 hp shall be "premium efficiency motors": U.S. Electric Motors, General Electric or an approved equal.

#### H. Inverter Duty

1. Motor used on VFD systems shall be inverter duty and be provided with 1200 volt insulation as a minimum.

### 2.04 MATERIALS AND CONSTRUCTION

#### A. Enclosure

1. The enclosure shall be the type as specified in respective parts of equipment specifications and shall be constructed of cast iron or fabricated steel components in proper position. Fans may form part of the rotor and shall be of non-sparking material on totally enclosed motors. Enclosures for motors not specified elsewhere, shall be TEFC, unless otherwise stated. Fractional horsepower motor enclosures shall be totally enclosed non-ventilated.

#### B. Insulation

1. Motors shall have inorganic, non-hygroscopic insulation unless otherwise noted in other parts of these specifications. Insulation shall be Class F rating.

#### C. Stator

1. The stator shall be assembled from high grade electrical sheet steel laminations adequately secured together.
2. The stator windings shall consist of materials such as polyester film, synthetic varnish or glass cloth. Windings shall be random or from wound, adequately insulated and securely braced to resist failure due to electrical stress and vibrations.
3. Any junction in motor insulation, such as coil connections or between slot and end winding sections, shall have protection equivalent to that of the slot sections of coils. The entire winding of all motors when finished, shall be epoxy encapsulated, after subjecting to a process which removes all moisture and ensures freedom of air pockets.

D. Rotor

1. The shaft shall be made of high grade machine steel or steel forging of size and design adequate to withstand the load stresses. The rotor shall be fabricated of high grade electrical sheet steel laminations adequately fastened together and to the shaft. Squirrel cage windings may be cast aluminum or bar-type construction with brazed end rings.

E. Bearings shall be ball or roller

1. Motors up to 1,000 horsepower shall have oil bath and grease-lubricated, sealed bearings. Above 1,000 horsepower, lubrication shall be oil. Unless specified otherwise, the bearings shall have a B-10 life as follows:

<u>Motor hp</u>	<u>B-10 Life (hrs.)</u>
Less than 50	24,000
50 to 200	40,000
greater than 200	100,000

2. For vertical motors, thrust bearings shall be Kinsbury type, ball or roller bearings as required for the design thrust load. Guide bearings shall be radical type ball bearing.

F. Space Heaters, motors 20 hp and greater

1. Unless otherwise indicated, 120-volt, single phase, space heaters shall be provided to maintain a motor temperature of approximately 10°C above a 40°C ambient. Maximum wattage shall be 200W.

G. Temperature switches, motors 20 hp and greater

1. Provide motor winding thermostatic-controlled switch. The switch shall be normally closed and shall open upon high temperature condition.

H. Leads and Terminals

1. Leads shall be suitably marked and identified. Terminal housing locations, which are not shown on the Contract Drawings, shall be NEMA Assembly F-1.

I. Motor Terminal Boxes

1. Motor terminal boxes shall be provided separately for the power connections.

2. The thermal switches and heater connections shall be in a common separate terminal box.
3. All terminal boxes shall be provided with threaded hubs.

J. Grounding Means

1. Each motor shall have adequate means for attaching #4/0 AWG copper grounding conductor to the motor frame near the base. It shall be a mechanical clamp terminal connector located on the same side as the stator lead junction box.

K. Direction of Rotation

1. Motors shall be designed and manufactured for operation in a direction as required for driven equipment. The phase sequence, at the specification rotation, shall be marked permanently and plainly inside the stator lead junction box.

L. Noise

1. All motors shall have an equivalent A-weighted sound level of 80 dp A as determined in accordance with IEEE Standard No. 85. In no case shall the noise levels exceed those levels established as maximum values in the Town of Jupiter Code of Ordinances.

M. Nameplates

1. Each motor shall have a stainless steel nameplate including the following minimum amount of information:
  - a. Manufacturer's type designation
  - b. Frame number
  - c. Output horsepower rating
  - d. Duty (time rating)
  - e. Rated load speed (rpm)
  - f. Temperature rise in degrees centigrade at rated load, rotor and stator.
  - g. Stator voltage rating

- h. Stator full load amperes
- i. Service factor (marked for operation at 40°C ambient)
- j. Frequency
- k. Number of Phases
- l. Inrush of locked rotor KVA
- m. Code letter designation
- n. Efficiency
- o. Bearing type, size, lubricant

### PART 3 – EXECUTION

#### 3.01 INSTALLATION

- A. Motors shall be mounted in accordance with the motor manufacturer's drawings and instructions. Field installation of the unit shall include final alignment.
- B. Installation shall also include furnishing necessary oil and grease for initial operation and making final adjustments to place the equipment in operable condition.

#### 3.02 FIELD TESTS

- A. All motors, their driven equipment and speed controllers (if applicable), shall be tested together after installation as described in the applicable sections of these specifications.

#### 3.03 PAINTING

- A. Motors shall be assembled with pump at pump manufacturer's plant and shipped to the site with manufacturer's standard finishes. After installation and before being placed in final operation, the motors shall be with Corro- Duty or an approved equal.

END OF SECTION

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## SECTION 16901

### I&C SYSTEMS

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

- A. The Contractor shall furnish all instrumentation control equipment.
- B. Field instruments are specified elsewhere and/or indicated on drawings.
- C. The VFD pump control panels shall be provided by the I&C system supplier.
- D. Reference Section 16913 – PLC and SCADA Programming for Contractor and Owner responsibilities.

##### 1.02 SINGLE INSTRUMENT SUPPLIER

- A. The Contractor shall assign to the Single Instrument and Control (I&C) supplier full responsibility for the functional operation of all new instrumentation systems. The Contractor shall have said supplier perform all engineering necessary to select, to furnish, to supervise installation, connection, to calibrate, to place into operation all sensors, instruments, alarm equipment, control panels, accessories and all other equipment as specified herein.
- B. The foregoing shall enable the Contractor and the Owner to be assured that the full responsibility for the requirements of this section will reside in an organization which is qualified and experienced in the water treatment field and its process technology on a functional system basis.
- C. Contractor shall review all specifications and plans. Contractor shall be sure all control panels are included in the bid. The following are suggested to be in the I&C Contractor's package. Major pieces of equipment include:
  - 1. VFD pump control panel
  - 2. BOSTER PUMP STATION control panel.
  - 3. Field instruments
  - 4. Fiber systems
  - 5. Computer systems
  - 6. Field terminal boxes
  - 4. Pneumercator Fuel Management System including sensors coordinate with generator/ tank supplier.

##### 1.03 NAMED I&C SUPPLIER

- A. CC Control

- B. Curry Controls
- C. Revere Controls
- D. No equal

#### 1.04 INSTALLATION WORK

- A. Nothing in this part of the specifications shall be construed as requiring the Contractor to utilize personnel supplied by his assigned instrument manufacturer's organization or any division thereof, to accomplish the physical installation of any elements, instruments, accessories or assemblies specified herein. However, the Contractor shall employ installers who are skilled and experienced in the installation and connection of all elements, instruments, accessories and assemblies; portions of their work shall be supervised or checked as specified herein.

#### 1.05 PREPARATION OF SUBMITTAL OF DRAWINGS AND DATA

- A. It is incumbent upon the Contractor to coordinate the work specified in these Sections so that a complete instrumentation and control will be provided and will be supported by accurate shop and record drawings. As part of the responsibility as assigned by the Contractor, the Single I&C supplier shall prepare and submit through the Contractor, complete and organized shop drawings, as specified herein. Interface between instruments, motor starters, flow meters, and existing instruments shall be included in his shop drawing submittal.
- B. In order to provide a fully coordinated system, shop drawings by other equipment vendors associated with the I&C control panel systems shall be reviewed and approved by the Contractor before submittal to the Engineer for approval.
- C. During the period of preparation of this submittal, the Contractor shall authorize direct informal liaison between his single I&C Supplier and the Engineer for exchange of technical information. As a result of this liaison certain minor refinements and revisions in the systems as specified may be authorized informally by the Engineer, but these shall not alter the scope of the work or cause increase or decrease in the contract price. During this informal exchange no oral statement by the Engineer shall be construed to give formal approval of any component or method, nor shall any statement be construed to grant formal exception to, or variation from these specifications.
- D. Operation and Maintenance Manual
  - 1. Submit one preliminary O&M for review and comment by the Engineer. Provide five final O&Ms, bound in a three-ring binder. O&M shall include the requirements of I&C materials and minimally include the following: approved submittal data, start-up corrected as built shop drawings. O&M shall be neatly and

logically arranged with a contents page followed by tabbed sections.

#### 1.06 ADDITIONAL TECHNICAL SERVICES

- A. At no additional cost to the Owner, the Contractor shall provide the services of qualified technical representatives of the Single I&C supplier:
  - 1. To supervise installation and connection of all instruments, elements and components of every system, including connection of instrument signals to primary measurement elements and to final control elements such as pumps;
  - 2. To make all necessary adjustments, calibrations and tests;
  - 3. To instruct operating staff and maintenance personnel on instrumentation. This time shall be in addition to whatever time is required for other facets of work at the site and shall be during the Owner's normal working days and hours.

#### 1.07 GUARANTEE

- A. The Contractor shall guarantee all equipment and installation, as specified herein, for a period of one (1) year following the date of completion of the work. To fulfill this obligation, the Contractor shall utilize technical service personnel designated by the Single I&C supplier to which the Contractor originally assigned project responsibility for instrumentation.

#### 1.08 ADDITIONAL PROVISIONS

- A. The applicable provisions of the following sections under Electrical Work shall apply the work and equipment specified herein, the same as if stated in full herein:
  - 1. Codes and Standards
  - 2. Equipment Materials and Workmanship
  - 3. Testing
  - 4. Grounding
  - 5. Equipment Anchoring
  - 6. Conductor and Equipment Identification
  - 7. Terminal Cabinets and Control Compartments
  - 8. Process Control Devices



## 1.09 NEWEST MODEL COMPONENTS

- A. All meters, instruments and other components shall be the most recent field proven models marketed by their manufacturers at the time of the submittal of shop drawings unless otherwise specified to match existing equipment. All technical data publications included with the submittal shall be the most recent issue.

## 1.10 COORDINATION

- A. I&C supplier shall coordinate with his supplier and other Contractors on the project. Where large subsystems are provided, the I&C supplier shall coordinate before the bid to be certain all equipment, engineering and labor are provided. Coordination item minimally includes: equipment dimensions, heat rejection, power requirements, control and signal requirements, and interconnection requirements.

## 1.11 TEST PROCEDURE DEVELOPMENT AND DOCUMENTATION

- A. I&C subcontractor shall prepare and submit to the Engineer for review a detailed description of the test procedures that he proposed to perform to demonstrate conformance of the complete system of instrumentation and controls to this Specification.
- B. It is recommended that the I&C subcontractor develop the test procedures in two steps by first submitting general descriptions and outlines of the tests and then, upon receipt of approval, submit the required detailed procedures and forms.
- C. Operational Acceptance Tests
  - 1. The I&C subcontractor shall prepare check-off sheet(s) for each loop and an instrument calibration sheet for each active I&C element (except simple hand switches, lights, etc.). These check-off and data sheets shall form the basis for these operational tests and this documentation.
  - 2. Each loop check-off sheet shall cite the following information and shall provide spaces for sign-off on individual items and on the completed loop by the I&C subcontractor.
    - a. Project name
    - b. Loop number
    - c. For each elements: Tag number, description, manufacturer and model number, installation bulletin, and Specification sheet number.
    - d. Loop description

- e. Installation check
  - f. Termination check
  - g. Calibration check
  - h. Adjustment check
  - i. Space for comments
  - j. Space for loop sign-off I&C subcontractor and date.
3. Each instrument calibration sheet shall provide the following information and a space for sign-off on individual items and on the completed unit by Owner Representative and the I&C subcontractor.
- a. Project name
  - b. Loop number
  - c. Tag number
  - d. Manufacturer
  - e. Model number
  - f. Serial number
  - g. Calibration range
  - h. Calibration data: Input, output and error at 0, 25, 50, 75, and 100% of span.
  - i. Switch setting, contact action and dead band for discrete elements.
  - j. Space for comments
  - k. Space for sign-off by I&C subcontractor and date.

D. Functional Acceptance Tests

The I&C subcontractor shall prepare two types of test forms as follows:

- 1. For those functions that can be demonstrated on a loop-by-loop basis, the form shall include:
  - a. Project name
  - b. Loop number

- c. Loop description
  - d. Test procedure description
  - e. For each component: Tag number, description, manufacturer and data sheet number.
  - f. Space for sign-off and date by both I&C subcontractor and Owner Representative.
2. For those functions that cannot be demonstrated on a loop-by-loop basis, the test form shall be a listing of the specific tests to be conducted. With each test description, the following information shall be included:
- a. Spec page and paragraph of function demonstrated
  - b. Description of function
  - c. Space for sign-off and date by both I&C subcontractor and Engineer.

## PART 2 – PRODUCTS

### 2.01 TECHNICAL MANUALS

- A. One preliminary O&M manual shall be submitted to the Engineer for review and comment. Assuming a favorable review the I&C supplier shall incorporate comments and forward the five final copies to the Engineer. If the preliminary O&M is not acceptable, the I&C supplier shall resubmit.
- B. Five (5) final sets of technical manuals shall be supplied for the Owner as a condition for final acceptance of the project. Each set shall consist of one (1) or more volumes, each of which shall be bound in a standard size, 3-ring, loose leaf, vinyl plastic hard cover binder suitable for bookshelf storage. Binder ring size shall not exceed 3 inches.
- C. In addition to updated shop drawing information to reflect actual existing conditions, each set of technical manuals shall include installation, connection, operating, trouble-shooting, maintenance and overhaul instructions in complete detail. This shall provide the Owner with comprehensive information on all systems and components to enable operation, service, maintenance and repair. Exploded or other detailed views of all instruments, assemblies, and accessory components shall be included together with the complete parts lists and ordering instructions.
- D. Shop drawing files shall be provided in the latest version of Autocad with each O&M manual. Provide ACAD files on disk.

## 2.02 SPARE PARTS

- A. The Contractor shall include, as part of the bid package, a list of recommended spare parts covering items required under these specifications.
- B. Minimum spare parts shall be provided boxed and identified including the following:
  - 1. 6-control relays of each type used.
  - 2. 6-timing relays of each type used.
  - 3. 6-fuses of each size and type used.
  - 4. 6-pilot lights of each size and type use.
  - 5. 6-signal field surge arrester of each type used.
  - 6. 6-signal panel surge arrester of each type used.
  - 7. 6-incoming power lightning arrester of each type used.
  - 8. 6-surge capacitor of each type used.

Also provide other spares as noted by the particular sections and paragraphs of other- specifications.

