COLUMBIA COUNTY, FLORIDA
BOARD OF COUNTY COMMISSIONERS

INVITATION TO BID
2025-13
ELLISVILLE – FDOT WASTEWATER INTERCONNECT

The Board of County Commissioners (County) will receive sealed proposals in the office of Commissioners, 135 NE Hernando Avenue, Suite 203, Lake City, FL 32055, until **2:00 PM** local time on **NOVEMBER 6, 2025** for the following:

ELLISVILLE – FDOT WASTEWATER INTERCONNECT

The Project consists of constructing an interconnect between the Columbia County Ellisville WWTP and the Florida Department of Transportation (FDOT) MM-413 Rest Area WWTP. Work approximately includes 540 LF of 4-inch and 6-inch DIP forcemain, 3,130 LF of 4-inch and 6-inch PVC forcemain, and one duplex submersible pump station at the existing Ellisville WWTP site with related valves, fittings, appurtenances, electrical and control equipment.

The Bid Form and other Bid and Construction Documents may be obtained from the County's website at http://www.columbiacountyfla.com/PurchasingBids.asp. The deadline for questions regarding Bid Documents or Construction Plans and Specifications must be received in writing before **Thursday, October 30, 2025, at 5:00 PM.** Questions shall be directed in writing to the County Purchasing Department at ejones@columbiacountyfla.com.

The successful Bidder shall furnish a 5% bid bond with Bid submittal, and if selected, shall furnish the County Manager with a Performance Bond and Proof Liability Insurance prior to commencing work.

The Columbia County Commission reserves the right to reject any or all bids and to add to the contract or delete from the contract to stay within their funding capabilities.

ADVERTISEMENT FOR BIDS
COLUMBIA COUNTY BOARD OF COUNTY COMMISSIONERS
COLUMBIA COUNTY PROJECT NO: 2025-13
ENGINEER'S PROJECT NO: L231019CCB

COLUMBIA COUNTY WILL RECEIVE BIDS FOR THE FOLLOWING:
ELLISVILLE – FDOT WASTEWATER INTERCONNECT

Date & Time for Receiving Bids:	2:00 PM, LOCAL TIME Thursday, November 6, 2025 Late bids will not be considered.
Deadline for Questions:	5:00 PM, LOCAL TIME Thursday, October 30 2025
Date & Time for Bid Opening:	2:00 PM, LOCAL TIME (or as soon thereafter) Thursday, November 6, 2025
Place for Receiving Bids:	Columbia County Commissioner's Office 135 Hernando Avenue Room 203 Lake City, FL 32055
Bid Documents Available at:	COLUMBIA COUNTY PURCHASING DEPARTMENT 135 NE Hernando Ave, Suite 203 Lake City, FL 32055 Contact: Erica Jones (ejones@columbiacountyfla.com)

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Project Description:

The Project consists of constructing an interconnect between the Columbia County Ellisville WWTP and the Florida Department of Transportation (FDOT) MM-413 Rest Area WWTP. Work approximately includes 540 LF of 4-inch and 6-inch DIP forcemain, 3,130 LF of 4-inch and 6-inch PVC forcemain, and one duplex submersible pump station at the existing Ellisville WWTP site with related valves, fittings, appurtenances, electrical and control equipment.

Dates of Advertisement:	10/14/2025 10/22/2025

SECTION I. GENERAL INSTRUCTIONS

These instructions will bind bidders and conditions herein set forth, except as specifically qualified in special bid and contract terms issued with any individual bid.

1. The following criteria are used in determining low responsible bidder:

   A. The ability, capacity and skill of bidder to perform required service.
   B. Whether the bidder can perform service promptly or within specified time.
   C. The determined character, integrity, reputation, judgment, experience and efficiency of bidder.
   D. The performance of previous contracts with Columbia County or entities similar to Columbia County.
   E. The suitability of equipment or material for County use.
   F. The ability of bidder to provide future maintenance.

2. Payment Terms are net thirty (30) unless otherwise specified. Favorable terms, discounts, may be offered and will be considered in determining low bids if they are deemed by Purchasing Department to be advantageous to the County.

3. All bids should be tabulated, totaled and checked for accuracy. Where applicable, the provided unit price will prevail in case of discrepancies or other errors.

4. All requested information shall be included in the envelope. All desired information must be included for your bid to receive full consideration.

5. If anything on the bid request is not clear, you should contact the Purchasing Officer immediately.

6. A bidders list is available at the Purchasing Office.

7. Quote all prices F.O.B. our warehouse or as specified in bid documents.

8. Each proposal shall be clearly marked on the outside of the envelope including Fed Ex, UPS or other delivery service envelopes, as a sealed bid. The name of the item being bid shall be shown on the outside in full.

9. The County shall not be liable for any bid opened prematurely if that bid was not sealed in a properly marked envelope.

10. If only one (1) bid is received, the bid may be rejected and re-advertised or accepted if determined to be in the counties best interest.

11. Bids received late will not be accepted. It is the bidder’s sole responsibility to ensure proposals are timely delivered and received before the deadline.

12. Telephone and facsimile bids will not be accepted under any circumstances. Should a timely delivered bid be misplaced by the County but later found before ranking occurs, the

bid will be considered. A bidder may request a receipt showing the day and time a bid envelope is delivered to the appropriate office of the County.

13. Bids requiring bid bonds will not be accepted if bond is not enclosed. Cash or certified check will be accepted in lieu of bond except on construction projects with a project budget exceeding $40,000.

14. Upon request of the Purchasing Office or County Manager, a bidder must provide proof that the bidder has the requisite organization, capital, plant, stock, ability, and experience to perform the contract contemplated by the Request for Proposals/Qualifications or Invitation to Bid.

15. Any alterations, erasures, additions, or omissions of required information or any changes to specifications or bidding schedule are done at the risk of the bidder. Any bid will be rejected that has a substantial variation, that is; a variation that affects price, quantity, and quality or delivery date (when delivery is required by a specific time).

16. When requested, samples will be furnished to the County free of expense, properly marked for identification and accompanied by a list where there is more than one (1) sample. The County reserves the right to mutilate or destroy any sample submitted whenever it may be to the best interest of the County to do so for the purpose of testing.

17. The County will reject any material, supplies or equipment that did not meet the specifications, even though the bidder lists the trade names or names of such material on the bid or price quotation form.

18. The unauthorized use of patented articles is done entirely at the risk of the successful bidder.

19. The ESTIMATED QUANTITY given in the specifications or advertisements is for the purpose of bidding only. The County may purchase more or less than the estimated quantity and the vendor must not assume that such estimated quantity is part of the contract.

20. Only the latest model equipment as evidenced by the manufacture's current published literature will be considered. Obsolete models of equipment not in production will not be acceptable. The equipment shall be composed of new parts and materials. Any unit containing used parts or having seen any service other than the necessary tests will be rejected. In addition to the equipment specifically called for in the specification, all equipment catalogued by the manufacturer as standard or required by the State of Florida shall be furnished with the equipment. Where required by the State of Florida Motor Vehicle Code, vehicles shall be inspected and bear the latest inspection sticker of the Florida Department of Revenue.

21. The successful bidder on motor vehicle equipment shall be required to furnish with delivery of vehicle, certificate of origin and any other appropriate documentation as required by the Florida Motor Vehicle Department.

22. Prospective bidders are required to examine the location of the proposed work or delivery

and determine, in their own way, the difficulties, which are likely to be encountered in the prosecution of the same.

23. All materials, equipment and supplies shall be subject to rigid inspection, under the immediate supervision of the Purchasing Department, its designee and /or the department to which they are delivered. If defective material, equipment, or supplies are discovered, the contractor, upon being instructed by the Purchasing Department or designee, shall remove, or make good such material, equipment, or supplies without extra compensation. It is expressly understood and agreed that the inspection of materials by the County will in no way lessen the responsibility of the Contractor release him from his obligation to perform and deliver to the County sound and satisfactory materials, equipment, or supplies. The Contractor agrees to pay the costs of all tests upon defective material, equipment, or supplies or allow the costs to be deducted from any monies due him from the County.

24. Unless otherwise specified by the Purchasing Department all materials, supplies, or equipment quoted herein must be delivered within thirty (30) days from the day of notification or exceptions noted on bid sheets.

25. A contract will not be awarded to any corporation, firm, or individual who is, from any cause, in arrears to the County or who has failed in former contracts with the County to perform work satisfactorily, either to the character of the work, the fulfillment or guarantee, or the time consumed in completing the work.

26. Reasonable grounds for supposing that any bidder is interested in more than one proposal for the same item will be considered sufficient cause for rejection of all proposals in which he is interested.

27. Submitting a proposal when the bidder intends to sublet the contract may be a cause for rejection of bids or cancellation of the contract by the County Manager.

28. Unless otherwise specified, the County reserves the right to award each items separately or on a lump sum basis whichever is in the best interest of the County.

29. The County reserves the right to reject any quotations or specifications and the right to waive minor discrepancies as to all bidders equally, when such rejection or waiver is deemed to be in the best interest of the County. For unit priced items, the County may elect to purchase part, all, or none of the materials, supplies, or equipment specified in a bid.