## 2.03 CONTROL PANELS

- A. General
  - 1. I&C supplier shall construct the control panel to properly control internal and external equipment. No attempt is made to specify or indicate on plans, all required equipment but rather to set forth the minimum requirements.
- B. Engineering
  - 1. I&C supplier shall provide system engineering and produce detailed fully engineered, coordinated and completed drawings.
- C. Construction
  - 1. Control panel construction shall be per these specification and plans.
- D. Signal and Control Circuit Wiring
  - 1. Wire Type and Sizes: Conductors shall be flexible stranded copper wire; these shall be UL listed TFFN, THWN, THHN and

shall be rated 600v. Wire for control signal circuits shall be #16 AWG unless otherwise noted. All instrumentation cables shall be shielded #18 AWG with a copper drain wire unless otherwise noted. All special instrumentation cable such as between sensor and transmitter shall be supplied by the I&C supplier. Contractor shall increase wire size per load or impedance requirements.

E. Wiring Instrumentation

1. All wires shall be run in plastic wireways except (1) field wiring, (2) wiring between mating blocks in adjacent sections, (3) wiring run from components on a swing-out panel to components on a part of the fixed structure, (4) wiring run to panel mounted components on the door and the like. Wiring run on a swing out panel to other components on a fixed panel shall be made up in nylon wire ties bundles and secured so that bundles are not strained at the terminals.
2. Wiring run to control devices on the front panels shall be tied together at short intervals with nylon ties and secured to the inside face of the panel using adhesive mounts and adhesive strips.
3. Wiring to rear terminals on panel mounted instruments shall be run in plastic wares secured to horizontal brackets run above or below the instruments in the same plane as the rear of the instruments.
4. Shields of instrument cable shall only be grounded on one side of each circuit. The side to be grounded shall be nearest the source of excitation.
5. Care shall be exercised to properly insulate the ungrounded side of the loop to prevent ground loops from occurring.
6. Conformance to the above wiring installation requirements shall be reflected by details shown on the shop drawings for the Engineer's review.

F. Wire Marking

1. Each signal, alarm, control, and indicating circuit conductor connected to a given electrical point shall be designated by a single unique number which shall be shown on all shop drawings. These numbers shall be marked on all conductors using white plastic heatshrink sleeves with typewritten characters. Instrument signal conductors shall be tagged with unique multiple digit numbers. Wires from the circuit breaker panelboard shall be tagged indicating the branch circuit breaker number.

G. Terminal Blocks

1. Compression type terminal blocks shall be molded plastic with barriers and box lug terminals, and shall be rated 15 amps at 600v and mounted securely to DIN rails. White marking strips fastened to the molded sections shall be provided and wire numbers and circuit identifications shall be marked thereon with machine printed marker on top. Terminal blocks shall be IEC style by Allen Bradley or an approved equal.
2. Provide field terminal boxed with each terminal identified. Provide Panduit. The field terminals shall be included with the loop drawings and be identified.

H. Wire Color

1. Wire color shall be, Line Power – Black; Neutral or common – White; AC Control – Red; DC Control – Blue; Equipment or Chassis Ground – Green; specified externally powered circuits – Orange.

I. Enclosures

1. Unless otherwise indicated, all enclosures shall be provided with the following.
  - a. Modified NEMA 3R, 316 stainless steel, gasketed, freestanding or wall mounted, bolted to concrete base.
  - b. Subplate for mounting equipment.
  - c. Padlockable, pocketed exterior doors.
  - d. Where required, provide stainless steel piano hinged dead fronts with quarter turn latches.

J. Identification

1. All components shall be identified using Lamicoid labels or an approved equal.

2.04 CONTROL PANEL EQUIPMENT

A. General Purpose Relays

1. General purpose relays in the control panel shall be the plug in type with contacts rated 10 amps at 120 vac as a minimum. The quantity and type of contacts shall be as required to accomplish the desired control task. Each relay shall be enclosed in a clear plastic heat and shock resistant dust cover. Relays shall be Potter and Brumfield or an approved equal. Differing mounting sockets

shall be used to prohibit improper relay installations. Provide tube type base, 8 PIN or 11 PIN.

B. Time Delay Relays

1. Time delay relay shall be Diversified with digital settings or an approved equal. Timers shall be time delay on, interval on or time delay off relays, as required and shall be Diversified or an approved equal. Instantaneous contacts or auxiliary slave relays shall be provided as required. Provide tube type base, 8 PIN or 11 PIN.

C. Signal Isolators

1. Additional slave or interposing relays and signal isolators and signal converters shall be installed as required.

D. Circuit Breakers

1. Circuit breakers shall be single pole, 120vac, 15 amp rating or as required to protect wires and equipment; mounted on the inside of the enclosure or equipment remote from the enclosure.

E. Name Plates

1. Name plates shall be supplied for identification of control panels and all field mounted elements, including flowmeters and their transmitters. These name plates shall identify the instrument or meter, descriptively as to the function of the system. Nameplates shall be fabricated from black faced, white centered, laminated engraving plastic. A nameplate shall be provided for each signal transducer, signal converter, signal isolator, each electronic trip, and the like, mounted inside the control panels. These shall uniquely identify each control component. Adhesives shall be acceptable for attaching nameplates. Painted surfaces must be prepared to allow permanent bonding of adhesives. Nameplates shall be provided for instruments, function titles for each group of instruments and other components mounted on the front of the control panels as shown. Proposed colors, styles, height and text shall be submitted for approval.

F. LED panel Light

1. Provide panel light. Provide sub plate mounted light switch. Provide receptacle.

G. Vapor Guard

1. Moisture absorbing vapor guard shall be provided in each control panel.

H. Power Supplies

1. Power supplies shall be provided as required for loop power or other requirements for special equipment. Loop power supplies shall be Square D or an approved equal.

I. Circuit Breakers

1. Square D
2. Amperage ratings shall be indicated on drawings.

J. Fuses

1. Fuses and fuse holders 5 x 20mm, IEC style, with blown fuse indicating light.

K. Ground Fault Interrupting Receptacle

1. Leviton Duplex Receptacle or equal.
2. AC receptacle box shall be Steel City 58351-1/2 or equal.
3. Covers shall be Steel City 58-C-5, or equal.

L. Selector Switches and Push Buttons

1. Square D, Class 9001, Type K, or equal.
2. Operators shall be black knob type or key switch, 3-position or 2-position, push button or as noted.
3. Selector switches shall be spring return where noted.
4. Pushbuttons inserts

	<u>Label</u>	<u>Color</u>
a.	On	Green
b.	Off	White
c.	Start	Green
d.	Stop	White
e.	Reset	Black
f.	Acknowledge	Yellow

5. Selector Switch Operator

	<u>Label</u>	<u>Color</u>	<u>Text</u>
a.	All	Black	White



M. Indicator Lights

1. Square D, Class 9001, type K. Units shall be press to test, transformer type.
2. Lens color shall be as noted.

	<u>Label</u>	<u>Color</u>
a.	On	Green
b.	Off	White
c.	Open	Green
d.	Closed	White
e.	Hand	Yellow
f.	Auto	Green
g.	Local	White
h.	Remote	Green
i.	Alarm	Red
j.	Power available	White

N. Surge and Lightning Arrestors

1. All control panels shall be provided with surge and lightning arrestors as specified.
2. TVSS
  - a. Lightning surge suppressors shall be Innovative Technology PTX-160 Series, unless otherwise indicated.
3. Signal
  - a. Panel surge arrestors shall be Joslyn, 1800 Series.
  - b. Field surge arrestors shall be Joslyn, 1660-06.
4. Ethernet Surge Protection
  - a. Atlantic Scientific, 240040P, plug in surge arrestor, via FB Suppressors, Inc., (305) 247-3477.

2.05 FIELD INSTRUMENTS

- A. Refer to drawings or other specifications.

2.06 NAMEPLATES, NAME TAGS AND SERVICE LEGENDS

- A. All components provided under this section, both field and panel mounted, shall be provided with permanently mounted name tags bearing the entire IA tag number of the components. Panel mounted tags shall be plastic; field mounted tags shall be stamped stainless steel.

- B. The panel drawings refer to nameplates and service legends: nameplates are defined as inscribed laminated plastic plates mounted under or near a panel face mounted instrument. Service legends are defined as inscribed laminated plastic integrally mounted on a panel face mounted instrument.
- C. Service legends and nameplates shall be engraved, rigid, laminated plastic. Service legends and nameplates shall be fastened to the panel by screws or with a specially applied adhesive. Fastening shall not depend only on the adhesive.

## 2.07 UPS SYSTEM

- A. Provide best model APC or Triplite UPS sized to run the PLC, I&C, operator interface and field I&C equipment.

## PART 3 – EXECUTION

### 3.01 INSTALLATION, CALIBRATION, TESTING, START UP AND INSTRUCTION

#### A. General

- 1. Under the supervision of a Single I&C supplier, all systems specified in this section shall be installed, connected, calibrated and tested and in coordination with the Owner and Engineer shall be started to place the process in operation. This shall include final calibration in concert with equipment specified elsewhere in these specifications as well as equipment provided by the Owner.

#### B. Installation and Connection

- 1. The Contractor shall install and connect all field mounted components and assemblies under the criteria imposed in 1.3, herein. The installation personnel shall be provided with a final reviewed copy of the shop drawings and data.
- 2. The instrument process lines, impulse piping lines and air signal tubing shall, in general, be installed in a similar manner to the installation of conduit specified under Section 16000.
- 3. Bends shall be formed with the proper tools and to uniform radii and shall be made without deforming or thinning the walls of the tubing.
  - a. Unless otherwise indicated, all fittings, adapters, impulse piping, valves, etc. shall be 316 stainless. Valves shall be Whitey Series 40 or an approved equal.
- 4. The Contractor shall have a technical field representative of the I&C supplier to instruct these installation personnel on any and all

installation requirements; thereafter the technical field representatives shall be readily available by telephone to answer questions and to provide clarification when needed by installation personnel.

- a. Where primary elements (supplied by the I&C supplier) will be part of a mechanical system, the I&C supplier shall coordinate the installation of the primary elements with the mechanical system manufacturer.
5. After all installation and connection work has been completed, the technical field representatives shall check all for correctness, verifying polarity of electric power and signal connections making sure all process connections are free of leaks and all such similar details. The technical field representative shall certify in writing to the Contractor that for each loop or system he has completed such check out and that any discrepancies have been corrected by the installation personnel.
  6. The field representative of the I&C supplier shall coordinate all work required to interface the new equipment, including all required modifications to the existing equipment and related devices.

C. Calibration

1. All new instruments shall be calibrated.
  - a. All instruments and systems shall be calibrated after installation, in accordance with the component manufacturer's written instructions. This shall provide that those components having adjustable features are set carefully for the specific conditions and applications of this installation and that the components and/or systems are within the specified limits of accuracy. Defective elements which cannot achieve proper calibration or accuracy, either individually or within the system shall be replaced. This calibration work shall be accomplished by the I&C Supplier.
  - b. Proof of Conformance – The burden of proof of conformance to the specified accuracy and performance is on the Contractor using his designated I&C supplier. The Contractor shall supply necessary test equipment and technical personnel if called upon to prove accuracy and performance at no additional cost to the Owner, wherever reasonable doubt or evidence of malfunction or poor performance may appear within the guarantee period.

D. Testing

1. All systems shall be exercised through operational tests in the presence of the Engineer in order to demonstrate achievement of the specified performance. Operational tests depend upon completion of work specified elsewhere in these specifications. The scheduling of the test shall be coordinated by the Contractor among all parties involved so that the tests may proceed without delays or disruption by incomplete work.
2. All functional/loop tests shall be witnessed and signed off by the Owner's representative and the I&C subcontractor.
3. Contractor shall provide testing service in conjunction with the PLC/SCADA program developer. Contractor shall include a maximum of 20 man hours for this service. If problems are found as a result of I&C equipment additional time shall be provided as may be required. Reference Section 16910-Programmable Logic Controller.

E. Training

1. Operating personnel shall be provided with training prior to start-up.
2. Two 4 hour training sessions shall be provided. Training shall be at a time convenient to the Owner.
3. Operating and maintenance personnel shall be instructed in the functions and operation of each system and shall be shown the various adjustable and set point features which may require readjustment, resetting or checking, recalibration or maintenance by them from time to time. This instruction shall be scheduled at a time arranged with the Owner at least two (2) weeks in advance. Instruction shall be given by qualified persons employed by the I&C supplier.

F. Start Up

1. When all systems are assessed by the Contractor to have been successfully carried through complete operational tests with a minimum of simulation, and the Engineer concurs in his assessment, start up by the operating personnel can follow.

END OF SECTION

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SECTION 16910

PROGRAMMABLE LOGIC CONTROLLER

PART 1 – GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall furnish, install and place into service the Programmable Logic Control (PLC) systems.
- B. Provide complete I/O system including all racks, power supplies, cables, connectors, terminals, interposing relays, signal conditioners, signal isolators and the like.
- C. All hardware and cables shall be provided. All field debugging and testing shall be provided. Field testing shall be provided concurrent with Owner's separately provided programmer.
- D. In order to establish sole source responsibility of the Instrumentation and Control (I&C) system, the I&C vendor shall be responsible for all systems and subsystems provided.
- F. Like items of equipment provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance operation and maintenance.
- G. See CONDITIONS OF THE CONTRACT and Division 1, GENERAL REQUIREMENTS, which contain information and requirements that apply to the Work specified herein and are mandatory for this project.
- H. Refer to the drawings. Provide all labor materials for a complete and functional system.
- J. PLC programming shall not be provided.
- K. PLC systems, hardware and store bought software shall be provided as part of the I&C system.
- L. Provide fiber system improvements.

1.02 SUBMITTALS

- A. Submittals shall be made in accordance with the General Requirements.
  - 1. During the period of preparation of this submittal, the Contractor shall authorize direct informal liaison between his single I&C Supplier and the Engineer for exchange of technical information. As a result of this liaison certain minor refinements and revisions in the systems as specified may be authorized informally by the

Engineer, but these shall not alter the scope of the work or cause increase or decrease in the Contract price. During this informal exchange no oral statement by the Engineer shall be construed to give formal approval of any component or method, nor shall any statement be construed to grant formal exception to, or variation from these specifications.

- B. Six complete sets of Operation and Maintenance Manuals shall be provided.
- C. Warranty information shall be submitted in accordance with general conditions.

#### 1.03 QUALITY ASSURANCE

- A. All equipment furnished under this specification shall be new and unused, shall be the product of a manufacturer having a successful record of manufacturing and servicing the equipment specified herein for a minimum of five (5) years.

#### 1.04 WARRANTY

- A. The Contractor shall warrant all equipment for a period of one (1) year from the date of Owner acceptance of the system.

#### 1.05 PROGRAMMING

- A. None required.

### PART 2 – PRODUCTS

#### 2.01 GENERAL

- A. The programmable logic controller and all related equipment including I/O cards shall be of the Allen Bradley family for all applications. See drawings.
- B. PLC systems manufactured into control panels and assemblies shall contain a minimum of 25% spare I/O connected and ready to use.

#### 2.02 POWER SUPPLY

- A. Provide a battery backed power supply sized to power all PLC equipment.

#### 2.03 UPS SYSTEM

- A. Provide a U.L. labeled UPS system with 30 min. runtime.
- B. 1000 va minimum.
- C. DOUBLE CONVERSION ONLINE UPS for the PLC, I/O, and communication related devices.
- D. Provide N1 Critical Technologies, no equal.

## 2.04 RACKS

- A. Provide racks as may be required.

## 2.05 PLC EQUIPMENT

### A. Processor

- 1. Provide Allen Bradley family. See drawings.
- 2. No substitutions shall be accepted.

### B. MODULES

- 1. Provide the following I/O modules as a minimum including all terminals, surge arrestors and other equipment wired and ready for immediate use.
  - a. 1-discrete input module
  - b. 1-discrete output module
  - c. 1-analog input module
  - d. 1-analog output module
- 2. Discrete output modules. Provide slave relays for control of remote equipment as may be required.
- 3. Analog input modules shall be as a minimum, 24 vDC, 4-20 mADC, isolated.
- 4. Analog output modules shall be 24 vDC, 4-20 mADC, isolated, self powered.
- 5. Provide base rack or DIN rail.
- 6. Provide Ethernet/IP communications.
- 7. Provide the named materials and systems only.

### C. Miscellaneous PLC Equipment

- 1. Provide all power supplies, cable and miscellaneous equipment for a complete and functional PLC system.

### D. PROGRAMMING SOFTWARE, not required

### E. PLC SPARES



1. 1 – I/O modules of each type and point count used.
2. 1 – Processor module of each type.
3. Submit spares bill of material for review and approval.

#### 2.06 ETHERNET SWITCHES

- A. Units shall NTRON or an approved equal. Units shall use ring topography and shall be fault tolerant.
- B. Provide fiber and metallic ports; 16 port E-switch as needed.
- C. Provide all cables and connectors.
- D. Provide Cat. 6 Ethernet cable for all uses on the project.
  1. Include cables and connectors.
  2. Include cables and connectors extending beyond the control panel to the VFD.s or other similar devices.
- E. Ethernet spares
  1. Provide 1 unit as spare.

#### 2.07 LOCAL HMI OR OPERATOR INTERFACE TERMINAL

- A. Shall not be provided.
- B. The separate computer shall provide the interface.

#### 2.08 ETHERNET FIBER OPTIC MEDIA CONVERSION MODULES

- A. Units shall be NTRON Fiber to Ethernet 10/100 base T fiber converters. Match existing units shall be compatible to the existing systems.

#### 2.09 FIBER OPTIC CABLE

- A. Fiber optic systems and connectors shall be Optical Cable Corp. or an approved equal.
- B. Type of fiber shall be selected by the control panel manufacturer and shall be based on the lengths of transmission losses, connector losses, ease of handling, terminating connectors, etc. The following shall be used as a basis for bid and minimum requirements.
  1. Fiber type shall be single mode.
  2. 12 strand, 6 pair fiber cable.

3. Heavy duty, installed in duct.
  4. Connectors shall be field terminated by I&C Contractor.
  5. Contractor shall provide field testing and documentation to document all terminations light system work according to manufacturer's requirements.
- C. Cable lengths shall be field measured and specified by the Installation Contractor with a minimum of 10% spare. Cable lengths shall not be scaled from drawings.
  - D. Provide fiber optic patch panel at each end of run.
  - E. Provide factory made fiber optic jumpers. Jumpers shall include units 10 feet or less.
  - F. Provide field splicing.

#### 2.10 FIBER OPTIC CONNECTORS AND SPLICES

- A. Provide connectors and splices.
- B. Provide and install all connectors for a complete and functional system.
- C. Provide no spares.

#### 2.11 ETHERNET EQUIPMENT

- A. Provide Ethernet equipment as may be required for a complete and functional system including communication modules, fiber patch cords, metallic Ethernet cables, connectors and the like.

#### 2.12 PATCH PANELS AND FIBER BREAKOUT BOXES

- A. Provide and install breakout boxes, fiber enclosures, compact design by Fiber Instrument Sales or an approved equal.
- B. Identify panel connections.

#### 2.13 FIBER OPTIC PATCH CORDS

- A. Fiber optic patch cord shall be manufactured store bought unit with lengths as required by Fiber Instrument Sales or an approved equal.

### PART 3 – EXECUTION

#### 3.01 PLC I/O SCHEDULE

- A. Provide an I/O schedule identifying all I/O used and spares.
- 3.02 PROVIDE LOOP TESTING SPREADSHEET
- A. Provide spreadsheet with separate rows to identify each I/O point.
  - B. Test each I/O point with the calibrated device.
- 3.03 START UP MODIFICATIONS
- A. Modifications shall be required during start up per the Owner/Engineers requirements. Contractor shall coordinate with the Owner's programmer during start up.
- 3.04 GUARANTEE
- A. Contractor shall guarantee the hardware through the service of his appointed I&C supplier for a period of one year.

END OF SECTION

SECTION 16913

PLC AND SCADA PROGRAMMING

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

A. Contractor Responsibilities

1. Install and configure all hardware.
2. Test and demonstrate all hardware.
3. Provide assistance during testing and demonstration of hardware, as may be required.
4. Provide no PLC and SCADA programming.

B. Owner's Responsibilities

1. All PLC and SCADA programming.
2. **Unless otherwise noted or indicated, all PLC and SCADA programming shall be provided by Control Systems Design.**

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION (not used)

END OF SECTION

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SECTION 16950

COMPUTER AND ACCESSORIES

PART 1 – GENERAL

1.01 INTRODUCTION

- A. See the drawings.
- B. A computer system and all accessories to accommodate or serve the needs of the PLC and SCADA system. This shall be a performance based specification and shall include the elements as indicated in the drawings or as specified in these specifications. The following minimum performance levels shall be provided, installed and made functional by the Contractor
  - 1. Provide computer as indicated.

1.02 SCOPE

- A. Provide all hardware, SCADA software, labor, and all documentation for a complete system. The Owner shall be the licensed Owner of all hardware and software. The following shall minimally be included:
  - 1. Computer Systems
  - 2. Operating Systems
  - 3. Input/Output subsystem as required
  - 4. Communications equipment
  - 5. Cables and Connectors
- B. The computer system shall exchange data with SCADA system, PLC network and fiber network.
- C. The PC shall also have the capacity to perform general purpose data processing tasks without interfering with the prescribed use.
- D. Coordinate with the Owner/Engineer prior to the time of purchase. These specifications shall establish the level of quality for bidding purposes. Provide the latest materials.
- E. Upgrade specified or indicated hardware to run the specified software as may be required.

### 1.03 MANUFACTURER

- A. In order to establish system responsibility, the PC shall be provided as part of the I&C system. The manufacturer shall be a UL listed systems manufacturer as named in Section 16900.

## PART 2 – PRODUCTS

### 2.01 COMPUTER GENERAL REQUIREMENTS

#### A. Manufacturer

1. The following sets the minimum level of quality and quantities.
2. All computers shall be the current state of the art at time of purchase.
3. Manufacturer shall be one of the following:
  - a. Dell
  - b. Engineer approved equal

#### B. Work Station Computer

1. Dell OPTIPLEX 3050 Tower
2. Multi-flash card reader.
3. PCI-Express video card, 2 616 MB video RAM, dual capable with HDMI output.
4. 2 Serial ATA SSD, 512 GB
5. 4 2.0 USB ports
6. 16 bit sound, SoundBlaster compatible, with desktop stereo speakers.
7. Wireless mouse, wireless Windows keyboard.
8. 100/1000 Network Interface, minimum.
9. Windows 2010 Server OS, most recent service pack.
10. MS Office latest edition Small Business Edition.
11. Fire Wall Software Symantech or equal.
12. 21" Flat screen monitors as indicated. LG, LCD 1080P minimum resolution.
13. 2-HDMI ports compatible with hardware and software provided.

## 2.02 LIGHTNING AND SURGE PROTECTION

- A. All power, data and communications interface shall be provided with TVSS surge protection.
- B. Surge protection equipment shall be IT or an approved equal. Materials shall be manufacturer's standard product as it relates to the application.

## 2.03 MISCELLANEOUS

- A. All cable adapters, extensions and connectors shall be provided.
- B. Provide all materials for a complete and functional system.
- C. Miscellaneous
  - 1. Provide all cables, connectors, patch chords, power supplies, etc. for a complete and functioning system.

## 2.04 WIRELESS PRINTER

- A. Color Printer
  - 1. Hewlett-Packard Desk Jet latest version color printer, or latest equivalent.
  - 2. Provide 2 spare black and 2 spare color cartridges of each color.
- B. Cables
  - 1. Provide all power cables, as may be required.
  - 2. Provide all signal cables, as may be required.
  - 3. Provide extra long video cables, as needed.

## 2.05 MONITORS AND FLAT PANELS

- A. Provide new computer monitors and flat panels as indicated by the drawings. Units shall be compatible with the hardware and software upgrades provided.
  - 1. All monitors shall be provided with the new computer systems. Monitors shall be HD Dell or an approved equal. See the drawings.
  - 2. 21" minimum

## 2.06 UPS SYSTEM

- A. Provide a U.L. labeled UPS system with 30 min. runtime.
- B. 1000 va minimum.
- C. DOUBLE CONVERSION ONLINE UPS for the PLC, I/O, and communication related devices.
- D. Provide N1 Critical Technologies, no equal.



## PART 3 EXECUTION

### 3.01 SUBMITTALS

#### A. Submittals for approval

1. Refer to Contract General Conditions for additional instructions on submittals and substitutions. Where conflicts occur between the General Conditions and this Section, the more stringent requirements shall apply.
2. Shop Drawings and manufacturer's data sheets are required for all materials.
3. Submittals will not be accepted for partial systems. Submit all materials for each specification section at one time. Submittals must be arranged, correlated, indexed and bound in orderly sets for ease of review.
4. Samples are to be supplied for any substitute as requested by the Engineer.
5. The following numbers of copies are required:

a.	Shop drawings	6 sets
b.	Samples	1 each
c.	Manufacturer's data	6 sets
d.	Certifications	6 sets
e.	Test reports	6 sets
f.	Warranties/Guarantees	6 sets
6. Submit shop drawings, manufacturer's data and certifications on all items of electrical work prior to the time such equipment and materials are to be ordered. Order no equipment or materials without approval from the Engineer. Submittals will not be accepted for partial system submittals; submit all data at one time. Submittals will be promptly returned, approved, approved as noted, or not approved. Items "approved as noted" must be changed to comply with the Engineer's comments and need not be resubmitted for "approved" status. Items "not approved" are not suitable, requiring complete new submittals.
7. Time delays caused by rejection of submittals are not cause for extra charges to Owner or time extensions.
8. Contractor shall be responsible for investigating other systems or shop drawings in order to fully integrate the equipment into the system.

#### B. Operation and Maintenance Manuals

1. Submit to the Engineer 5 (five) copies of all manufacturers' service, installation and operation manuals, instructions and bulletins. These manuals shall be subject to review of the Engineer. If acceptable, they shall be forwarded to the Owner. If not acceptable, they shall be returned

to the Contractor for revision and resubmittal. Manuals shall contain, but not be limited to the following:

- a. Brief description of systems and basic features.
- b. Manufacturer's name and model number for all components in the system.
- c. List of local factory authorized service companies.
- d. Operating instructions.
- e. Maintenance instructions.
- f. Trouble shooting instructions.
- g. Manufacturer's literature describing each piece of equipment.
- h. Power and control wiring diagrams.
- i. Parts lists.

### 3.02 MANUFACTURING

- A. All equipment shall be manufactured by the 16900 system Vendor. Equipment shall be shop tested to confirm system performance before shipment. Equipment shall be ready for immediate use upon arrival at the job site.

### 3.03 LICENSING

- A. The Owner shall be the named license holder for all software provided. Provide 2 copies on CD of all store bought and developed files.

### 3.04 START UP, TESTING AND CHECK OUT

- A. All systems shall be confirmed by testing by the Contractor.

END OF SECTION

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SECTION 16960

SCADA SYSTEM

PART 1 – GENERAL

1.01 INTRODUCTION

- A. Provide new SCADA system node.
- B. Provide development key.
- C. Reference Section 16913 – PLC and SCADA Programming for Contractor and Owner responsibilities

1.02 SCOPE

- A. Provide software, labor, and all documentation for a complete system. The Owner shall be the licensed Owner of all software. SCADA and PLC programming by Owner.
- B. The computer system shall exchange data from the PLC and provide dynamic screen displays, reports, alarm handling and alarm logging and all main machine interface the I&C system.
- C. Other software, drivers, and programming functions shall be provided as required.
- D. Provide graphic elements similar to Owner's other existing system for displaying equipment, status, alarms, settings, and the like.
- E. Approved I&C equipment vendor/Sub-Contractor; shall be provided by the named Supplier.
- F. SCADA software shall match Owner's standard.
- G. As a minimum, include a new VTScada 10,000 tag Development Runtime license. Provide any and all drivers as may be required.

1.03 MANUFACTURER

- A. In order to establish system responsibility, the software modifications shall be provided as part of the I&C system. The manufacturer shall be a UL listed systems manufacturer.

PART 2 – PRODUCTS

2.01 SCADA SOFTWARE

- A. Use software as may be required for a fully functional system.

- B. Provide additional software drivers as may be required to work with the Vendor furnished PLC system.
- C. Alarm Processing
  - 1. Alarm conditions shall automatically be brought to the operator's attention audibly and visually on the PC. The video terminal shall have reserved section for alarm display and/or a dedicated screen for displaying alarms. The capabilities of the specified software shall be utilized, including color changes, audible and visual annunciations, alarm logging to disk with time and date stamp, alarm acknowledgement written to disk with time and date stamp, alarm report generation upon operator demand shall be provided. Audible and flashing visual annunciation shall remain until acknowledgement by the operator. Non-flashing visual alarm shall remain until alarm clears. Alarms shall be provided with automatic reset.
- D. Dynamic Screen Displays
  - 1. Color dynamic screen displays shall be provided. All PLC I/O as well as derived values and alarms shall be utilized and displayed on one or more screens. System developer shall use good judgement in developing logically oriented screens depicting the process. Dynamic bar graphs with text shall be used to represent analog values for tank level. Other analog values shall be represented numerically. Consistent conventions shall be used regarding normally open/close states, alarm/normal states, running/non-running states for all equipment with I/O associated with it.
  - 2. Provide man machine interface via keyboard and/or mouse to display the status, parameters, and alarms of vacuum sewer equipment.
  - 3. Color print outs of proposed screens shall be submitted for review and approval during shop drawing submittal.
- E. Data Exchange
  - 1. Send and receive data over the system wide SCADA.

## PART 3 – EXECUTION

### 3.01 SUBMITTALS

- A. Submittals for approval

1. Refer to Contract General Conditions for additional instructions on submittals and substitutions. Where conflicts occur between the General Conditions and this Section, the more stringent requirements shall apply.
2. Shop Drawings and manufacturer's data sheets are required for all materials.
3. Submittals will not be accepted for partial systems. Submit all materials for each specifications section at one time. Submittals must be arranged, correlated, indexed and bound in orderly sets for ease of review.
4. Samples are to be supplied for any substitute as requested by the Engineer.
5. The following numbers of copies are required:
  - a. Shop drawings 6 sets
  - b. Samples 1 each
  - c. Manufacturer's data 6 sets
  - d. Certifications 6 sets
  - e. Test reports 6 sets
  - f. Warranties/Guarantees 6 sets
6. Submit shop drawings, manufacturer's data and certifications on all items of electrical work prior to the time such equipment and materials are to be ordered. Order no equipment or materials without approval from the Engineer. Submittals will not be accepted for partial system submittals; submit all data at one time. Submittals will be promptly returned, approved, approved as noted, or not approved. Items "approved as noted" must be changed to comply with the Engineer's comments and need not be resubmitted for "approved" status. Items "not approved" are not suitable, requiring complete new submittals.
7. Time delays caused by rejection of submittals are not cause for extra charges to Owner or time extensions.
8. Contractor shall be responsible for investigating other systems or shop drawings in order to fully integrate the equipment into the system.