30. The bidder or the bidder's authorized representative or agent must sign the bid in the space provided. Unsigned bids will be rejected. Signature must be "wet" signatures in ink. Typewritten or printed signatures will not be accepted.

31. Any bidder may withdraw his/her bid at any time before the time set for the opening of the bids.

32. It is mutually understood and agreed that if at any time the Purchasing Department or designee shall be of the opinion that the contract or any part thereof is unnecessarily delayed or that the rate of progress or delivery is unsatisfactory, or that the contractor is

willfully violating any of the conditions or covenants of the agreement, or executing the same in bad faith, the Purchasing Department or his/her designee shall have the power to notify the contractor of the nature of the complaint. Notification shall constitute delivery of notice, or letter to address given in the proposal. If after three (3) working days of notification the conditions are not corrected to the satisfaction of the Purchasing Officer, he shall have the power to take whatever action necessary to complete the work or delivery and the expense shall be deducted from any paid by the County out of such monies as may become due to the said contractor. In case such expense shall exceed the last said sum, then and in that event, the bondsman or the contractor, his/her executors, administrators, successors, or assigns, shall pay the amounts of such excess to the County on notice made by the Purchasing Department or his/her designee of the excess due.

33. If the bidder proposes to furnish any item of foreign make or product, he shall write "foreign" together with the name of the originating country opposite such item on a proposal.

34. Any complaint from bidders relative to the invitation to bid or attached specifications shall be made prior to the time of opening bids; otherwise, the bidder waives any such complaint.

35. Contracts may be cancelled by the County with or without cause on thirty- (30) days advance written notice.

36. All contractors submitting bids for road projects in excess of $250,000 must be pre-qualified with the Florida Department of Transportation and shall provide proof of such qualification.

37. Any bidder affected adversely by an intended decision with respect to the award of any bid, shall file with the Purchasing Department for Columbia County, a written notice of intent to file a protest not later than seventy-two (72) hours (excluding Saturdays, Sundays and legal holidays), after the posting of the bid tabulation. Protest procedures may be obtained in the Purchasing Department.

38. A person or affiliate who has been placed on the convicted vendor's list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to Columbia County, may not submit a bid on a contract with Columbia County for the construction or repair of a public building or public work, may not submit bids on leases of real property to Columbia County, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with Columbia County, and may not transact business with Columbia County for a period of 36 months from the date of being placed on the convicted vendor list.

39. Vendor/Contractor shall utilize the U.S. Department of Homeland Security's E-Verify system, in accordance with the terms governing use of the system, to confirm the employment eligibility of;

    A. All persons employed by the Vendor/Contractor during the term of the Contract to perform employment duties within Florida; and
    B. All persons, including subcontractors, assigned by the Vendor/Contractor to

perform work pursuant to the contract with the County.

40. Contractor shall register on line at https://www.columbiacountyfla.com/PurchasingBids.asp for this specific project. All addendums are delivered via email through this website, and it is the contractor's responsibility to ensure all addendums are used in the bid submittal.

NFPS
PO BOX 3823
LAKE CITY, FL 32056
PHONE (386) 752-4675
FAX (386) 752-4674
www.nfps.net

ELLISVILLE – FDOT
WASTEWATER INTERCONNECT

COLUMBIA COUNTY, FLORIDA

PROJECT MANUAL
VOLUME 1 OF 2
(CONTRACTUAL SPECIFICATIONS)

Ricky L. Hendrix, PE
FL License No. 45239
Date:_____

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SECTION 001116 – INVITATION TO BID

1.1 BID INFORMATION

A. Project Title: Ellisville - FDOT Wastewater Interconnect

B. Project No.: 2025-13

C. Owners: Columbia County and Florida Department of Transportation

D. Engineer:
North Florida Professional Services, Inc.
1450 SW State Road 47
Lake City, FL 32025

E. Date: October 9, 2025

1.2 ANNOUNCEMENT

A. Your firm is invited to submit a Bid to the Owner for construction of a sanitary sewer pump station and force main for the Ellisville-FDOT Wastewater Interconnect project. Owner will receive Bids at the Columbia County Manager's Office located on the second floor of the Courthouse Annex at 135 Hernando Avenue, Room 203, Lake City, FL 32055, until 2 p.m. local standard time on Thursday, November 6, 2025. The Bid opening will take place on Thursday, November 6, 2025, immediately thereafter. Bids will be publicly opened and read aloud.

B. Project Description: The Project consists of constructing an interconnect between the Columbia County Ellisville WWTP and the Florida Department of Transportation (FDOT) MM-413 Rest Area WWTP. Work approximately includes 540 LF of 4-inch and 6-inch DIP forcemain, 3,130 LF of 4-inch and 6-inch PVC forcemain, and one duplex submersible pump station at the existing Ellisville WWTP site with related valves, fittings, appurtenances, electrical and control equipment.

C. Owner requires the Project to be completed in 240 calendar days.

D. Bidding Documents for a Unit Price contract may be obtained thru electronic copies (in pdf format) of the bid documents, plans, specifications and addenda from the North Florida Professional Services, Inc. website at http://www.nfps.net/bid-opportunities/. All addenda issued in regard to this bid will also be available via the NFPS website. Bidders using partial sets of Documents are fully responsible for any errors or omissions made due to not reviewing the entire set of Construction Documents.

E. Bidders will be required to provide Bid security according to the requirements in Document 002113.12 - Instructions to Bidders - EJCDC and Document 003100 - Available Project Information.

F. Refer to other Bidding requirements as described in Document 002113.12 - Instructions to Bidders - EJCDC and Document 003100 - Available Project Information.

G. Bids shall be submitted on the Bid Form provided.

H. All Bids shall be submitted under a condition of irrevocability for a period of 60 days after submission.

I. Owner reserves the right to waive irregularities and to accept or reject any or all Bids.

END OF SECTION 001116

SECTION 002113.12 – INSTRUCTIONS TO BIDDERS - EJCDC

1.1 SUMMARY Document Includes:

1. Appendix A – EJCDC C-200 Instructions to Bidders

1. Defined terms.
2. Copies of Bidding Documents.
3. Qualifications of Bidders.
4. Site and other areas; existing Site conditions; examination of Site; Owner's safety program; other Work at the Site.
5. Bidder's representations.
6. Prebid conference.
7. Interpretations and Addenda.
8. Bid security.
9. Contract Times.
10. Liquidated damages.
11. Substitute and "or-equal" items.
12. Subcontractors, suppliers, and others.
13. Preparation of Bid.
14. Basis of Bid.
15. Submittal of Bid.
16. Modification and withdrawal of Bid.
17. Opening of Bids.
18. Bids to remain subject to acceptance.
19. Evaluation of Bids and award of Contract.
20. Bonds and insurance.
21. Signing of Agreement.
22. Sales and use taxes.

23. Contracts to be assigned.

B. Related Documents:

24. Document 001116 - Invitation to Bid.

25. Document 003100 - Available Project Information.

26. Document 007314 - Supplementary Conditions - EJCDC:

    a. Definitions.
    b. Contract Time identification.
    c. Tax and duty rebate procedures.
    d. Tax-exempt procedures.
    e. Contractor's fees for changes.
    f. Contractor's liability insurance.
    g. Bond types and values.

27. Document Appendix G – C-410 Bid Form – EJCDC

END OF SECTION 002113.12

SECTION 003100 - AVAILABLE PROJECT INFORMATION

1.1 SUMMARY

A. Documents Include:

1. Topographic survey.
2. Existing conditions survey.

B. Available Project information has been furnished by Owner to Engineer for use in designing this Project.

1. Each Bidder shall be fully familiar with the available Project information, which has been prepared for Owner by separate consultants.
2. Available Project information is offered solely for reference and shall not be considered part of Contract Documents.
3. Data contained in Documents prepared by Owner's separate consultants is believed to be reliable; however, Owner and Engineer do not guarantee their accuracy or completeness.
4. In preparing their Bids, Bidders shall consider and evaluate data contained in available Project information as well as Contract Documents prepared by Engineer.

C. Related Documents:

1. Document 002113.12 - Instructions to Bidders - EJCDC: Site examination.

1.2 TOPOGRAPHIC SURVEY

A. A copy of limited topographic information is included in the Drawings.

B. This survey identifies grade elevations prepared primarily for use of Engineer in establishing new grades and identifying natural watershed in certain areas.

END OF SECTION 003100

SECTION 005213.12 - AGREEMENT FORM - EJCDC STIPULATED PRICE (SINGLE-PRIME CONTRACT)

1.1 SUMMARY

A. Document Includes:

1. Agreement.

B. Related Documents:

1. Document 007213.12 - General Conditions - EJCDC Stipulated Price (Single-Prime Contract).
2. Document 007314 - Supplementary Conditions - EJCDC.

1.2 AGREEMENT

A. Basis of Agreement between Owner and Contractor: EJCDC C-520 - Agreement between Owner and Contractor for Construction Contract (Stipulated Price).

END OF SECTION 005213.12

SECTION 007213.12 - GENERAL CONDITIONS - EJCDC STIPULATED PRICE (SINGLE-PRIME CONTRACT)

1.1 SUMMARY

A. Document Includes:

1. General Conditions.

B. Related Documents:

1. Document 005213.12 - Agreement Form - EJCDC Stipulated Price (Single-Prime Contract).
2. Document 007314 - Supplementary Conditions - EJCDC.

1.2 GENERAL CONDITIONS

A. General Conditions of the Contract: EJCDC C-700 - Standard General Conditions of the Construction Contract.

1.3 SUPPLEMENTARY CONDITIONS

A. Refer to Document 007314 - Supplementary Conditions - EJCDC for amendments and supplements to General Conditions.

END OF SECTION 007213.12

SECTION 009113 - ADDENDA

1.1 ADDENDUM

A. Project Information:

1. To: Prospective Bidders.
2. Project Title: Ellisville - FDOT Wastewater Interconnect
3. Project No.: 2025-13
4. Date: <_____>.
5. Owners: Columbia County and Florida Department of Transportation
6. Engineer: North Florida Professional Services, Inc.
7. This Addendum forms a part of the Contract Documents and modifies the Bidding Documents dated <_____>, Addendum Number [1] <_____> issued <_____>, and Addendum Number [2] <_____> issued <_____>, with amendments and additions noted below.
8. Acknowledge receipt of this Addendum in the space provided in the Bid Form. Failure to do so may disqualify the Bidder.
9. This Addendum consists of <____> pages and following Drawings:
   a. No. Drawing Title.
   b. Issue Date.

B. Changes to Addendum Number 1 - Issued _____:

1. Revise Item _____.

C. Changes to the Project Manual:

1. Document _____:
   a. _____.
   b. _____.
2. Document _____:
   a. _____.
   b. _____.
3. Document _____:
   a. _____.
   b. _____.

D. Changes to the Drawings:

1. Drawing _____:
   a. _____.
   b. _____.
2. Drawing _____:
   a. _____.
   b. _____.

3. Drawing _____:
   a. _____.
   b. _____.

END OF SECTION 009113

SECTION 011000 - SUMMARY

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Contract description.
2. Work by Owner or other Work at the Site.
3. Owner-furnished products.
4. Contractor's use of Site.
5. Future work.
6. Work sequence.
7. Owner occupancy.
8. Permits.
9. Specification conventions.

1.2 CONTRACT DESCRIPTION

A. Work of the Project includes construction of a sanitary sewer pump station at the Ellisville WWTP site and an interconnecting sanitary force main between the existing Ellisville WWTP and FDOT WWTP sites. The pump station will provide influent flow splitting between these wastewater treatment facilities in order to balance influent loading to the two facilities and to better utilize existing treatment capacities for anticipated future wastewater flows.

B. Perform Work of Contract under stipulated sum Contract with Owner according to Conditions of Contract.

1.3 OWNER-FURNISHED PRODUCTS

A. Owner's Responsibilities:

1. Arrange for and deliver Owner-reviewed Shop Drawings, Product Data, and Samples to Contractor.
2. Arrange and pay for delivery to Site.
3. Upon delivery, inspect products jointly with Contractor.
4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
5. Arrange for manufacturers' warranties, inspections, and service.

B. Contractor's Responsibilities:

1. Review Owner-reviewed Shop Drawings, Product Data, and Samples.
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.

1.4 SPECIFICATION CONVENTIONS

A. These Specifications are written in imperative mood and streamlined form. This imperative language is directed to Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 011000

SECTION 012000 - PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Schedule of Values.

B. Application for Payment.

C. Change procedures.

D. Defect assessment.

E. Unit prices.

F. Alternates.

1.2 SCHEDULE OF VALUES

A. Submit electronic file of schedule on EJCDC C-620.

B. Submit Schedule of Values as electronic file within 15 days after date of Owner-Contractor Agreement.

C. Format: Use Table of Contents of this Project Manual. Identify each line item with number and title of major Specification Section. Also identify Site mobilization, bonds and insurance.

D. Include in each line item amount of allowances as specified in this Section.

E. Include within each line item, direct proportional amount of Contractor's overhead and profit.

F. Revise schedule to list approved Change Orders with each Application for Payment.

1.3 APPLICATION FOR PAYMENT

A. Submit electronic file of each Application for Payment on EJCDC C-620 - Contractor's Application for Payment

B. Content and Format: Use Schedule of Values for listing items in Application for Payment.

C. Submit updated construction schedule with each Application for Payment.

D. Payment Period: Submit at intervals stipulated in the Agreement.

E. Submit submittals with transmittal letter as specified in Section 013300 - Submittal Procedures.

F. Substantiating Data: When Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:

1. Current construction photographs specified in Section 013300 - Submittal Procedures.
2. Partial release of liens from major Subcontractors and vendors.
3. Record Documents as specified in Section 017000 - Execution and Closeout Requirements, for review by Owner, which will be returned to Contractor.
4. Affidavits attesting to off-Site stored products.
5. Construction progress schedule, revised and current as specified in Section 013300 - Submittal Procedures.

1.4 CHANGE PROCEDURES

A. Submittals: Submit name of individual who is authorized to receive change documents and is responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. Carefully study and compare Contract Documents before proceeding with fabrication and installation of Work. Promptly advise Engineer of any error, inconsistency, omission, or apparent discrepancy.

C. Requests for Interpretation (RFI) and Clarifications: Allot time in construction scheduling for liaison with Engineer; establish procedures for handling queries and clarifications.

1. Use CSI Form 13.2A - Request for Interpretation for requesting interpretations.
2. Engineer may respond with a direct answer on the Request for Interpretation form, EJCDC C-942 - Field Order, or Proposal Request.

D. Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions on EJCDC C-942.

E. Engineer may issue Proposal Request including a detailed description of proposed change with supplementary or revised Drawings and Specifications, a change in Contract Time for executing the change with stipulation of overtime work required and with the period of time during which the requested price will be considered valid. Contractor will prepare and submit estimate within seven days.

F. Document requested substitutions according to Section 012500 - Substitution Procedures.

G. Stipulated Sum/Price Change Order: Based on Proposal Request and Contractor's fixed price quotation or Contractor's request for Change Order as approved by Engineer.

H. Work Directive Change: Engineer may issue directive, on EJCDC C-940 - Work Change Directive signed by Owner, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.

I. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract. Engineer will determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.

J. Maintain detailed records of Work done on time and material basis. Provide full information required for evaluation of proposed changes and to substantiate costs for changes in the Work.

K. Document each quotation for change in Project Cost or Time with sufficient data to allow evaluation of quotation.

L. Change Order Forms: EJCDC C-941 - Change Order.

M. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract.

N. Correlation of Contractor Submittals:

1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
2. Promptly revise Progress Schedules to reflect change in Contract Time, revise sub schedules to adjust times for other items of Work affected by the change and resubmit.
3. Promptly enter changes in Record Documents.

1.5 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of Engineer, it is not practical to remove and replace the Work, Owner will direct appropriate remedy or adjust payment.

C. The defective Work may remain, but unit sum/price will be adjusted to new sum/price at discretion of Owner.

D. Defective Work will be partially repaired according to instructions of Owner, and unit sum/price will be adjusted to new sum/price at discretion of Owner.

E. Individual Specification Sections may modify these options or may identify specific formula or percentage sum/price reduction.

F. Authority of Owner to assess defects and identify payment adjustments is final.

G. Nonpayment for Rejected Products: Payment will not be made for rejected products for any of the following reasons:

1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.
3. Products not completely unloaded from transporting vehicle.
4. Products placed beyond lines and levels of the required Work.
5. Products remaining on hand after completion of the Work.
6. Loading, hauling, and disposing of rejected products.

1.6 UNIT PRICES

A. Authority: Measurement methods are delineated in individual Specification Sections.

B. Measurement methods delineated in individual Specification Sections complement criteria of this Section. In event of conflict, requirements of individual Specification Section govern.

C. Take measurements and quantities. Engineer will verify measurements and quantities.

D. Unit Quantities: Quantities and measurements indicated on Bid Form are for Contract purposes only. Quantities and measurements supplied or placed in the Work shall determine payment.

1. When actual Work requires more or fewer quantities than those quantities indicated, provide required quantities at contracted unit sum/prices.

A. Payment Includes: Full compensation for required labor, products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application, or installation of item of the Work; overhead and profit.

B. Final payment for Work governed by unit prices will be made on basis of actual measurements and quantities accepted by Engineer multiplied by unit sum/price for Work incorporated in or made necessary by the Work.

C. Measurement of Quantities:

1. Measurement by Volume: Measured by cubic dimension using mean length, width, and height or thickness.
2. Measurement by Area: Measured by square dimension using mean length and width or radius.
3. Linear Measurement: Measured by linear dimension, at item centerline or mean chord.
4. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as completed item or unit of the Work.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 012000

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Quality assurance.

B. Product options.

C. Product substitution procedures.

1.2 QUALITY ASSURANCE

A. Contract is based on products and standards established in Contract Documents without consideration of proposed substitutions.

B. Products specified define standard of quality, type, function, dimension, appearance, and performance required.

C. Substitution Proposals: Permitted for specified products except where specified otherwise. Do not substitute products unless substitution has been accepted and approved in writing by Owner.