B. Operation and Maintenance Manuals

1. Submit to the Engineer 5 (five) copies of all manufacturer's service, installation and operation manuals, instructions and bulletins. These manuals shall be subject to review of the Engineer. If acceptable, they shall be forwarded to the Owner. If not acceptable, they shall be returned to the Contractor for revision and resubmittal. Manuals shall contain, but not be limited to the following:
  - a. Brief description of systems and basic features.
  - b. Manufacturer's name and model number for all components in the system.
  - c. List of local factory authorized service companies.
  - d. Operating instructions.
  - e. Maintenance instructions.
  - f. Trouble shooting instructions.
  - g. Manufacturer's literature describing each piece of equipment.
  - h. Power and control wiring diagrams.
  - i. Parts lists.

### 3.02 MANUFACTURING

- A. All equipment shall be supplied and/or manufactured by the I&C system Vendor, or I&C Contractor. Equipment shall be new and shop tested to confirm system performance before shipment. Equipment shall be ready for immediate use upon arrival at the job site.

### 3.03 LICENSING

- A. The Owner shall be the named license holder for all software provided.

### 3.04 ALARMS

- A. Alarms shall be directed to the screen and hard disk. Coordinate with Owner and follow their latest standards.

### 3.05 START UP, TESTING AND CONTROL POINTS

- A. All I/O interface shall be confirmed by testing.

END OF SECTION



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**APPENDIX A:**  
**GEOTECHNICAL REPORT DATED AUGUST**  
**14, 2018 FROM KSM ENGINEERING**

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**KELLER, SCHLEICHER & MacWILLIAM ENGINEERING AND TESTING, INC.**  
MARTIN (772) 337-7755      P.O. BOX 78-1377, SEBASTIAN, FL 32978-1377      SEBASTIAN (772) 589-0712  
PALM BEACH (561) 845-7445      www.ksmengineering.net      MELBOURNE (321) 768-8488  
FAX (561) 845-8876      E-Mail: KSM@KSMENGINEERING.NET      ST. LUCIE (772) 229-9093  
C.A.: 5693      FAX (772) 589-6469

August 14, 2018

Matt Tebow, P.E.  
Kimley-Horn  
1920 Wekiva Way, Suite 200  
West Palm Beach, FL 33411

**Re: Proposed Roseland EST Fill Water Main  
Roseland Road  
Indian River County, Florida  
KSM Project #: 182717-b**

Dear Mr. Tebow:

As requested, KSM Engineering & Testing has performed a subsurface investigation for the referenced project. The purpose of the investigation was to provide soil profiles to determine the suitability of the soils for Directional Boring and water line installation. Presentation of the data gathered during the investigation, together with our geotechnical related opinions, are included in this report.

**A. Project Description:**

A new 12" HDPE water main will be installed approximately 10 feet deep for the referenced project.

**B. The scope of our work consisted of the following:**

1. Performed Standard Penetration test borings (SPT), along the proposed project area to determine the subsurface conditions.
2. Measured the groundwater level at each boring.
3. Evaluated the existing soil conditions with respect to the proposed construction.
4. Prepared this report to document our findings.



**KELLER, SCHLEICHER & MacWILLIAM ENGINEERING AND TESTING, INC.**  
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PALM BEACH (561) 845-7445 www.ksmengineering.net MELBOURNE (321) 768-8488  
FAX (561) 845-8876 E-Mail: KSM@KSMENGINEERING.NET ST. LUCIE (772) 229-9093  
C.A.: 5693 August 14, 2018 FAX (772) 589-6469

Roseland EST Fill Water Main  
Indian River County, Florida

-2-

August 14, 2018

### **C. Site Investigation:**

The site investigation program consisted of performing four (4) Standard Penetration Test (SPT) borings in the proposed construction area. The test borings were terminated at depths of 20 feet below existing grade. The locations of the borings are indicated on the attached Boring Location Plan.

The SPT borings were completed in accordance with procedures described in ASTM D-1586. A standard 1.5 inch I.D., 2 inch O.D. split-spoon sampler is driven into the soil by successive blows of a 140 pound hammer freely falling 30 inches. The number of blows required to drive the sampler 1 foot, after seating 6 in., is designated the Penetration Resistance, or "N" value. At regular intervals the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample. Also, the groundwater table was allowed to stabilize and the depth of the groundwater elevation recorded from existing grade.

The records of the soils encountered, the penetration resistances and groundwater levels are shown on the attached logs.

### **D. Engineering Evaluation and Recommendations:**

Based on the information obtained from this site investigation we are pleased to offer the following evaluation:

The boring logs indicate the subsurface soils generally consist of fine-grained sand. These soils were generally found to be loose to medium dense. No "muck", rock or cemented sand was found in the test borings. These subsurface soil conditions are considered satisfactory for the proposed water line including any areas of open cuts. Please refer to the soil Boring Logs for more specific information relative to the soil description.

Backfill around the sides of the pipe and over the pipe in any open cut areas should consist of clean sand (free of clay, rubble, organics and debris) with less than 10% passing the #200 sieve and placed in compacted lifts. The fine-grained sands encountered in our subsurface investigation, (below the typical surface vegetation) appear suitable as backfill material.

A density of at least 90% of its modified dry Proctor value (ASTM D1557) is recommended for all fill materials in unpaved areas and 98% of its modified dry Proctor value in pavement areas.





Roseland EST Fill Water Main  
Indian River County, Florida

-3-

August 14, 2018

**E. Groundwater Table:**

<b>Boring No.</b>	<b>Location</b>	<b>Measured Water Table</b>
B-1	See Location Plan	5.2 Feet
B-2	"	4.5 Feet
B-3	"	2.5 Feet
B-4	"	2.0 Feet

The groundwater table was measured at depths of 2.0 feet to 5.2 feet below existing grade in the test borings. Therefore, temporary de-watering may be required to control the groundwater at some locations to achieve the necessary excavation, construction, backfilling and compaction requirement for the project. The actual method of dewatering should be determined by the contractor to achieve the necessary excavation, construction and backfill compaction requirements. We suggest drawing down the water table at least 2 feet below the bottom of the excavations.

**F. Excavation:**

Excavations should be sloped as necessary to prevent slope failure and to allow backfilling. As a minimum, temporary excavations below 4-foot depth should be sloped in accordance with OSHA regulations. Where lateral confinement will not permit slopes to be laid back, the excavation should be shored in accordance with OSHA requirements. During excavation, excavated material should not be stockpiled at the top of the slope within a horizontal distance equal to the excavation depth. Provisions for maintaining workman safety within excavations is the sole responsibility of the contractor.





KSM Engineering & Testing  
 P.O. Box 78-1377  
 Sebastian, FL 32978  
 Tel: (772)-589-0712  
 Fax: (772)-589-6469

# BORING NUMBER B-1

PAGE 1 OF 1

<b>CLIENT</b> <u>Kimley-Horn</u>	<b>PROJECT NAME</b> <u>Proposed Roseland EST Fill Water Main</u>
<b>PROJECT NUMBER</b> <u>182717-b</u>	<b>PROJECT LOCATION</b> <u>Indian River County, Florida</u>
<b>DATE STARTED</b> <u>8/13/18</u> <b>COMPLETED</b> <u>8/13/18</u>	<b>GROUND ELEVATION</b> _____ <b>HOLE SIZE</b> _____ inches
<b>DRILLING CONTRACTOR</b> _____	<b>GROUND WATER LEVELS:</b>
<b>DRILLING METHOD</b> <u>Split Spoon Sample</u>	▽ <b>AT TIME OF DRILLING</b> <u>5.17 ft</u>
<b>LOGGED BY</b> <u>MS/SF</u> <b>CHECKED BY</b> <u>JEK</u>	<b>AT END OF DRILLING</b> <u>---</u>
<b>NOTES</b> <u>See Attached Location Plan</u>	<b>AFTER DRILLING</b> <u>---</u>

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ SPT N VALUE ▲		
								20	40	60
0		Brown Sand with Traces of Roots								
		Brown Sand	X SS		3-3-4 (7)					
		Light Gray Sand	X SS		3-4-5 (9)					
5	▽		X SS		3-4-4 (8)					
			X SS		4-3-4 (7)					
10		Light Brown Sand	X SS		7-8-10 (18)					
			X SS		5-5-7 (12)					
15		Brown Sand	X SS							
			X SS		4-5-7 (12)					
20										

Bottom of borehole at 20.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 8/14/18 10:29 - \\KSM-SERVER\KSM FILES\18 DOCS (KSM-SERVER)\182717-B.GPJ



KSM Engineering & Testing  
 P.O. Box 78-1377  
 Sebastian, FL 32978  
 Tel: (772)-589-0712  
 Fax: (772)-589-6469

# BORING NUMBER B-2

PAGE 1 OF 1

CLIENT <u>Kimley-Horn</u>	PROJECT NAME <u>Proposed Roseland EST Fill Water Main</u>
PROJECT NUMBER <u>182717-b</u>	PROJECT LOCATION <u>Indian River County, Florida</u>
DATE STARTED <u>8/13/18</u> COMPLETED <u>8/13/18</u>	GROUND ELEVATION _____ HOLE SIZE _____ inches
DRILLING CONTRACTOR _____	GROUND WATER LEVELS:
DRILLING METHOD <u>Split Spoon Sample</u>	∇ AT TIME OF DRILLING <u>4.50 ft</u>
LOGGED BY <u>MS/SF</u> CHECKED BY <u>JEK</u>	AT END OF DRILLING <u>---</u>
NOTES <u>See Attached Location Plan</u>	AFTER DRILLING <u>---</u>

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ SPT N VALUE ▲				
								20	40	60	80	
0		Brown Sand with Traces of Roots										
		Brown Sand	X SS		4-3-4 (7)							
		Light Gray Sand	X SS		3-4-5 (9)							
5	∇		X SS		4-4-6 (10)							
		Light Brown Sand	X SS		4-5-7 (12)							
10			X SS		4-4-7 (11)							
		Brown Sand	X SS		3-4-5 (9)							
15			X SS		4-6-7 (13)							
20			X SS									

Bottom of borehole at 20.0 feet.

GEOTECH BH PLOTS - GINT STD. US LAB.GDT - 8/14/18 10:29 - \\KSM-SERVER\KSM FILES\18 DOCS (KSM-SERVER)\182717-B.GPJ



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 P.O. Box 78-1377  
 Sebastian, FL 32978  
 Tel: (772)-589-0712  
 Fax: (772)-589-6469

# BORING NUMBER B-3

CLIENT Kimley-Horn PROJECT NAME Proposed Roseland EST Fill Water Main  
 PROJECT NUMBER 182717-b PROJECT LOCATION Indian River County, Florida  
 DATE STARTED 8/13/18 COMPLETED 8/13/18 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE \_\_\_\_\_ inches  
 DRILLING CONTRACTOR \_\_\_\_\_ GROUND WATER LEVELS:  
 DRILLING METHOD Split Spoon Sample ∇ AT TIME OF DRILLING 2.50 ft  
 LOGGED BY MS/SF CHECKED BY JEK AT END OF DRILLING ---  
 NOTES See Attached Location Plan AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ SPT N VALUE ▲						
								20	40	60	80			
0		Gray Sand with Some Roots												
		Brown Sand	X SS		4-3-3 (6)									
		Light Gray Sand	X SS		4-5-5 (10)									
5			X SS		4-5-4 (9)									
			X SS		3-5-6 (11)									
10		Brown Sand	X SS		4-4-7 (11)									
			X SS		8-10-11 (21)									
15														
20		Light Brown Sand	X SS		6-4-5 (9)									

Bottom of borehole at 20.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 8/14/18 10:29 - \\KSM-SERVER\KSM FILES\18 DOCS (KSM-SERVER)\182717-B.GPJ





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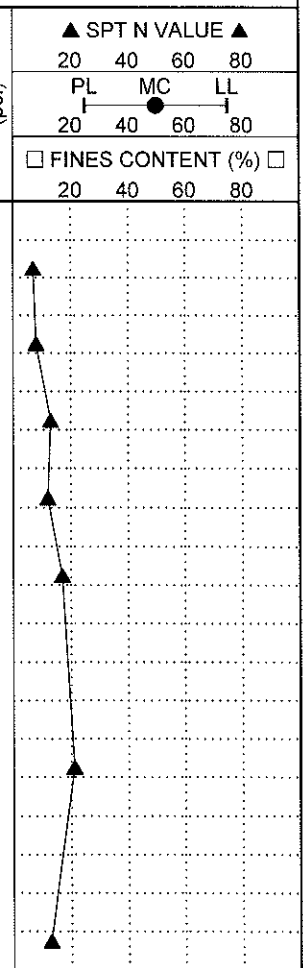
# BORING NUMBER B-4

CLIENT Kimley-Horn  
 PROJECT NUMBER 182717-b  
 DATE STARTED 8/13/18 COMPLETED 8/13/18  
 DRILLING CONTRACTOR \_\_\_\_\_  
 DRILLING METHOD Split Spoon Sample  
 LOGGED BY MS/SF CHECKED BY JEK  
 NOTES See Attached Location Plan