1.3 PRODUCT OPTIONS

A. See Section 016000 - Product Requirements.

1.4 PRODUCT SUBSTITUTION PROCEDURES

A. Engineer will consider requests for substitutions only within 15 days after date of Owner-Contractor Agreement

B. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.

C. Document each request with complete data, substantiating compliance of proposed substitution with Contract Documents, including:

1. Manufacturer's name and address, product, trade name, model, or catalog number, performance and test data, and reference standards.
2. Itemized point-by-point comparison of proposed substitution with specified product, listing variations in quality, performance, and other pertinent characteristics.
3. Reference to Article and Paragraph numbers in Specification Section.
4. Cost data comparing proposed substitution with specified product and amount of net change to Contract Sum.
5. Changes required in other Work.

6. Availability of maintenance service and source of replacement parts as applicable.
7. Certified test data to show compliance with performance characteristics specified.
8. Samples when applicable or requested.
9. Other information as necessary to assist Engineer's evaluation.

D. A request constitutes a representation that Contractor:

1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
2. Will provide same warranty for substitution as for specified product.
3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension that may subsequently become apparent.
5. Will coordinate installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
6. Will reimburse Owner and Engineer for review or redesign services associated with reapproval by authorities having jurisdiction.

E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals without separate written request or when acceptance will require revision to Contract Documents.

F. Substitution Submittal Procedure:

1. Submit requests for substitutions on CSI Form 13.1A Substitution Request-After the Bidding/Negotiating Stage.
2. Submit electronic files of Request for Substitution for consideration. Limit each request to one proposed substitution.
3. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
4. Engineer will notify Contractor in writing of decision to accept or reject request.

1.5 INSTALLER SUBSTITUTION PROCEDURES

A. Engineer will consider requests for substitutions only within 15 days after date of Owner-Contractor Agreement.

B. Document each request with:

1. Installer's qualifications.
2. Installer's experience in work similar to that specified.
3. Other information as necessary to assist Engineer's evaluation.

C. Substitution Submittal Procedure:

1. Submit electronic files of Request for Substitution for consideration. Limit each request to one proposed substitution.
2. Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 012500

SECTION 013000 - ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Coordination and Project conditions.

B. Preconstruction meeting.

C. Site mobilization meeting.

D. Progress meetings.

E. Preinstallation meetings.

F. Closeout meeting.

G. Alteration procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of various Sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.

B. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing operating equipment in service.

C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practical; place runs parallel with lines of building. Use spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

1. Coordination Drawings: Prepare as required to coordinate all portions of Work. Show relationship and integration of different construction elements that require coordination during fabrication or installation to fit in space provided or to function as intended. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are important.

D. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors to ensure coordination of Work.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion.

G. After Owner's occupancy of premises, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

1.3 PRECONSTRUCTION MEETING

A. Engineer will schedule and preside over meeting after Notice of Award.

B. Attendance Required: Engineer, Owner, major Subcontractors, and Contractor.

C. Contractor: Record minutes and distribute copies to participants within two days after meeting, to Engineer, Owner, and those affected by decisions made.

1.4 SITE MOBILIZATION MEETING

A. Engineer will schedule and preside over meeting at Project Site prior to Contractor occupancy.

B. Attendance Required: Engineer, Owner, Contractor, Contractor's superintendent, and major Subcontractors.

C. Minimum Agenda:

1. Use of premises by Owner and Contractor.
2. Owner's requirements.
3. Construction facilities and controls.
4. Temporary utilities.
5. Survey and building layout.
6. Security and housekeeping procedures.
7. Schedules.
8. Procedures for testing.
9. Procedures for maintaining record documents.
10. Requirements for startup of equipment.
11. Inspection and acceptance of equipment put into service during construction period.

D. Contractor: Record minutes and distribute copies to participants within two days after meeting to Engineer, Owner, and those affected by decisions made.

1.5 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, and preside over meetings.

C. Attendance Required: Job superintendent, major subcontractors and suppliers, and Engineer, as appropriate to agenda topics for each meeting.

D. Minimum Agenda:

1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems impeding planned progress.
5. Review of submittal schedule and status of submittals.
6. Review of off-Site fabrication and delivery schedules.
7. Maintenance of Progress Schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on Progress Schedule and coordination.
13. Other business relating to Work.

E. Contractor: Record minutes and distribute copies to participants within two days after meeting, to Engineer, and those affected by decisions made.

1.6 PREINSTALLATION MEETINGS

A. When required in individual Specification Sections, convene preinstallation meetings at Project Site before starting Work of specific Section.

B. Require attendance of parties directly affecting, or affected by, Work of specific Section.

C. Notify Engineer four days in advance of meeting date.

D. Prepare agenda and preside over meeting:

1. Review conditions of installation, preparation, and installation procedures.
2. Review coordination with related Work.

E. Record minutes and distribute copies to participants within two days after meeting, to Engineer, and those affected by decisions made.

1.7 CLOSEOUT MEETING

A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.

B. Attendance Required: Contractor, major Subcontractors, Engineer, Owner, and others appropriate to agenda.

C. Notify Engineer four days in advance of meeting date.

D. Minimum Agenda:

1. Start-up of facilities and systems.
2. Operations and maintenance manuals.
3. Testing, adjusting, and balancing.
4. System demonstration and observation.

5. Operation and maintenance instructions for Owner's personnel.
6. Contractor's inspection of Work.
7. Contractor's preparation of an initial "punch list."
8. Procedure to request Engineer inspection to determine date of Substantial Completion.
9. Completion time for correcting deficiencies.
10. Inspections by authorities having jurisdiction.
11. Certificate of Occupancy and transfer of insurance responsibilities.
12. Partial release of retainage.
13. Final cleaning.
14. Preparation for final inspection.
15. Closeout Submittals:

    a. Project record documents.
    b. Operating and maintenance documents.
    c. Operating and maintenance materials.
    d. Affidavits.

16. Final Application for Payment.
17. Contractor's demobilization of Site.
18. Maintenance.

E. Record minutes and distribute copies to participants within two days after meeting to Engineer, Owner, and those affected by decisions made.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 ALTERATION PROCEDURES

A. Materials: As specified in product Sections; match existing products with new products for patching and extending Work.

B. Employ skilled and experienced installer to perform alteration and renovation Work.

C. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion. Comply with Section 017000 - Execution and Closeout Requirements

D. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

E. Remove debris and abandoned items from area and from concealed spaces.

F. Prepare surface and remove surface finishes to permit installation of new Work and finishes.

G. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.

H. Remove, cut, and patch Work to minimize damage and to permit restoring products and finishes to original condition.

I. Where new Work abuts or aligns with existing Work, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

J. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Engineer for review.

K. Where change of plane of ¼ inch or more occurs, submit recommendation for providing smooth transition to Engineer for review.

L. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections.

M. Finish surfaces as specified in individual product Sections.

END OF SECTION 013000

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Definitions.

B. Submittal procedures.

C. Construction progress schedules.

D. Proposed product list.

E. Product data.

F. Use of electronic CAD files of Project Drawings.

G. Shop Drawings.

H. Samples.

I. Other submittals.

J. Design data.

K. Test reports.

L. Certificates.

M. Manufacturer's instructions.

N. Manufacturer's field reports.

O. Erection Drawings.

P. Construction photographs.

Q. Contractor review.

R. Engineer review.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer’s responsive action.

B. Informational Submittals: Written and graphic information and physical Samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

A. Transmit each submittal with Submittal Transmittal

B. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.

C. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.

D. Schedule submittals to expedite Project and submit electronic submittals via email as PDF electronic files. Coordinate submission of related items.

E. For each submittal for review, allow 15 days excluding delivery time to and from Contractor.

F. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.

G. Allow space on submittals for Contractor and Engineer review stamps.

H. When revised for resubmission, identify changes made since previous submission.

I. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

J. Submittals not requested will not be recognized nor processed.

K. Incomplete Submittals: Engineer will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Engineer.

1.4 PROPOSED PRODUCT LIST

A. Within 15 days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.

1.5 PRODUCT DATA

A. Product Data: Action Submittal: Submit to Engineer for review for assessing conformance with information given and design concept expressed in Contract Documents.

B. Submit electronic submittals via email as PDF electronic files.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 017000 - Execution and Closeout Requirements.

1.6 ELECTRONIC CAD FILES OF PROJECT DRAWINGS

A. Electronic CAD Files of Project Drawings: May only be used to expedite production of Shop Drawings for the Project. Use for other Projects or purposes is not allowed.

B. Electronic CAD Files of Project Drawings: Distributed only under the following conditions:

1. Use of files is solely at receiver's risk. Engineer does not warrant accuracy of files. Receiving files in electronic form does not relieve receiver of responsibilities for measurements, dimensions, and quantities set forth in Contract Documents. In the event of ambiguity, discrepancy, or conflict between information on electronic media and that in Contract Documents, notify Engineer of discrepancy and use information in hard-copy Drawings and Specifications.
2. CAD files do not necessarily represent the latest Contract Documents, existing conditions, and as-built conditions. Receiver is responsible for determining and complying with these conditions and for incorporating addenda and modifications.
3. User is responsible for removing information not normally provided on Shop Drawings and removing references to Contract Documents. Shop Drawings submitted with information associated with other trades or with references to Contract Documents will not be reviewed and will be immediately returned.
4. Receiver shall not hold Engineer responsible for data or file clean-up required to make files usable, nor for error or malfunction in translation, interpretation, or use of this electronic information.
5. Receiver shall understand that even though Engineer has computer virus scanning software to detect presence of computer viruses, there is no guarantee that computer viruses are not present in files or in electronic media.
6. Receiver shall not hold Engineer responsible for such viruses or their consequences, and shall hold Engineer harmless against costs, losses, or damage caused by presence of computer virus in files or media.

1.7 SHOP DRAWINGS

A. Shop Drawings: Action Submittal: Submit to Engineer for assessing conformance with information given and design concept expressed in Contract Documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings.

1. Include signed and sealed calculations to support design.
2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
3. Make revisions and provide additional information when required by authorities having jurisdiction.

D. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 017000 - Execution and Closeout Requirements.

1.8 SAMPLES

A. Samples: Action Submittal: Submit to Engineer for assessing conformance with information given and design concept expressed in Contract Documents.

B. Samples for Selection as Specified in Product Sections:

C. Submit to Engineer for aesthetic, color, and finish selection.

D. Submit Samples of finishes, textures, and patterns for Engineer selection.

E. Submit Samples to illustrate functional and aesthetic characteristics of products, with integral parts and attachment devices. Coordinate Sample submittals for interfacing work.

F. Include identification on each Sample, with full Project information.

G. Submit number of Samples specified in individual Specification Sections; Engineer will retain one Sample.

H. Reviewed Samples that may be used in the Work are indicated in individual Specification Sections.

I. Samples will not be used for testing purposes unless specifically stated in Specification Section.

J. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 017000 - Execution and Closeout Requirements.

1.9 OTHER SUBMITTALS

A. Closeout Submittals: Comply with Section 017000 - Execution and Closeout Requirements.

B. Informational Submittal: Design data are typically submitted for Architect/Engineer's knowledge as Contract administrator or for Owner.

C. Informational Submittal: Submit data for Engineer's knowledge as Contract administrator or for Owner.

D. Submit information for assessing conformance with information given and design concept expressed in Contract Documents.

1.10 TEST REPORTS

A. Informational Submittal: Submit reports for Engineer's knowledge as Contract administrator or for Owner.

B. Submit test reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.11 CERTIFICATES

A. Informational Submittal: Certificates are usually submitted for Owner's information and confirmation of actual products supplied.

B. Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Engineer, in quantities specified for Product Data.

C. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

D. Certificates may be recent or previous test results on material or product but must be acceptable to Engineer.

1.12 MANUFACTURER'S INSTRUCTIONS

A. Informational Submittal: Submit manufacturer's installation instructions for Engineer's knowledge as Contract administrator or for Owner.

B. Submit printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, to Engineer in quantities specified for Product Data.

C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.13 MANUFACTURER'S FIELD REPORTS

A. Informational Submittal: Submit reports for Engineer's knowledge as Contract administrator or for Owner.

B. Submit report within 5 days of observation to Engineer for information.

C. Submit reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.14 ERECTION DRAWINGS

A. Informational Submittal: Submit Drawings for Engineer's knowledge as Contract administrator or for Owner.

B. Submit Drawings for information assessing conformance with information given and design concept expressed in Contract Documents.

C. Data indicating inappropriate or unacceptable Work may be subject to action by Engineer or Owner.

1.15 CONSTRUCTION PHOTOGRAPHS

A. Provide photographs of Site and construction throughout progress of Work produced by photographer acceptable to Engineer.

B. Each month submit photographs with Application for Payment.

C. Photographs: One print; color; 5 x 7-inch size; TIFF electronic files.

D. Take eight Site photographs from different directions indicating relative progress of the Work, two days maximum before submitting.

E. Take photographs as evidence of existing Project conditions:

F. Digital Images: Deliver complete set of digital image electronic files on CD-ROM to Owner with Project record documents. Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as sensor, uncropped.

1. Digital Images: Uncompressed TIFF format, produced by digital camera with minimum sensor size of 8.0 megapixels, and image resolution of not less than 1600 by 1200 pixels.
2. Date and Time: Include date and time in filename for each image.

1.16 CONTRACTOR REVIEW

A. Review for compliance with Contract Documents and approve submittals before transmitting to Engineer.

B. Contractor: Responsible for:

1. Determination and verification of materials including manufacturer's catalog numbers.
2. Determination and verification of field measurements and field construction criteria.
3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
4. Determination of accuracy and completeness of dimensions and quantities.
5. Confirmation and coordination of dimensions and field conditions at Site.
6. Construction means, techniques, sequences, and procedures.
7. Safety precautions.
8. Coordination and performance of Work of all trades.

C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.

D. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Engineer.

1.17 ENGINEER REVIEW

A. Do not make "mass submittals" to Engineer. "Mass submittals" are defined as six or more submittals or items in one day or 15 or more submittals or items in one week. If "mass submittals" are received, Engineer's review time stated above will be extended as necessary to perform proper review. Engineer will review "mass submittals" based on priority determined by Engineer after consultation with Owner and Contractor.

B. Informational submittals and other similar data are for Engineer's information, do not require Engineer's responsive action, and will not be reviewed or returned with comment.

C. Submittals made by Contractor that are not required by Contract Documents may be returned without action.

D. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order, or Construction Change Directive.

E. Owner may withhold monies due to Contractor to cover additional costs beyond the second submittal review.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Quality control.

B. Tolerances.

C. References.

D. Labeling.

E. Mockup requirements.

F. Testing and inspection services.

G. Manufacturers' field services.

1.2 QUALITY CONTROL

A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.

B. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

C. Perform Work using persons qualified to produce required and specified quality.

D. Products, materials, and equipment may be subject to inspection by Engineer and Owner at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.

E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current as of date for receiving Bids except where specific date is established by code.

C. Obtain copies of standards and maintain on Site when required by product Specification Sections.

D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

E. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Engineer shall be altered from Contract Documents by mention or inference in reference documents.

1.5 LABELING

A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.

B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:

1. Model number.
2. Serial number.
3. Performance characteristics.

C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

1.6 MOCK-UP REQUIREMENTS

A. Tests will be performed under provisions identified in this Section and identified in individual product Specification Sections.

B. Assemble and erect specified or indicated items with specified or indicated attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mockups shall be comparison standard for remaining Work.

D. Where mockup has been accepted by Engineer and is specified in product Specification Sections to be removed, remove mockup and clear area when directed to do so by Engineer.

1.7 TESTING AND INSPECTION SERVICES

A. Employ and pay for services of an independent testing agency or laboratory acceptable to Owner to perform specified testing.

1. Before starting Work, submit testing laboratory name, address, and telephone number, and names of full-time Professional Engineer and responsible officer.
2. Submit copy of report of laboratory facilities' inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.

B. Independent firm will perform tests, inspections, and other services specified in individual Specification Sections and as required by Engineer

1. Laboratory: Authorized to operate in State of Florida.
2. Laboratory Staff: Maintain full-time Professional Engineer on staff to review services.
3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.

C. Testing, inspections, and source quality control may occur on or off Project Site. Perform off-Site testing as required by Engineer or Owner.

D. Reports shall be submitted by independent firm to Engineer, Contractor, and authorities having jurisdiction, indicating observations and results of tests and compliance or noncompliance with Contract Documents.

1. Submit final report indicating correction of Work previously reported as noncompliant.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1. Notify Engineer and independent firm 48 hours before expected time for operations requiring services.
2. Make arrangements with independent firm and pay for additional Samples and tests required for Contractor's use.

F. Employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work according to requirements of Contract Documents.

G. Retesting or re-inspection required because of nonconformance with specified or indicated requirements shall be performed by same independent firm on instructions from Engineer. Payment for retesting or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

H. Agency Responsibilities:

1. Test Samples of mixes submitted by Contractor.
2. Provide qualified personnel at Site. Cooperate with Engineer and Contractor in performance of services.
3. Perform indicated sampling and testing of products according to specified standards.
4. Ascertain compliance of materials and mixes with requirements of Contract Documents.

5. Promptly notify Engineer and Contractor of observed irregularities or nonconformance of Work or products.
6. Perform additional tests required by Engineer.
7. Attend preconstruction meetings and progress meetings.

I. Agency Reports: After each test, promptly submit [two] copies of report to Engineer, Contractor, and authorities having jurisdiction. When requested by Engineer, provide interpretation of test results. Include the following:

1. Date issued.
2. Project title and number.
3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product and Specification Section.
1. Location in Project.
2. Type of inspection or test.
3. Date of test.
4. Results of tests.
5. Conformance with Contract Documents.

J. Limits on Testing Authority:

1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency or laboratory may not approve or accept any portion of the Work.
3. Agency or laboratory may not assume duties of Contractor.
4. Agency or laboratory has no authority to stop the Work.

1.8 MANUFACTURER'S FIELD SERVICES

A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer is subject to approval of Engineer.

C. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

D. Refer to Section 013300 - Submittal Procedures, "Manufacturer's Field Reports" Article.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary facilities under Construction Management Agreement.

B. Temporary Utilities:

1. Temporary sanitary facilities.

C. Construction Facilities:

1. Vehicular access.
2. Parking.
3. Progress cleaning and waste removal.
4. Project identification.
5. Traffic regulation.
6. Fire-prevention facilities.

D. Temporary Controls:

1. Barriers.
2. Enclosures and fencing.
3. Security.
4. Water control.
5. Dust control.
6. Erosion and sediment control.
7. Noise control.
8. Pest and rodent control.
9. Pollution control.

E. Removal of utilities, facilities, and controls.

1.2 REFERENCES

A. ASTM International:

1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
3. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

1.3 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of Project mobilization.

1.4 VEHICULAR ACCESS

A. Construct temporary access roads from public thoroughfares to serve construction area, of width and load-bearing capacity to accommodate unimpeded traffic for construction purposes.

B. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.

C. Extend and relocate vehicular access as Work progress requires and provide detours as necessary for unimpeded traffic flow.

D. Locate as approved by Engineer.

E. Provide unimpeded access for emergency vehicles. Maintain 20 foot-wide driveways with turning space between and around combustible materials.

F. Provide and maintain access to fire hydrants and control valves free of obstructions.

G. Provide means of removing mud from vehicle wheels before entering streets.

H. Use existing on-Site roads for construction traffic.

1.5 PARKING

A. Arrange for temporary paved surface parking areas to accommodate construction personnel.

B. Locate as approved by Owner.

C. If Site space is not adequate, provide additional off-Site parking.

D. Use of existing on-Site streets and driveways used for construction traffic is permitted. Tracked vehicles are not allowed on paved areas.

E. Use of existing parking facilities used by construction personnel is permitted.

F. Do not allow heavy vehicles or construction equipment in parking areas.

G. Do not allow vehicle parking on existing pavement.

H. Permanent Pavements and Parking Facilities:

1. Bases for permanent roads and parking areas may be used for construction traffic.
2. Avoid traffic loading beyond paving design capacity. Tracked vehicles are not allowed.
3. Use of permanent parking structures is permitted.

I. Maintenance:

4. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, ice, and the like.
5. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original condition.

J. Removal, Repair:

1. Remove temporary materials and construction at Substantial Completion.
2. Remove underground Work and compacted materials to depth of 2 feet; fill and grade Site as indicated.
3. Repair existing facilities damaged by use, to original condition.

K. Mud from Site vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.6 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, before enclosing spaces.

C. Broom and vacuum clean interior areas before starting surface finishing and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from Site daily and dispose of off-Site.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.7 TRAFFIC REGULATION

A. Signs, Signals, and Devices:

1. Post-Mounted and Wall-Mounted Traffic Control and Informational Signs: As approved by authorities having jurisdiction.
2. Traffic Control Signals: As approved by local jurisdictions.
3. Traffic Cones, Drums, Flares, and Lights: As approved by authorities having jurisdiction.
4. Flag Person Equipment: As required by authorities having jurisdiction.

B. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

C. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

D. Haul Routes:

1. Consult with authorities having jurisdiction and establish public thoroughfares to be used for haul routes and Site access.
2. Confine construction traffic to designated haul routes.
3. Provide traffic control at critical areas of haul routes to regulate traffic and to minimize interference with public traffic.

E. Traffic Signs and Signals:

1. Provide signs at approaches to Site and on Site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
2. Provide, operate, and maintain traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control and areas affected by Contractor's operations.
3. Relocate signs and signals as Work progresses, to maintain effective traffic control.

F. Removal:

1. Remove equipment and devices when no longer required.
2. Repair damage caused by installation.
3. Remove post settings to depth of 2 feet.

1.8 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way.

C. Tree and Plant Protection: Preserve and protect existing trees and plants designated to remain.

1. Protect areas within drip lines from traffic, parking, storage, dumping, chemically injurious materials and liquids, ponding, and continuous running water.
2. Provide 6-foot-high barriers around drip line, with access for maintenance.
3. Replace trees and plants damaged by construction operations.

D. Protect non-owned vehicular traffic, stored materials, Site, and structures from damage.

1.9 ENCLOSURES AND FENCING

A. Construction: Commercial-grade chain-link fence.

B. Provide 6-foot-high fence around construction Site; equip with vehicular gates with locks.

1.10 SECURITY

A. Security Program:

1. 1. Protect Work on existing premises from theft, vandalism, and unauthorized entry.

B. Entry Control:

1. Restrict entrance of persons and vehicles to Project Site.
2. Allow entrance only to authorized persons with proper identification.
3. Maintain log of workers and visitors and make available to Owner on request.

C. Restrictions:

1. Do no work on Sundays without prior approval of Owner.

1.11 WATER CONTROL

A. Grade Site to drain. Maintain excavations free of water. Provide, operate, and maintain necessary pumping equipment.

B. Protect Site from puddles or running water. Provide water barriers as required to protect Site from soil erosion.

1.12 DUST CONTROL

A. Execute Work by methods that minimize raising dust from construction operations.

B. Provide positive means to prevent airborne dust from dispersing into atmosphere.

1.13 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize surface area of bare soil exposed at one time.

C. Provide temporary measures including berms, dikes, drains, and other devices to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts and clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation. Promptly apply corrective measures.

1.14 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise produced by construction operations.

1.15 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

B. Comply with pollution and environmental control requirements of Suwannee River Water Management District and Florida Department of Environmental Protection.

1.16 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials before Substantial Completion inspection.

B. Remove underground installations to minimum depth of 2 feet. Grade Site as indicated on Drawings.

C. Clean and repair damage caused by installation or use of temporary Work.

D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

E. Equipment electrical characteristics and components.

1.2 PRODUCTS

A. At minimum, comply with specified requirements and reference standards.

B. Specified products define standard of quality, type, function, dimension, appearance, and performance required.

C. Furnish products of qualified manufacturers that are suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.

D. Do not use materials and equipment removed from existing premises except as specifically permitted by Contract Documents.

E. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

F. Transport and handle products according to manufacturer's instructions.

G. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

H. Provide equipment and personnel to handle products; use methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products according to manufacturer's instructions.

B. Store products with seals and labels intact and legible.

C. Store sensitive products in weathertight, climate-controlled enclosures in an environment suitable to product.

D. For exterior storage of fabricated products, place products on sloped supports aboveground.

E. In first Paragraph below bonded storage may be required to permit progress payments to Contractor.

F. Provide off-Site storage and protection when Site does not permit on-Site storage or protection.

G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

H. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.

I. Provide equipment and personnel to store products; use methods to prevent soiling, disfigurement, or damage.

J. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Products complying with specified reference standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and complying with Specifications; no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit Request for Substitution for any manufacturer not named, according to Section 012500 - Substitution Procedures.

PART 2 - PRODUCTS

1.6 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.

B. Cord and Plug: Furnish minimum 6-foot long cord and plug including grounding connector for connection to electric wiring system. Cord of longer length may be specified in individual Specification Sections.

PART 3 - EXECUTION - Not Used

END OF SECTION 016000

SECTION 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Field engineering.

B. Closeout procedures.

C. Starting of systems.

D. Demonstration and instructions.

E. Project record documents.

F. Operation and maintenance data.

G. Manual for materials and finishes.

H. Manual for equipment and systems.

I. Spare parts and maintenance products.

J. Product warranties and product bonds.

K. Maintenance service.

L. Examination.

M. Preparation.

N. Execution.

O. Cutting and patching.

P. Protecting installed construction.

Q. Final cleaning.

1.2 FIELD ENGINEERING

A. Employ land surveyor registered in State of Florida.

B. Locate and protect survey control and reference points. Promptly notify Engineer of discrepancies discovered.

C. Control datum for survey is indicated on Survey.

D. Prior to beginning Work, verify and establish elevations of existing facilities to ensure that new Work will meet existing elevations in smooth and level alignment except where specifically detailed or indicated otherwise.]

E. Verify setbacks and easements; confirm Drawing dimensions and elevations.

F. Provide field engineering services. Establish elevations, lines, and levels using recognized engineering survey practices.

G. Submit copy of Site drawing and certificate signed by land surveyor certifying elevations and locations of the Work are in conformance with Contract Documents.

H. Maintain complete and accurate log of control and survey Work as Work progresses.

I. On completion of foundation walls and major Site improvements, prepare certified survey illustrating dimensions, locations, angles, and elevations of construction and Site Work.

J. Protect survey control points prior to starting Site Work; preserve permanent reference points during construction.

K. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.

L. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.

M. Retain Paragraph below only when required by Owner.

N. Final Property Survey: Prior to Substantial Completion, prepare final property survey illustrating locations, dimensions, angles, and elevations of buildings and Site Work that have resulted from construction indicating their relationship to permanent bench marks and property lines.

1. Show significant features (real property) for Project.
2. Include certification on survey, signed by surveyor, that principal metes, bounds, lines, levels, and elevations of Project are accurately shown.