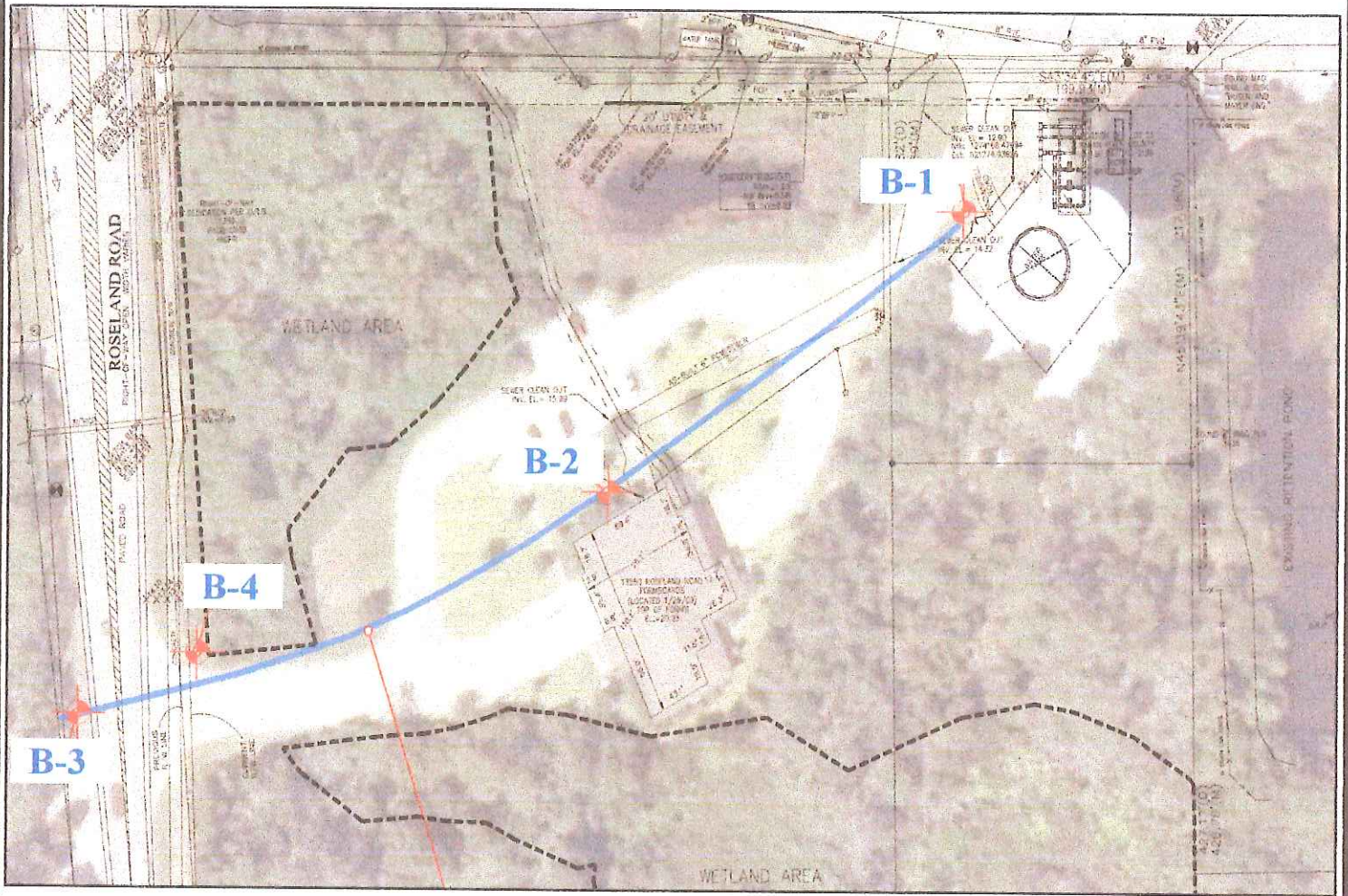
PROJECT NAME Proposed Roseland EST Fill Water Main  
 PROJECT LOCATION Indian River County, Florida  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE \_\_\_\_\_ inches  
 GROUND WATER LEVELS:  
 ∇ AT TIME OF DRILLING 2.00 ft  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ SPT N VALUE ▲				
								20	40	60	80	
0		Brown Sand with Traces of Roots and Shell Fragments										
		Brown Sand with Traces of Shell Fragments	X SS		3-3-4 (7)							
		Brown Sand	X SS		4-3-5 (8)							
		Light Gray Sand	X SS		4-6-7 (13)							
5			X SS		4-5-7 (12)							
		Brown Sand	X SS		6-8-9 (17)							
10			X SS		8-9-12 (21)							
15			X SS		5-6-7 (13)							
20		Light Brown Sand	X SS									

Bottom of borehole at 20.0 feet.



GEOTECH BH PLOTS - GINT STD US LAB.GDT - 8/14/18 11:51 - \\KSM-SERVER\KSM FILES\18 DOCS (KSM-SERVER)\182717-B.GPJ



## LOCATION OF TESTS

**PROJECT:** Proposed Roseland EST Fill Water Main, Roseland Road, Indian River County, Florida

SHEET 1 OF 1  
 PERMIT #:  
 PROJECT #: 182717-b

**KSM ENGINEERING AND TESTING**

DRAWN BY: J.L.  
 DESIGNED BY: J.K.  
 DATE: 20180814  
 SCALE: NONE

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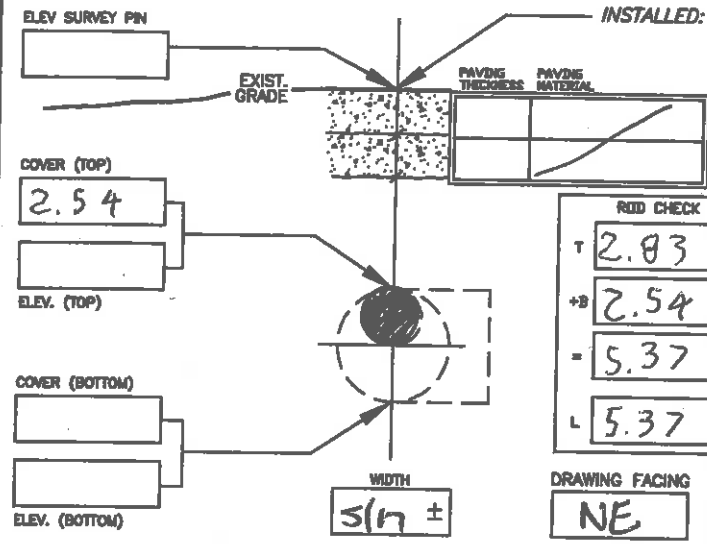
**APPENDIX B:**  
SUBSURFACE UTILITY LOCATES DATED  
AUGUST 9, 2018 FROM INFRAMAP

---

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**PROJECT NAME:** Roseland Tank Conversion  
**LOCATE REQUESTED BY:** Kimley & Horn  
**REQUESTED:**  STD  TYPE: GAS WATER ELEC TELE CATV  SAN FM  STORM  FI  STEAM  
**OTHER:**  
**FOUND:**  STD  MATR: CI DI STL W/STL CLAY AC RCP CPP CMP  
 HOPE PE PVC(GREEN) PVC(WHITE) PVC(GRAY) PVC(BLUE)  
 PVC (ORANGE) PVC (PURPLE) PVC (BLACK) COPPER  
**OTHER:** SN  
 CAST IN PLACE CONC. PRECAST CONC. DBC VCPX  
**TYPE:** GAS WATER ELEC TELE FI CATV  SAN FM  STORM STEAM

**D.O.T. JOB#** \_\_\_\_\_ **WORK ORDER#** \_\_\_\_\_  
**PROJECT LOCATION:** (CITY, COUNTY, STATE) Sebastian - Indian River Fl  
**SHEET #** 1A **OF** \_\_\_\_\_ **PROPOSED:** Utility Work  
**FORM BY:** ml **ASSISTED BY:** Temp **# OF HOLES:** 1  
**PAVING CONDITION:** GOOD FAIR POOR  N/A **DATE DUG:** 8-9-18  
**SOIL CONDITIONS:** HARD  SOFT  WET  MOIST DRY  SAND  CLAY ROCKY  
**UTILITY CONDITION:** GOOD  FAIR  POOR SEE NOTE N/A



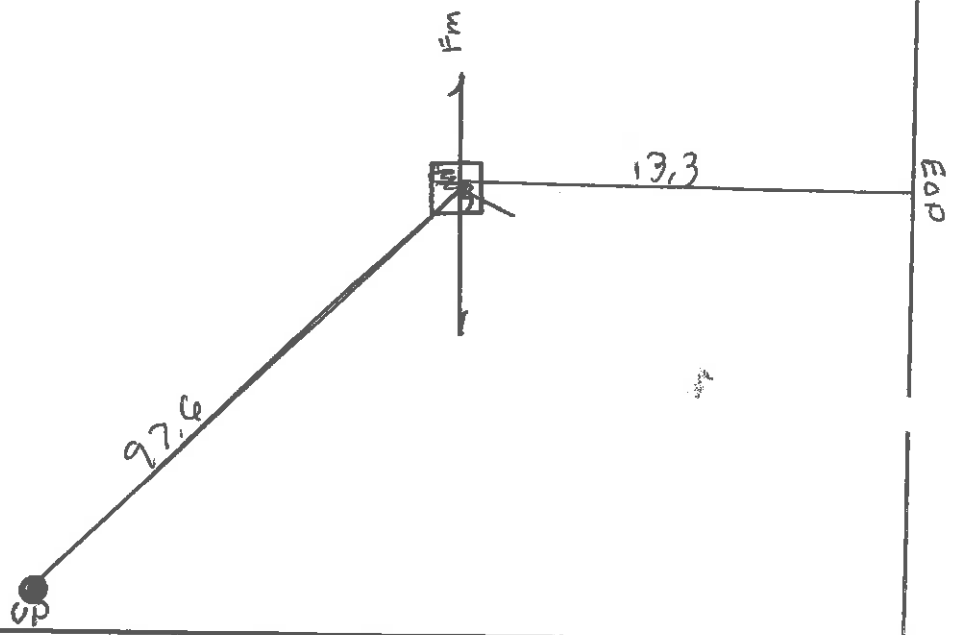
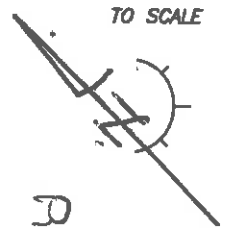
**INSTALLED:** PK  HUB & TACK  STL PIN  SPIKE CHS. "X" AT:  CROWN  EDGE TOP OF UTILITY.  
**RIBBON INSTALLED:** RED BLUE YELLOW ORANGE  GREEN  PINK  WHITE  
**SURVEY PIN TO BE LOCATED BY:** Others  

INC. READING	ROD	COVER	OFFSET	ADJUSTMENT

**NOTES:**  
 unable to obtain size due to ground water. Plans indicate 12" FM.

SHOW NEAREST CROSS STREET AND SURVEY STATION, AND INDICATE TYPE AND TREND OF UTILITY AND SIDE OF DUCT EXPOSED.

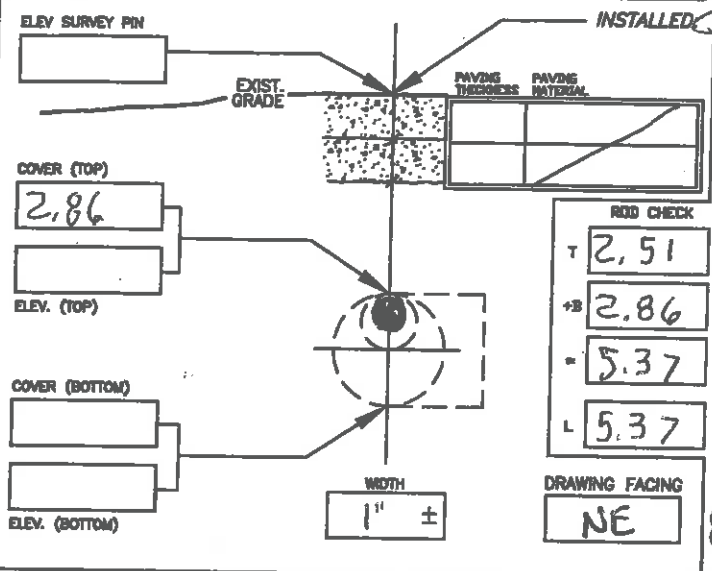
# PRELIMINARY





PROJECT NAME: **Roseland Tank Conversion**  
 LOCATE REQUESTED BY: **Kimley & Horn**  
 REQUESTED:  SIZE  TYPE: GAS  WATER  ELEC  TELE  CATV  SAN  FM  STORM  FI  STEAM  
 OTHER:  
 FOUND:  SIZE  1" MATR: CI DI STL V/STL CLAY AC RCP CPP CMP  
 HOPE PE PVC(GREEN) PVC(WHITE) PVC(GRAY) PVC(BLUE)  
 PVC (ORANGE) PVC (PURPLE) PVC (CLACIO) COPPER  
 CAST IN PLACE CONC. PRECAST CONC.  DBC  VCPX  
 OTHER: **UNK** TYPE: GAS WATER ELEC TELE FI CATV SAN FM STORM STEAM

D.O.T. JOB# \_\_\_\_\_ WORK ORDER# \_\_\_\_\_  
 PROJECT LOCATION: **Sebastian-Indian River-FL**  
 (CITY, COUNTY, STATE)  
 SHEET **n/a** OF \_\_\_\_\_ PROPOSED: **Utility Work**  
 FORM BY: **ML** ASSISTED BY: **Temp** # OF HOLES: **1**  
 PAVING CONDITION: GOOD FAIR POOR **(N/A)** DATE DUG: **8-9-18**  
 SOIL CONDITIONS: HARD  SOFT  WET  MOIST DRY  SAND  CLAY ROCKY  
 UTILITY CONDITION: GOOD  FAIR  POOR SEE NOTE **(N/A)**



INSTALLED:  HUB & TACK  STL PIN  SPIKE  CHS. "X" AT:  CROWN  EDGE  TOP OF UTILITY.  
 RIBBON INSTALLED: RED BLUE YELLOW ORANGE GREEN  PINK WHITE

SURVEY PIN TO BE LOCATED BY: **Others**  

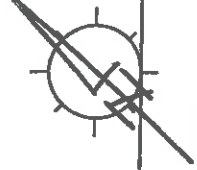
INC READING	ROD	COVER	OFFSET	ADJUSTMENT

NOTES:  
 TH DUG FOR WATER MAIN unable to locate water main, Area was scanned and several attempts were made no water found

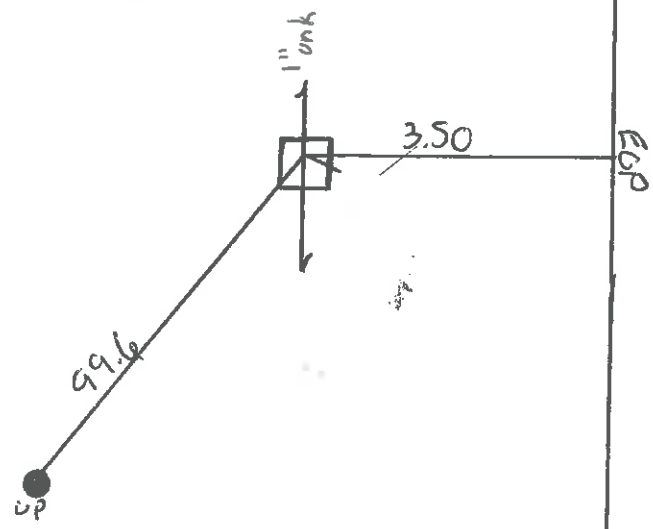
SHOW NEAREST CROSS STREET AND SURVEY STATION, AND INDICATE TYPE AND TREND OF UTILITY AND SIDE OF DUCT EXPOSED.