1.3 CLOSEOUT PROCEDURES

A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:

1. Submit maintenance manuals, Project record documents, digital images of construction photographs, and other similar final record data in compliance with this Section.
2. Complete facility startup, testing, adjusting, balancing of systems and equipment, demonstrations, and instructions to Owner's operating and maintenance personnel as specified in compliance with this Section.
3. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated

completion for each item. Include copy of list with request for Certificate of Substantial Completion.

4. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.
5. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.
6. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.
7. Perform final cleaning according to this Section.

B. Substantial Completion Inspection:

1. 1. When Contractor considers Work to be substantially complete, submit to Engineer:

    a. Written certificate that Work, or designated portion, is substantially complete.
    b. List of items to be completed or corrected (initial punch list).

2. Within seven days after receipt of request for Substantial Completion, Engineer will make inspection to determine whether Work or designated portion is substantially complete.
3. Should Engineer determine that Work is not substantially complete:

    a. Engineer will promptly notify Contractor in writing, stating reasons for its opinion.
    b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Engineer.
    c. Engineer will reinspect Work.
    d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.

4. When Engineer finds that Work is substantially complete, Engineer will:

    a. Prepare Certificate of Substantial Completion on EJCDC C-625 - Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Engineer and Owner (final punch list).
    b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.

5. After Work is substantially complete, Contractor shall:

    a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
    b. Complete Work listed for completion or correction within time period stipulated.

C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.

1. When Contractor considers Work to be complete, submit written certification that:

    a. Contract Documents have been reviewed.
    b. Work has been examined for compliance with Contract Documents.
    c. Work has been completed according to Contract Documents.
    d. Work is completed and ready for final inspection.

2. Submittals: Submit following:

    a. Final punch list indicating all items have been completed or corrected.
    b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
    c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
    d. Accounting statement for final changes to Contract Sum.
    e. Contractor's affidavit of payment of debts and claims on AIA G706 - Contractor's Affidavit of Payment of Debts and Claims.
    f. Contractor affidavit of release of liens on AIA G706A - Contractor's Affidavit of Release of Liens.
    g. Consent of surety to final payment on AIA G707 - Consent of Surety to Final Payment Form.

3. Perform final cleaning for Contractor-soiled areas according to this Section.

D. Final Completion Inspection:

1. Within seven days after receipt of request for final inspection, Engineer will make inspection to determine whether Work or designated portion is complete.
2. Should Engineer consider Work to be incomplete or defective:

    a. Engineer will promptly notify Contractor in writing, listing incomplete or defective Work.
    b. Contractor shall remedy stated deficiencies and send second written request to Engineer that Work is complete.
    c. Engineer will reinspect Work.
    d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.

1.4 STARTING OF SYSTEMS

A. Coordinate schedule for startup of various equipment and systems.

B. Notify Engineer seven days prior to startup of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

1. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.
2. Verify that wiring and support components for equipment are complete and tested.
3. Execute startup under supervision of manufacturer's representative or Contractors' personnel according to manufacturer's instructions.
4. When specified in individual Specification Sections, require manufacturer to provide authorized representative who will be present at Site to inspect, check, and approve equipment or system installation prior to startup and will supervise placing equipment or system in operation.

5. Submit a written report according to Section 013300 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.

B. Demonstrate Project equipment instructed by qualified representative who is knowledgeable about the Project.

C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time at equipment location.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

F. Required instruction time for each item of equipment and system is specified in individual Specification Sections.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain on Site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, product data, and Samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates used.
3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:

1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
2. Include locations of concealed elements of the Work.
3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.
4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
5. Identify and locate existing buried or concealed items encountered during Project.
6. Measured depths of foundations in relation to finish main floor datum.
7. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
8. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
9. Field changes of dimension and detail.
10. Details not on original Drawings.

G. Submit PDF electronic files of marked-up documents to Engineer before Substantial Completion.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit in PDF composite electronic indexed file.

B. Prepare cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," title of Project.

C. Drawings: Provide in PDF electronic file format.

D. Contents: Prepare table of contents for each volume, with each product or system description identified, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by Specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Include the following:

    a. Significant design criteria.
    b. List of equipment.
    c. Parts list for each component.
    d. Operating instructions.
    e. Maintenance instructions for equipment and systems.
    f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
    g. Safety precautions to be taken when operating and maintaining or working near equipment.

3. Part 3: Project documents and certificates, including the following:

    a. Shop Drawings and product data.
    b. Air and water balance reports.

c. Certificates.
d. Originals of warranties and bonds.

1.8 MANUAL FOR MATERIALS AND FINISHES

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one copy with comments.

B. For equipment or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit one copy of completed volumes before Substantial Completion. Draft copy be reviewed and returned after Substantial Completion, with Engineer comments. Revise content of document sets as required prior to final submission.

D. Submit in PDF composite electronic indexed file of final manual within ten days after final inspection.

E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations.

F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

H. Additional Requirements: As specified in individual product Specification Sections.

I. Include listing in table of contents for design data, with tabbed fly sheet and space for insertion of data.

1.9 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit one copy of completed volumes before Substantial Completion. Draft copy will be reviewed and returned after Substantial Completion, with Engineer comments. Revise content of document sets as required prior to final submission.

D. Submit in PDF composite electronic indexed file of final manual within ten days after final inspection.

E. Each Item of Equipment and Each System: Include description of unit or system and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed by label machine.

G. Include color-coded wiring diagrams as installed.

H. Operating Procedures: Include startup, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and special operating instructions.

I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

J. Include servicing and lubrication schedule and list of lubricants required.

K. Include manufacturer's printed operation and maintenance instructions.

L. Include sequence of operation by controls manufacturer.

M. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

N. Include control diagrams by controls manufacturer as installed.

O. Include Contractor's coordination drawings with color-coded piping diagrams as installed.

P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

Q. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

R. Include test and balancing reports as specified in Section 014000 - Quality Requirements.

S. Additional Requirements: As specified in individual product Specification Sections.

T. Include listing in table of contents for design data with tabbed dividers and space for insertion of data.

1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.

B. Deliver to Project Site and place in location as directed by Owner; obtain receipt prior to final payment.

1.11 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.

B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include table of contents and assemble in three D side ring binder with durable plastic cover.

F. Submit prior to final Application for Payment.

G. Time of Submittals:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
2. Make other submittals within ten days after date of Substantial Completion, prior to final Application for Payment.
3. For items of Work for which acceptance is delayed beyond Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual Specification Sections.

D. Verify that utility services are available with correct characteristics and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance according to manufacturer's instructions.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer-required or -recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

3.3 EXECUTION

A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.

B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.

D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual-effect choices to Engineer for final decision.

E. Allow for expansion of materials and building movement.

F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.

1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.

G. Mounting Heights: Where not indicated, mount individual units of Work at industry recognized standard mounting heights for particular application indicated.

1. Refer questionable mounting heights choices to Engineer for final decision.
2. Elements Identified as Accessible to Handicapped: Comply with applicable codes and regulations.

H. Adjust operating products and equipment to ensure smooth and unhindered operation.

I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

3.4 CUTTING AND PATCHING

A. Employ skilled and experienced installers to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements affecting:

1. Structural integrity of element.
2. Integrity of weather-exposed or moisture-resistant elements.
3. Efficiency, maintenance, or safety of element.
4. Visual qualities of sight-exposed elements.
5. Work of Owner or separate contractor.

C. Execute cutting, fitting, and patching including excavation and fill to complete Work and to:

1. Fit the several parts together, to integrate with other Work.
2. Uncover Work to install or correct ill-timed Work.
3. Remove and replace defective and nonconforming Work.
4. Remove samples of installed Work for testing.
5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.

E. Cut masonry and concrete materials using masonry saw or core drill.

F. Restore Work with new products according to requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.

J. Identify hazardous substances or conditions exposed during the Work to Engineer for decision or remedy.

3.5 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual Specification Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Use durable sheet materials to protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

3.6 FINAL CLEANING

A. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains, and foreign substances; polish transparent and glossy surfaces.

B. Clean equipment and fixtures to sanitary condition with appropriate cleaning materials.

C. Replace filters of operating equipment.

D. Clean debris from roofs, gutters, downspouts, and drainage systems.

E. Clean Site; sweep paved areas, rake clean landscaped surfaces.

F. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION 017000

APPENDIX A
EJCDC FORM C-200:
INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACTS

INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

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ARTICLE 1-DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. Issuing Office—The office from which the Bidding Documents are to be issued, and which registers plan holders.

ARTICLE 2-BIDDING DOCUMENTS

2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.

2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.

2.03 Owner has established a Bidding Documents Website as indicated in the Advertisement or invitation to bid. Owner recommends that Bidder register as a plan holder with the Issuing Office at such website, and obtain a complete set of the Bidding Documents from such website. Bidders may rely that sets of Bidding Documents obtained from the Bidding Documents Website are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.

2.04 Bidder may register as a plan holder and obtain complete sets of Bidding Documents, in the number and format stated in the Advertisement or invitation to bid, from the Issuing Office. Bidders may rely that sets of Bidding Documents obtained from the Issuing Office are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.