# PRELIMINARY

NOT TO SCALE



Roseland Road



PN: **PF18148** TEST HOLE NO.: **3**

PROJECT NAME: **Roseland Tank Conversion**

D.O.T. JOB# \_\_\_\_\_ WORK ORDER# \_\_\_\_\_

LOCATE REQUESTED BY: **Kimley + Horn**

PROJECT LOCATION: **Sebastian - Indian River**

REQUESTED: SIZE  TYPE:  GAS WATER ELEC TELE CATV SAN FM STORM FO STEAM  
 OTHER: \_\_\_\_\_

SHEET **1/A** OF \_\_\_\_\_ PROPOSED: **Utility Work**

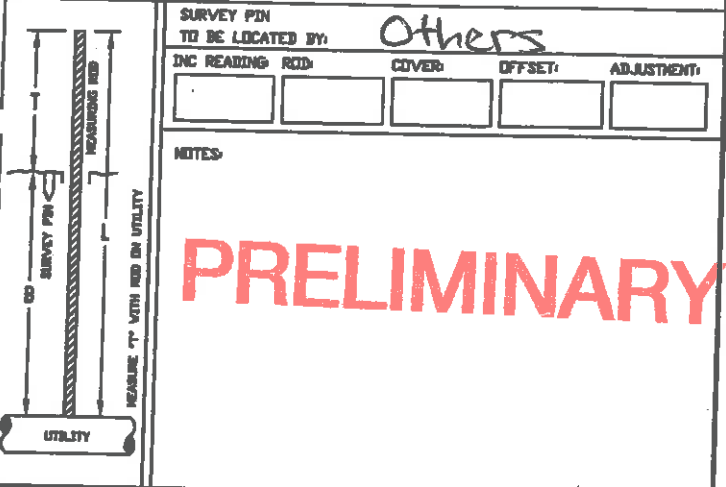
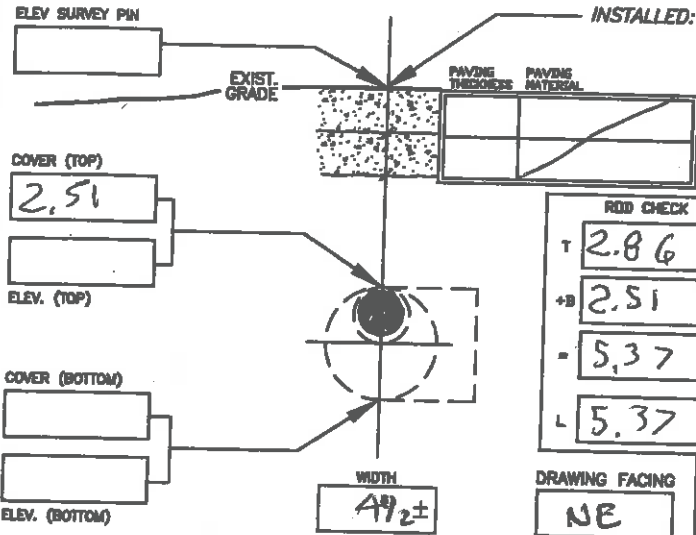
FOUND: SIZE  4" MATL: CI III STL  V/STL CLAY AC RCP CPP CMP  
 HDPE PE PVD(GREEN) PVD(WHITE) PVD(GRAY) PVD(BLUE)  
 PVC (ORANGE) PVC (PURPLE) PVC (BLACK) COPPER  
 OTHER: \_\_\_\_\_  
 TYPE:  GAS WATER ELEC TELE FO CATV SAN FM STORM STEAM

FORM BY: **mL** ASSISTED BY: **Temp** OF HOLES: **1**

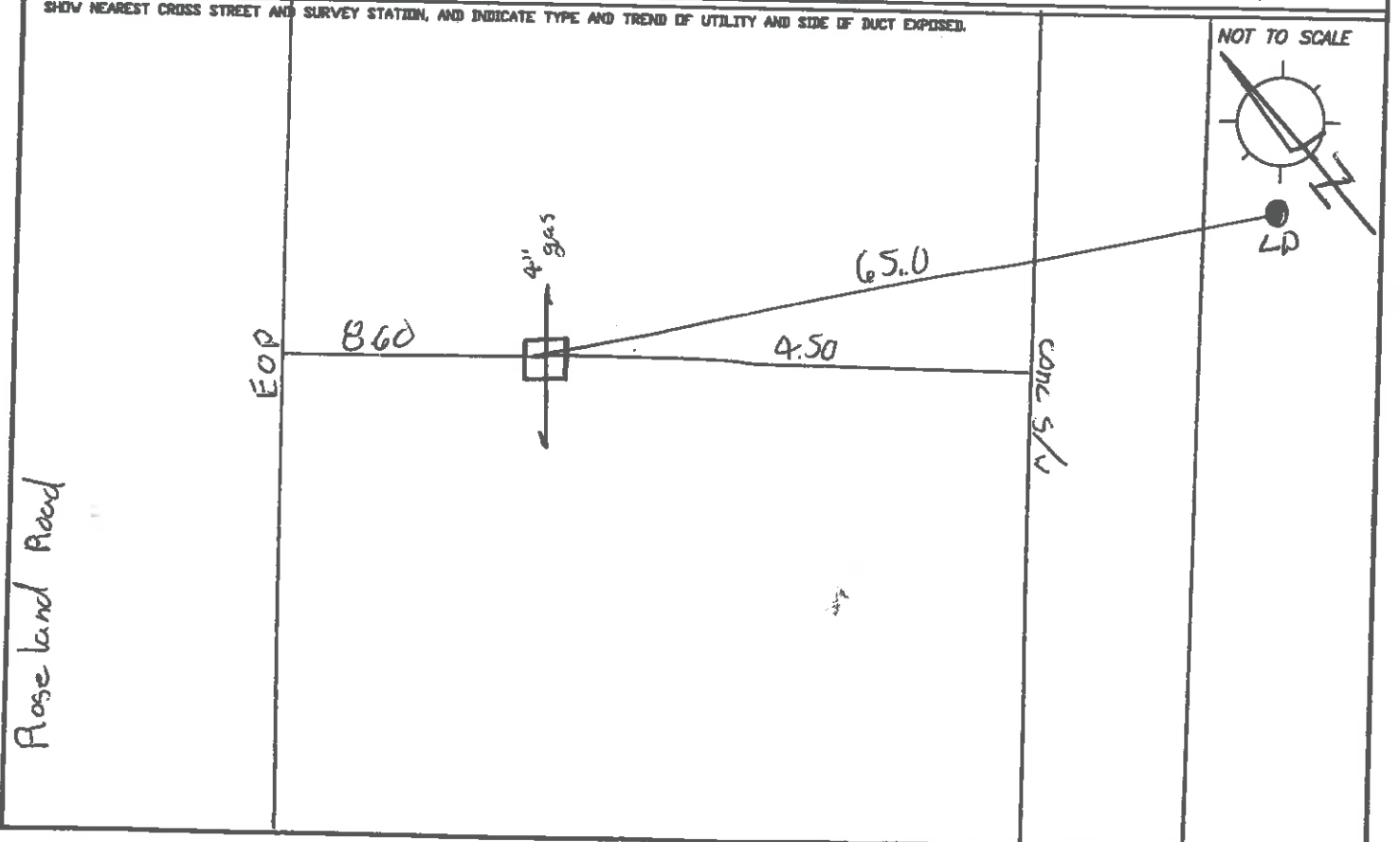
PAVING CONDITION: GOOD FAIR POOR N/A DATE DUG: **8-9-18**

SOIL CONDITIONS: HARD  SOFT  WET  MOIST DRY  SAND  CLAY ROCKY

UTILITY CONDITION: GOOD  FAIR  POOR SEE NOTE N/A



SHOW NEAREST CROSS STREET AND SURVEY STATION, AND INDICATE TYPE AND TREND OF UTILITY AND SIDE OF DUCT EXPOSED.



PROJECT NAME: **Roseland Tank Conversion**

D.O.T. JOB# \_\_\_\_\_ WORK ORDER# \_\_\_\_\_

LOCATE REQUESTED BY: **Kimley & Horn**

PROJECT LOCATION: **Sebastian - Indian River - FL**

REQUESTED:  SDG  TYPE: GAS WATER ELEC  TELE CATV SAN FH STORM FD STEAM  
 @  OTHER:

SHEET **N/A** OF \_\_\_\_\_ PROPOSED: **Utility Work**

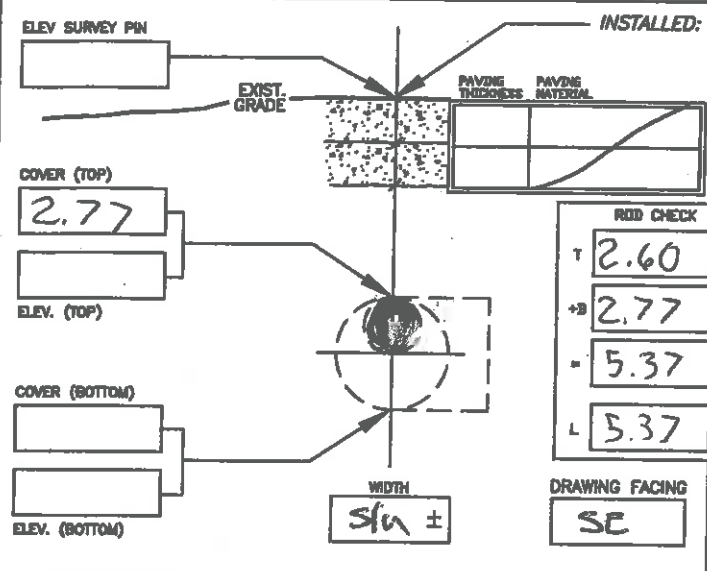
FOUND:  **SH** MATL: CI II STL V/STL CLAY AC RCP CPP CMP  
 HOPE PE PVC(GREEN) PVC(WHITE) PVC(GRAY) PVC(BLUE)  
 PVC (ORANGE) PVC (PURPLE) PVC (BLACK) COPPER  
 OTHER: **SH** CAST IN PLACE CONC. PRECAST CONC. JBC VCPX  
 TYPE: GAS WATER ELEC TELE FD CATV SAN FH STORM STEAM

FORM BY: **ML** ASSISTED BY: **Temp** # OF HOLES: **1**

PAVING CONDITION: GOOD FAIR POOR  **N/A** DATE DUG: **8-9-18**

SOIL CONDITIONS: HARD SOFT  **WET**  **MOIST** DRY  **SAND** CLAY ROCKY

UTILITY CONDITION: GOOD FAIR POOR  **SEE NOTE**  **N/A**



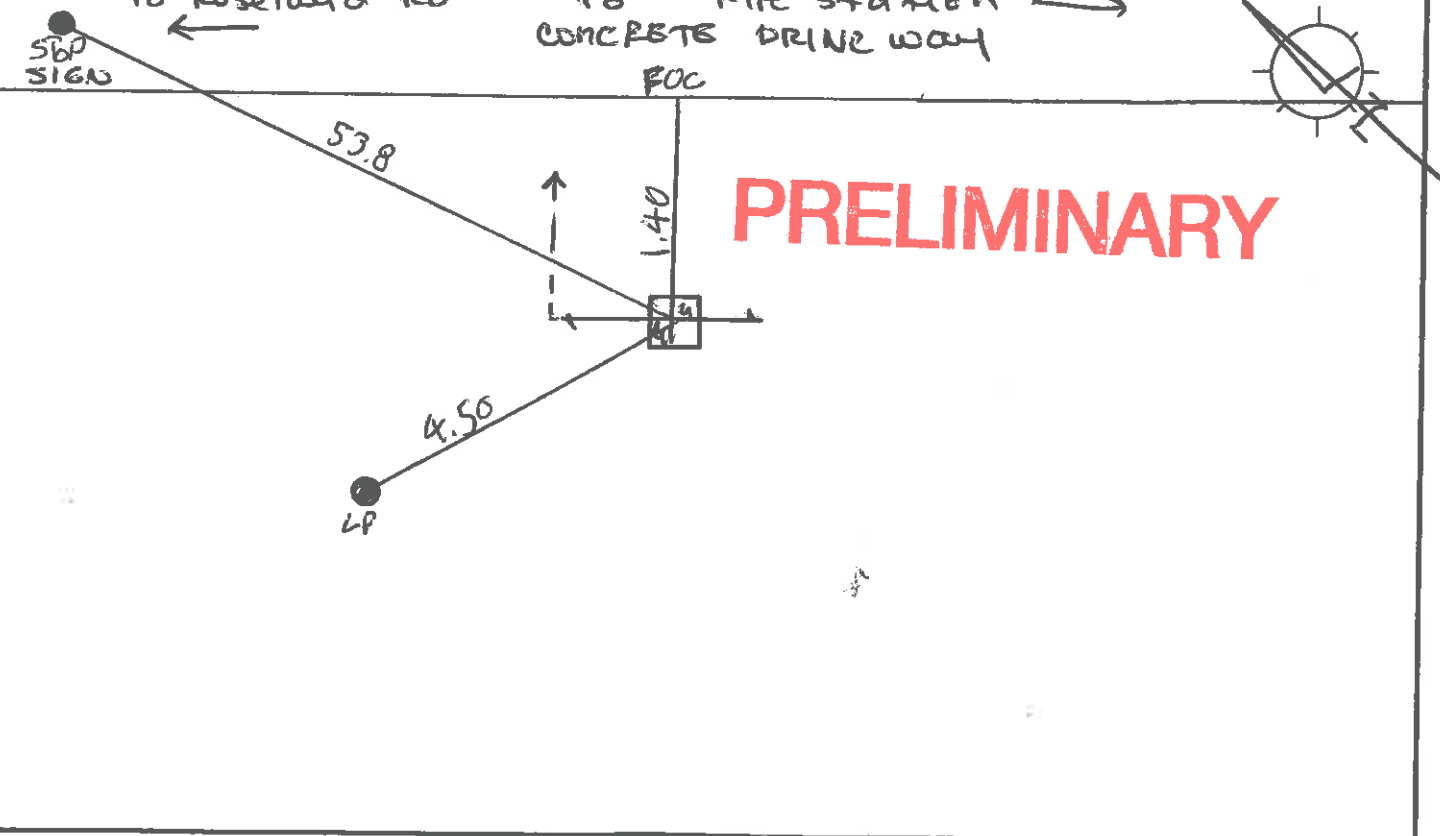
INC READING ROD COVER OFFSET ADJUSTMENT

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SURVEY PIN TO BE LOCATED BY: **Others**

NOTES:  
 Unable to get size and matrl due to ground water conduit turns 90° to NE 2.0'± across concrete driveway.

SHOW NEAREST CROSS STREET AND SURVEY STATION, AND INDICATE TYPE AND TREND OF UTILITY AND SIDE OF DUCT EXPOSED.



PN: **PF18148** TEST HOLE NO.: **5**

**PROJECT NAME:** Roseland Tank Conversion

**LOCATE REQUESTED BY:** Kimley + Horn

**REQUESTED:**  SIZE  TYPE: GAS WATER ELEC TELE CATV  SAN FM STORM FD STEAM  
 OTHER:

**FOUND:**  SIZE  SH  MATEL: CI DI STL V/STL CLAY AC RCP CPP CHP  
 HDPE PE PVC(GREEN) PVC(WHITE) PVC(GRAY) PVC(BLUE)  
 PVC (ORANGE) PVC (PURPLE) PVC (BLACK) COPPER  
 OTHER: SH  
 CAST IN PLACE CONC. PRECAST CONC. DBC VCPX  
 TYPE: GAS WATER ELEC TELE FD CATV  SAN FM STORM STEAM

**D.O.T. JOB#** \_\_\_\_\_ **WORK ORDER#** \_\_\_\_\_

**PROJECT LOCATION:** (CITY, COUNTY, STATE) Sebastian - Indian River FL

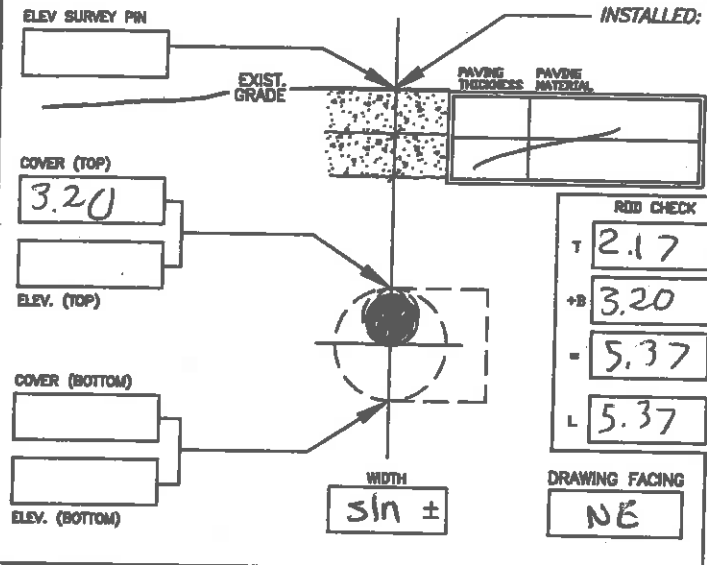
**SHEET** \_\_\_\_\_ **OF** \_\_\_\_\_ **PROPOSED:** Utility Work

**FORM BY:** ML **ASSISTED BY:** Temp **# OF HOLES:** 1

**PAVING CONDITION:** GOOD FAIR POOR N/A **DATE DUG:** 8-9-18

**SOIL CONDITIONS:** HARD  SOFT  WET  MOIST DRY  SAND  CLAY ROCKY

**UTILITY CONDITION:** GOOD FAIR POOR  SEE NOTE N/A



**INSTALLED:** PK  HUB & TACK STL PIN SPIKE CHS. "X" AT:  CROWN EDGE TOP OF UTILITY.

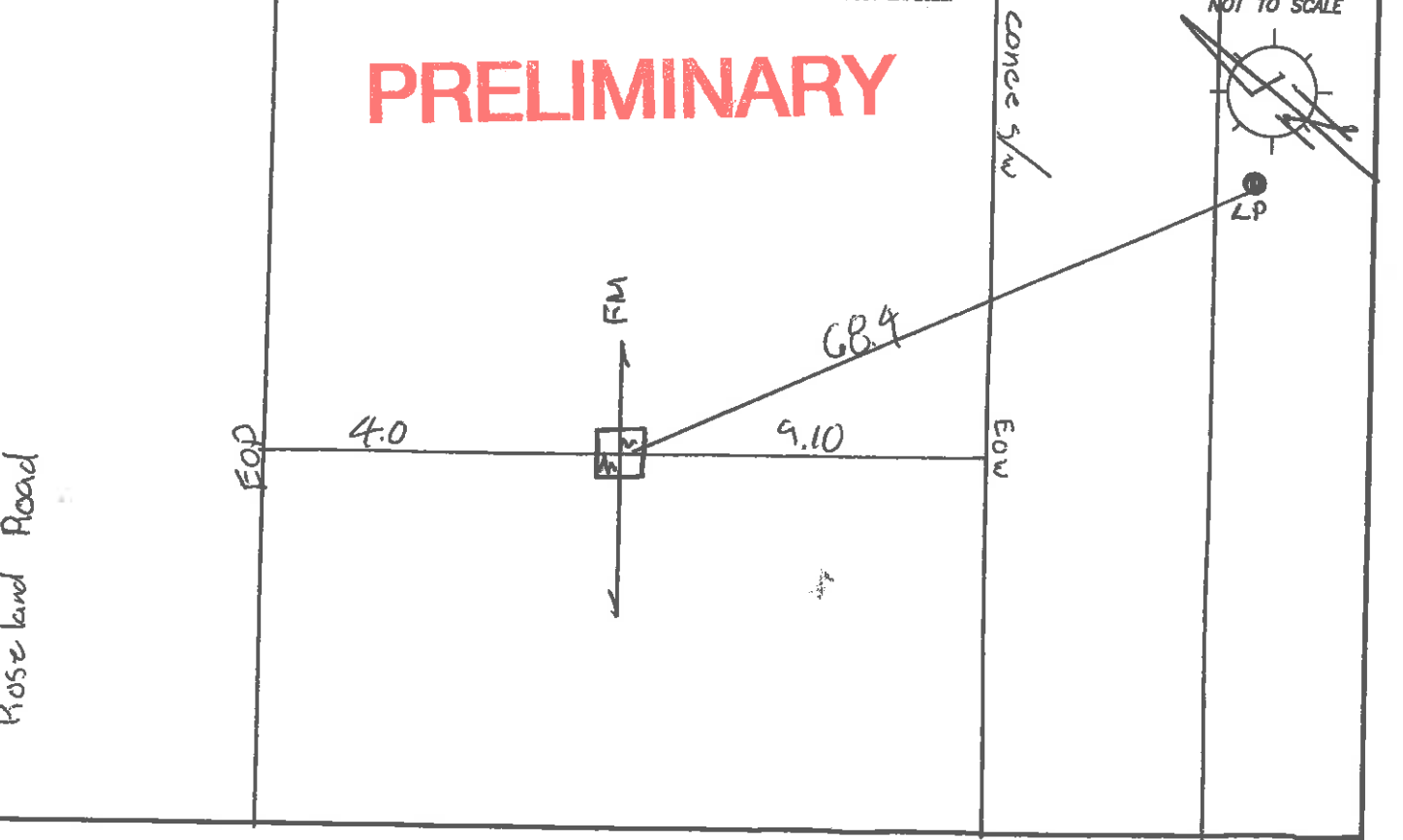
**RIBBON INSTALLED:** RED BLUE YELLOW ORANGE GREEN PINK WHITE

**SURVEY PIN TO BE LOCATED BY:** Others

INC READING	ROD	COVER	OFFSET	ADJUSTMENT

**NOTES:**  
 unable to see to determine size + material due to ground water  
 Plans indicate 8" FM

SHOW NEAREST CROSS STREET AND SURVEY STATION, AND INDICATE TYPE AND TREND OF UTILITY AND SIDE OF DUCT EXPOSED.





PN: **PF181A8** TEST HOLE NO.: **6**

**PROJECT NAME:** Roseland Tank Conversion

**LOCATE REQUESTED BY:** Kimley & Horn

**REQUESTED:** SIZE:  TYPE: GAS WATER  TELE CATV SAN FH STORM FO STEAM  
 OTHER:

**FOUND:** SIZE:  4" MATERIAL: CI DI STL V/STL CLAY AC RCP CPP CHP  
 HOPE PE PVD(GREEN)  PVD(WHITE) PVD(GRAY) PVD(BLUE)  
 PVC (ORANGE) PVC (PURPLE) PVC (BLACK) COPPER  
 OTHER: CAST IN PLACE CONC. PRECAST CONC. DBC VCPX  
 TYPE: GAS WATER  TELE FO CATV SAN FH STORM STEAM

**D.O.T. JOB#** \_\_\_\_\_ **WORK ORDER#** \_\_\_\_\_

**PROJECT LOCATION:** (CITY, COUNTY, STATE) Sebastian - Indian River - FL

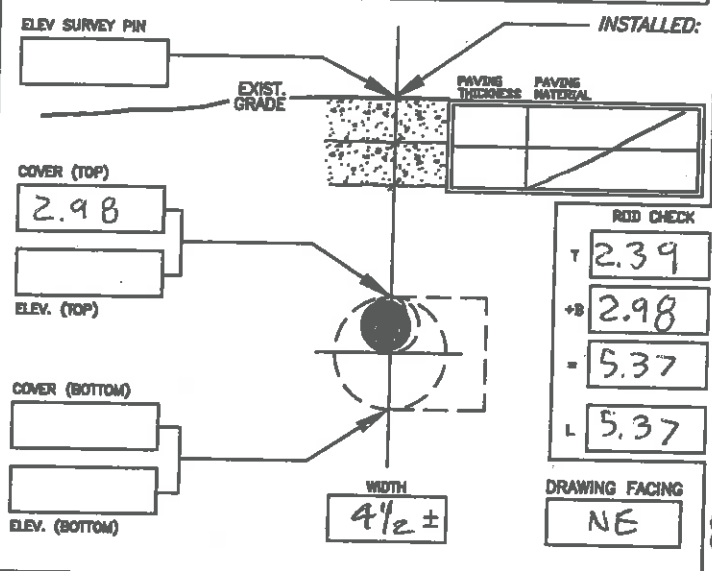
**SHEET N/A OF** \_\_\_\_\_ **PROPOSED:** Utility Work

**FORM BY:** ML **ASSISTED BY:** Temp **# OF HOLES:** 1

**PAVING CONDITION:** GOOD FAIR POOR N/A **DATE DUG:** 8-9-18

**SOIL CONDITIONS:** HARD  SOFT WET  MOIST DRY  SAND CLAY ROCKY

**UTILITY CONDITION:** GOOD  FAIR POOR SEE NOTE N/A



**INSTALLED:** PK  HUB & TACK STL PIN SPIKE CHIS. "X" AT:  CROWN  EDGE TOP OF UTILITY.

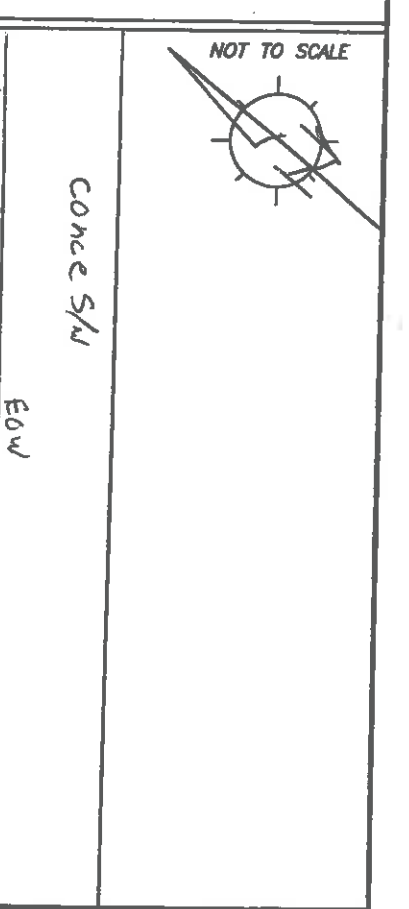
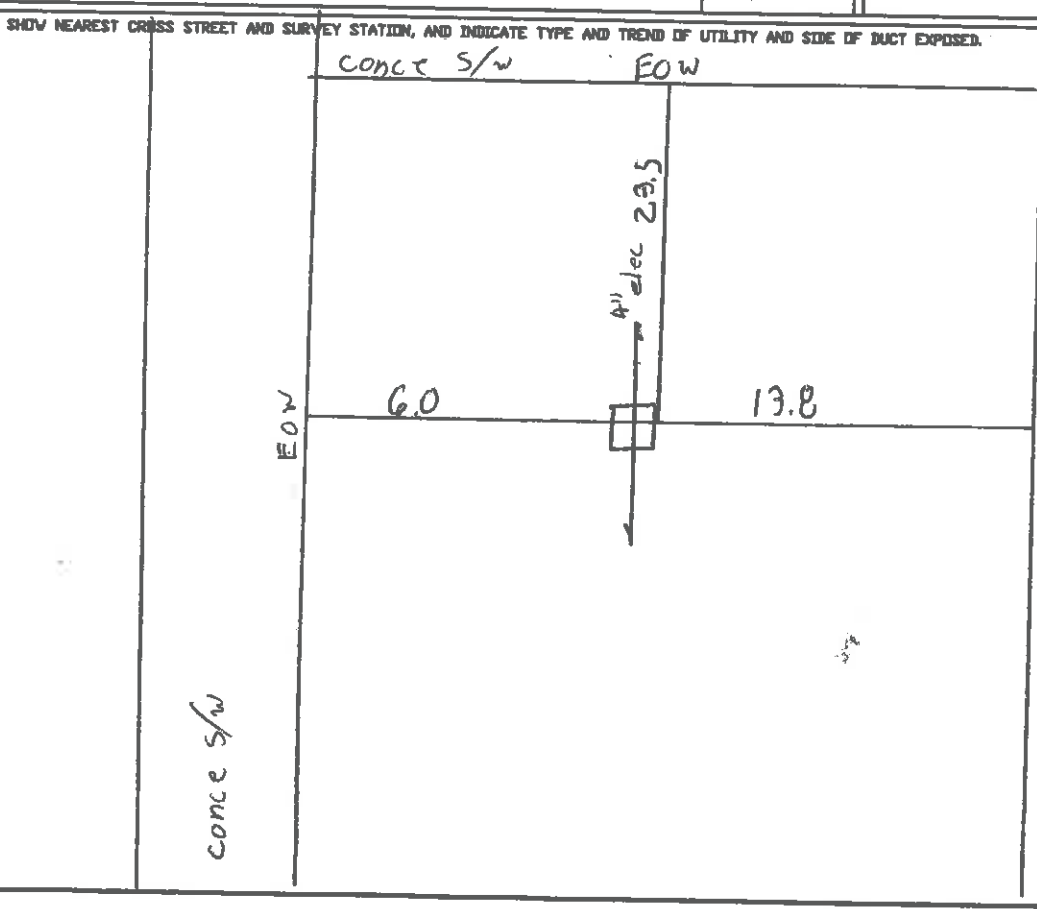
**RIBBON INSTALLED:**  RED  BLUE  YELLOW  ORANGE  GREEN  PINK  WHITE

**SURVEY PIN TO BE LOCATED BY:** Others

INC READING	ROD	COVER	OFFSET	ADJUSTMENT

**NOTES:**

**PRELIMINARY**



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# APPENDIX C:

## FDEP PERMIT

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# FLORIDA DEPARTMENT OF Environmental Protection

Southeast District Office  
3301 Gun Club Road, MSC 7210-1  
West Palm Beach, FL 33406  
561-681-6600

**Ron DeSantis**  
Governor

**Jeanette Nuñez**  
Lt. Governor

**Noah Valenstein**  
Secretary

February 27, 2019

In the Matter of an Application for Permit by:  
Mr. Vincent Burke, Director of Utilities Services  
Indian River County Department of Utility  
Services (IRCDU)  
1801 27<sup>th</sup> Street  
Vero Beach, Florida 32960  
Email: [vburke@ircgov.com](mailto:vburke@ircgov.com)

DEP File No.: 0039206-974-WC  
Indian River County  
IRCDU  
Roseland Elevated Storage Tank Conversion  
and Pump Station  
**PWS No.:** 3314052

## NOTICE OF PERMIT ISSUANCE

Enclosed is Permit Number 0039206-974-WC to convert Roseland Elevated Storage Tank to a storage and re-pump station in Indian River County, Florida. This permit is issued under Section 403.087 of the Florida Statutes.

A person whose substantial interests are affected by the proposed permitting decision of the Department may petition for an administrative hearing in accordance with Sections 120.569 and 120.57 of the Florida Statutes.

The petition must contain the information set forth below and must be filed (received) in the Department of Environmental Protection, Office of General Counsel, Mail Station 35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen days of receipt of this notice of intent. Petitions filed by any other person must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. A petitioner must mail a copy of the petition to the applicant at the address indicated above, at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 of the Florida Statutes, or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the discretion of the presiding officer upon the filing of a motion in compliance with rule 28-5.207 of the Florida Administrative Code.

A petition must contain the following information:

- (a) The name, address, and telephone number of each petitioner; the Department permit identification number and the county in which the subject matter or activity is located;
- (b) A statement of how and when each petitioner received notice of the Department action;

- (c) A statement of how each petitioner's substantial interests are affected by the Department action;
- (d) A statement of the material facts disputed by the petitioner, if any;
- (e) A statement of facts that the petitioner contends warrant reversal or modification of the Department action;
- (f) A statement of which rules or statutes the petitioner contends require reversal or modification of the Department action; and
- (g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wants the Department to take.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the final action of the Department may be different from the position taken by it in this notice of intent. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

Mediation under Section 120.573 of the Florida Statutes is not available for this proceeding.

This action is final and effective on the date filed with the Clerk of the Department unless a petition is filed in accordance with the above. Upon the timely filing of a petition this order will not be effective until further order of the Department.

Any party to the order has the right to seek judicial review of the order under Section 120.68 of the Florida Statutes, by the filing of a notice of appeal under rule 9.110 of the Florida Rules of Appellate Procedure with the Clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000; and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within 30 days from the date when the final order is filed with the Clerk of the Department.

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**EXECUTION AND CLERKING**

Executed in West Palm Beach, Florida.

**STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION**



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Diane Pupa  
Program Administrator  
Permitting and Waste Cleanup

DP/MP

**CERTIFICATE OF SERVICE**

The undersigned duly designated deputy clerk hereby certifies that this document and all attachments were sent on the filing date below to the following listed persons:

Electronic Copies Furnished to:

Kimley-Horn and Associates – Mark Miller, P.E. – [Mark.Miller@kimley-horn.com](mailto:Mark.Miller@kimley-horn.com)  
FDEP – [Jocelyn.Labbe@dep.state.fl.us](mailto:Jocelyn.Labbe@dep.state.fl.us) [Mark.Peters@dep.state.fl.us](mailto:Mark.Peters@dep.state.fl.us)  
Indian River County Health Department – [Cheryl.Dunn@flhealth.gov](mailto:Cheryl.Dunn@flhealth.gov)

**FILING AND ACKNOWLEDGMENT**

FILED, on this date, under Section 120.52(7), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

*Barbara Browning*

February 27, 2019

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Clerk

Date



# FLORIDA DEPARTMENT OF Environmental Protection

Southeast District Office  
3301 Gun Club Road, MSC 7210-1  
West Palm Beach, FL 33406  
561-681-6600

**Ron DeSantis**  
Governor

**Jeanette Nuñez**  
Lt. Governor

**Noah Valenstein**  
Secretary

February 27, 2019

**PERMITTEE:**

Mr. Vincent Burke, Director of Utilities Indian River  
County Department of Utility Services (IRCDU)  
1801 27<sup>th</sup> Street  
Vero Beach, Florida 32960  
Email: [vburke@ircgov.com](mailto:vburke@ircgov.com)

**PWS ID. NO.:** 3314052

**PERMIT NUMBER:** 0039206-974-WC

**DATE OF ISSUE:** February 27, 2019

**EXPIRATION DATE:** February 26, 2024

**COUNTY:** Indian River

**PROJECT:** Roseland Elevated Storage Tank  
Conversion and Pump Station

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Chapters 62-4, 62-550, 62-555 and 62-560. The above-named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

**TO CONSTRUCT:** Roseland Elevated Storage Tank Conversion and Pump Station

**PROPOSED CONSTRUCTION INCLUDES:**

- Approximately 500-ft of 12" DR-11 HDPE transmission water main
- Three (3), Peerless Model 8AE15 or approved equal 50-hp, 2,000 gpm, 60-ft TDH booster pumps controlled by variable frequency drives (VFDs)
- All associated appurtenance

**IN ACCORDANCE WITH:** The construction Permit Application and Fee dated December 6, 2018, prepared by Mark Miller, P.E. of Kimley-Horn and Associates and received by the Department on December 19, 2018. Request for Additional Information dated December 19, 2018, and response prepared by Mark Miller, P.E. of Kimley-Horn and Associates, and received February 22, 2019.

**LOCATED AT:** on Indian River County Utilities Roseland Elevated Storage Tank property, Indian River County, Florida

**TO SERVE:** Indian River County Department of Utility Services

**SUBJECT TO:** General Conditions, and Specific Conditions below.

**Mr. Vincent Burke, Director of Utilities Services  
Indian River County Department of Utility**

**DEP File No. 0039206-974-WC  
Indian River County**

Work must be conducted in accordance with the General and Specific Conditions, attached hereto.

Issued this 27th day of February 2019

STATE OF FLORIDA DEPARTMENT  
OF ENVIRONMENTAL PROTECTION



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Diane Pupa  
Program Administrator  
Permitting and Waste Cleanup

DP/MP

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## **A. General Conditions**

The permittee shall be aware of and operate under the Permit Conditions below. These applicable conditions are binding upon the permittee and enforceable pursuant to Chapter 403, Florida Statutes. [F.A.C. Rule 62-555.533(1)]

1. The terms, conditions, requirements, limitations and restrictions set forth in this permit, are "permit conditions" and are binding and enforceable pursuant to Sections 403.141, 403.727, or 403.859 through 403.861, F.S. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.
3. As provided in Subsections 403.087(6) and 403.722(5), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations. This permit is not a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in this permit.
4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.
6. The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed and used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.



7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at reasonable times (reasonable time may depend on the nature of the concern being investigated), access to the premises where the permitted activity is located or conducted to:
  - a. Have access to and copy any records that must be kept under conditions of the permit;
  - b. Inspect the facility, equipment, practices, or operations regulated or required under this permit; and
  - c. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.
8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:
  - a. A description of and cause of noncompliance; and
  - b. The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance. The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.
9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.111 and 403.73, F.S. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.
10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance; provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules. A reasonable time for compliance with a new or amended surface water quality standard, other than those standards addressed in Rule 62-302.500, shall include a reasonable time to obtain or be denied a mixing zone for the new or amended standard.
11. This permit is transferable only upon Department approval in accordance with Rule 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.
12. This permit or a copy thereof shall be kept at the work site of the permitted activity.
13. This permit also constitutes:

- a. Determination of Best Available Control Technology (BACT)
  - b. Determination of Prevention of Significant Deterioration (PSD)
  - c. Certification of compliance with State Water Quality Standards (Section 401, PL 92-500)
  - d. Compliance with New Source Performance Standards
14. The permittee shall comply with the following:
- a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.
  - b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
  - c. Records of monitoring information shall include:
    - i. the date, exact place, and time of sampling or measurements;
    - ii. the person responsible for performing the sampling or measurements;
    - iii. the dates analyses were performed;
    - iv. the person responsible for performing the analyses;
    - v. the analytical techniques or methods used;
    - vi. the results of such analyses.
15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware the relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

## **B. Regulatory Section**

1. All construction must be in accordance with this permit. Before commencing work on project changes for which a construction permit modification is required per 62-555.536(1), the permittee shall submit to the Department a written request for a permit modification. Each such request shall be accompanied by one copy of a revised construction permit

application, the proper processing fee and one copy of either a revised preliminary design report or revised drawings, specifications and design data. [F.A.C. Rule 62-555.536].

2. Permitted construction or alteration of public water supply systems must be supervised during construction by a professional engineer registered in the State of Florida if the project was designed under the responsible charge of a professional engineer licensed in the State of Florida. The permittee must retain the service of a professional engineer registered in the State of Florida to observe that construction of the project is in accordance with the engineering plans and specifications as submitted in support of the application for this permit. [F.A.C. Rule 62-555.520(3)].
3. If prehistoric or historic artifacts, such as pottery or ceramics, stone tools or metal implements, dugout canoe remains, or any other physical remains that could be associated with Native American cultures, or early colonial or American settlement are encountered at any time within the project site area, the permitted project should cease all activities involving subsurface disturbance in the immediate vicinity of such discoveries. The permittee, or other designee, should contact the Florida Department of State, Division of Historical Resources, Compliance and Review Section at 850.245.6333 or 800.847.7278, as well as the appropriate permitting agency office. Project activities should not resume without verbal and/or written authorization from the Division of Historical Resources and the permitting agency. In the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately, and the proper authorities notified in accordance with Section 872.05, *Florida Statutes*.
4. If delays will cause project completion to extend beyond the expiration date of this permit, the permittee shall submit to the Department a request to extend the expiration date of this permit including the appropriate processing fee. This request shall specify the reasons for the delay and shall be submitted to the Department for approval prior to the expiration date of this permit. Note that no specific construction permit shall be extended so as to remain in effect longer than five years. [F.A.C. Rule 62-555.536(4)]. {OPTIONAL}
5. In accordance with General Condition #11 of this permit, this permit is transferable only upon Department approval. Persons proposing to transfer this permit must apply jointly for a transfer of the permit within 30 days after the sale or legal transfer of ownership of the permitted project that has not been cleared for service by the Department using form, 62-555.900(8), Application for Transfer of a PWS Construction Permit along with the appropriate fee. [F.A.C. Rule 62-555.536(5)]
6. This permit satisfies Drinking Water permitting requirements only and does not authorize construction or operation of this facility prior to obtaining all other necessary permits from other program areas within the Department, or required permits from other state, federal, or local agencies.
7. If gasoline contamination is found at the construction site, work shall be stopped and the proper authorities notified. With the approval of the Department, ductile iron pipe and fittings, and solvent resistant gaskets materials shall be used in the contaminated area. The

ductile pipe shall be used in the contaminated area. The ductile iron pipe shall extend 100 feet beyond any solvent noted. Any contaminated soil that is excavated shall be placed on an impermeable mat, covered with waterproof covering, and held for disposal. If the site cannot be properly cleaned, then consultation with the Department is necessary prior to continuing with the project construction.

8. This permit does not constitute approval of construction on jurisdictional wetland areas; therefore, such approval must be obtained separately from the Water Management District or from DEP ERP Section, as applicable, Permittee shall provide a copy of the permit approval to the Department if water main installation involves activities on wetlands.

### **C. Construction Standards**

1. All products, including paints, which shall come into contact with potable water, either directly or indirectly, shall conform to National Sanitation Foundation (NSF) International, Water Chemicals Codex, Food Chemicals Codex, American Water Works Association (AWWA) Standards and the Food and Drug Administration, as provided in Rule 62-555.320(3), F.A.C.
2. Water supply facilities, including mains, pipe, fittings, valves, fire hydrants and other materials shall be installed in accordance with the latest applicable AWWA Standards and Department rules and regulations. The system shall be pressure and leak tested in accordance with AWWA Standard C600 C603, or C605, as applicable, and disinfected in accordance with AWWA Standard C651-653, as well as in accordance with Rule 62-555.340, F.A.C.
3. The installation or repairs of any public water system, or any plumbing in residential or nonresidential facilities providing water for human consumption, which is connected to a public water system shall be lead free in accordance with Rule 62-555.322, F.A.C.
7. The new or altered aboveground piping at the drinking water treatment plant shall be color coded and labeled as recommended in Section 2.14 of "Recommended Standards for Water Works, 1997 Edition". [F.A.C. Rule 62-555.320(10)]
8. Permittee shall ensure that there shall be no cross-connection with any non-potable water source in accordance with Rule 62-555.360, F.A.C.

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## **D. Operational Requirements**

1. The supplier of water shall operate and maintain the public water system so as to comply with applicable standards in F.A.C. Rule 62-550 and 62-555.350.
2. The permittee shall provide an operation and maintenance manual for the new or altered treatment facilities to fulfill the requirements under subsection 62-555.350(13), F.A.C. The manual shall contain operation and control procedures, and preventative maintenance and repair procedures, for all plant equipment and shall be made available for reference at the plant or at a convenient location near the plant. Bound and indexed equipment manufacturer manuals shall be considered sufficient to meet the requirements of the subsection.
3. The permittee shall submit a monthly operations report (MOR) DEP Form 62-555.900(x), to the Department no later than the tenth of each succeeding month. (Note x depends upon type of treatment)
4. The permittee shall have complete record drawings produced for the project in accordance with Rule 62-555.530(4), F.A.C.
5. The permittee or suppliers of water shall telephone the State Warning Point (SWP), at 1-800-320-0519 immediately (i.e., within two hours) after discovery of any actual or suspected sabotage or security breach, or any suspicious incident, involving a public water system in accordance with the F.A.C. Rule 62-555.350(10).

## **E. Monitoring Provisions**

1. Permittee shall follow the guidelines of Chapters 62-550, 62-555, and 62-560, F.A.C., regarding public drinking water system standards, monitoring, reporting, permitting, construction, and operation.
2. The water treatment plant shall maintain throughout the distribution system a minimum continuous and effective free chlorine residual of 0.2 mg/l or its equivalent. A minimum system pressure of 20 psi must be maintained throughout the system. Also, safety equipment shall be provided and located outside of chlorine room. **OR**

The water treatment plant shall maintain throughout the distribution system a minimum combined chlorine residual of 0.6 mg/l or its equivalent. A minimum system pressure of 20 psi must be maintained throughout the system. Also, safety equipment shall be provided and located outside of chlorine room.

3. To address copper pipe corrosion control and potential black water issues, permittee shall collect at least one sample of raw water from each new well in accordance with F.A.C. Rule 62-555.315(5). The sample shall be analyzed for alkalinity, dissolved iron, dissolved oxygen (D.O.), pH, total sulfide, and turbidity, and the results shall be submitted to the Department.

## F. Clearance Requirements

1. The permittee must instruct the engineer of record to request system clearance from the Department within sixty (60) days of completion of construction, testing and disinfecting the system. Bacteriological test results shall be considered unacceptable if the test were completed more than 60 days before the Department received the results. [F.A.C. Rule 62-555.340(2)(c)]

Permitted construction or alteration of a public water system may not be placed into service until a letter of clearance has been issued by this Department. [F.A.C. Rule 62-555.345]

2. Prior to placing this project into service, Permittee shall submit, at a minimum, all of the following to the Department for evaluation and approval for operation, as provided in Rules 62-555.340 and 62-555.345, F.A.C.:
  - a. The engineer's *Certification of Construction Completion and Request for Clearance to Place Permitted PWS Components into Operation* {DEP Form 62-555.900(9)};
  - b. Certified record drawings, if there are any changes noted for the permitted project.
  - c. Copy of a satisfactory pressure test of the process piping performed in accordance with AWWA Standards. [F.A.C. Rule 62-555.320(21)(a)(1)]
  - d. Two consecutive days of satisfactory bacteriological analytical results (see paragraph 3 below).

In order to facilitate the issuance of a letter of clearance, the Department requests that all of the above information be submitted as one package.

3. The new facilities shall be cleaned, disinfected, and bacteriologically cleared in accordance with Chapter 62-555, F.A.C. The bacteriological clearance data shall be submitted to the Department with the engineer's certification of construction completion. [Section 62-555.340 and 62-555.315(6)(b), F.A.C.]