2.05 ~~Plan rooms (including construction information subscription services, and electronic and virtual plan rooms) may distribute the Bidding Documents, or make them available for examination. Those prospective bidders that obtain an electronic (digital) copy of the Bidding Documents from a plan room are encouraged to register as plan holders from the Bidding Documents Website or Issuing Office. Owner is not responsible for omissions in Bidding Documents or other documents obtained from plan rooms, or for a Bidder's failure to obtain Addenda from a plan room.~~

2.06 Electronic Documents

A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.

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1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf) that is readable by Adobe Acrobat Reader Version 25.001.20672 or later. It is the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the paper copies.

B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.06.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.

~~C. After the Contract is awarded, the Owner will provide or direct the Engineer to provide for the use of the Contractor documents that were developed by Engineer as part of the Project design process, as Electronic Documents in native file formats.~~

~~1. Electronic Documents that are available in native file format include:~~

~~**[List documents that will be made available to Contractor]**~~

~~2. Release of such documents will be solely for the convenience of the Contractor. No such document is a Contract Document.~~

~~3. Unless the Contract Documents explicitly identify that such information will be available to the Successful Bidder (Contractor), nothing herein will create an obligation on the part of the Owner or Engineer to provide or create such information, and the Contractor is not entitled to rely on the availability of such information in the preparation of its Bid or pricing of the Work. In all cases, the Contractor shall take appropriate measures to verify that any electronic/digital information provided in Electronic Documents is appropriate and adequate for the Contractor's specific purposes.~~

~~4. In no case will the Contractor be entitled to additional compensation or time for completion due to any differences between the actual Contract Documents and any related document in native file format.~~

ARTICLE 3-QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, after submitting its Bid and within 10 days of Owner's request, Bidder must submit the following information:

A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.

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B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.

C. Bidder's state or other contractor license number, if applicable.

D. Subcontractor and Supplier qualification information.

E. Other required information regarding qualifications.

3.02 ~~Prospective Bidders must submit required information regarding their qualifications by **[insert deadline for prequalification submittals]**. Owner will review the submitted information to determine which contractors are qualified to bid on the Work. Owner will issue an Addendum listing those contractors that Owner has determined to be qualified to construct the project. Bids will only be accepted from listed contractors. The information that each prospective Bidder must submit to seek prequalification includes the following:~~

~~Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.~~

~~A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.~~

~~Prospective Bidder's state or other contractor license number, if applicable.~~

~~Subcontractor and Supplier qualification information.~~

~~E. Other required information regarding qualifications.~~

Deleted

3.03 Bidder is to submit the following information with its Bid to demonstrate Bidder's qualifications to perform the Work:

A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.

B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.

C. Bidder's state or other contractor license number, if applicable.

D. Subcontractor and Supplier qualification information.

E. Other required information regarding qualifications.

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3.04 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.

3.05 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

ARTICLE 4-PRE-BID CONFERENCE

4.01 A pre-bid conference will not be conducted for this Project.

~~4.02 A non-mandatory pre-bid conference will be held at the time and location indicated in the Advertisement or invitation to bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference; however, attendance at this conference is not required to submit a Bid.~~

~~4.03 A mandatory pre-bid conference will be held at the time and location indicated in the Advertisement or invitation to bid. Representatives of Owner and Engineer will be present to discuss the Project. Proposals will not be accepted from Bidders who do not attend the conference. It is each Bidder's responsibility to sign in at the pre-bid conference to verify its participation. Bidders must sign in using the name of the organization that will be submitting a Bid. A list of qualified Bidders that attended the pre-bid conference and are eligible to submit a Bid for this Project will be issued in an Addendum.~~

~~4.04 Information presented at the pre-Bid conference does not alter the Contract Documents. Owner will issue Addenda to make any changes to the Contract Documents that result from discussions at the pre-Bid conference. Information presented, and statements made at the pre-bid conference will not be binding or legally effective unless incorporated in an Addendum.~~

ARTICLE 5-SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

5.01 Site and Other Areas

The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

5.02 Existing Site Conditions

A. Subsurface and Physical Conditions; Hazardous Environmental Conditions

1. The Supplementary Conditions identify the following regarding existing conditions at or adjacent to the Site:

   a. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data.

   b. Those drawings known to Owner of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface

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structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data.

c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.

d. Technical Data contained in such reports and drawings.

2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.

4. Geotechnical Baseline Report/Geotechnical Data Report: The Bidding Documents contain a Geotechnical Baseline Report (GBR) and Geotechnical Data Report (GDR).

a. As set forth in the Supplementary Conditions, the GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations ("Baseline Conditions"). The GBR is a Contract Document.

b. The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.

c. Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.

d, As set forth in the Supplementary Conditions, the GDR is a Contract Document containing data prepared by or for the Owner in support of the GBR.

B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

5.03 Other Site-related Documents

A. In addition to the documents regarding existing Site conditions referred to in Paragraph 5.02.A, the following other documents relating to conditions at or adjacent to the Site are known to Owner and made available to Bidders for reference:

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1. [List of other Site-related documents].

Owner will make copies of these other Site-related documents available to any Bidder on request.

B. Owner has not verified the contents of these other Site-related documents, and Bidder may not rely on the accuracy of any data or information in such documents. Bidder is responsible for any interpretation or conclusion Bidder draws from the other Site-related documents.

C. The other Site-related documents are not part of the Contract Documents.

D. Bidders are encouraged to review the other Site-related documents, but Bidders will not be held accountable for any data or information in such documents. The requirement to review and take responsibility for documentary Site information is limited to information in (1) the Contract Documents and (2) the Technical Data.

E. No other Site-related documents are available.

5.04 Site Visit and Testing by Bidders

A. ~~Bidder is required to visit the Site and conduct a thorough visual examination of the Site and adjacent areas. During the visit the Bidder must not disturb any ongoing operations at the Site.~~

~~B. A Site visit is scheduled following the pre-bid conference. Maps to the Site will be available at the pre-Bid conference.~~

~~C. A Site visit is scheduled for **[designate, date, time and location]**. Maps to the Site will be made available upon request.~~

~~D. Bidders visiting the Site are required to arrange their own transportation to the Site.~~

E. All access to the Site other than during a regularly scheduled Site visit must be coordinated through the following Owner or Engineer contact for visiting the Site: County Engineer, Chad Williams cwilliams@columbiacountyfla.com. Bidder must conduct the required Site visit during normal working hours.

F. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

G. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site. Bidder is responsible for establishing access needed to reach specific selected test sites.

H. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.

I. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies

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5.05 Owner's Safety Program

A. Site visits and work at the Site may be governed by an Owner safety program. If an Owner safety program exists, it will be noted in the Supplementary Conditions.

5.06 Other Work at the Site

A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 6-BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 Express Representations and Certifications in Bid Form, Agreement

A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder's examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications, and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.

B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

ARTICLE 7-INTERPRETATIONS AND ADDENDA

7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.

7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to County Purchasing Officer in writing. Contact information and submittal procedures for such questions are as follows:

Erica Jones ejones@columbiacountyfla.com, no later than Thursday, October 30, 2025, by 5 pm.

7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than seven days prior to the date for opening of Bids may not be answered.

7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

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ARTICLE 8-BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5% percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a Bid bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions. Such Bid bond will be issued in the form included in the Bidding Documents. **Bid security must be at least 5% of the Bidder's maximum Bid price.**

8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract and furnish the required Contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited, in whole in the case of a penal sum bid bond, and to the extent of Owner's damages in the case of a damages-form bond. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.

8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.

8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within 7 days after the Bid opening.

ARTICLE 9-CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be (a) substantially completed and (b) ready for final payment, and (c) Milestones (if any) are to be achieved, are set forth in the Agreement.

9.02 ~~Bidder must set forth in the Bid the time by which Bidder must achieve Substantial Completion, subject to the restrictions established in Paragraph 13.07 of these Instructions. The Owner will take Bidder's time commitment regarding Substantial Completion into consideration during the evaluation of Bids, and it will be necessary for the apparent Successful Bidder to satisfy Owner that it will be able to achieve Substantial Completion within the time such Bidder has designated in the Bid. **[If applicable include the following: Bidder must also set forth in the Bid its commitments regarding the achievement of Milestones and readiness for final payment.]** The Successful Bidder's time commitments will be entered into the Agreement or incorporated in the Agreement by reference to the specific terms of the Bid.~~

Deleted

9.03 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

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ARTICLE 10-SUBSTITUTE AND "OR EQUAL" ITEMS

10.01 ~~The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or "or-equal" items. In cases in which the Contract allows the Contractor to request that Engineer authorize the use of a substitute or "or-equal" item of material or equipment, application for such acceptance may not be made to and will not be considered by Engineer until after the Effective Date of the Contract.~~

Deleted

10.02 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those "or-equal" or substitute or materials and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer as an "or-equal" or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer within 10 days of the issuance of the Advertisement for Bids or invitation to Bidders. Each such request must comply with the requirements of Paragraphs 7.05 and 7.06 of the General Conditions, and the review of the request will be governed by the principles in those paragraphs. **Each such request shall include the Manufacturer's Certification for Compliance with AIS. Refer to the Manufacturer's Certification form provided in these construction Contract Documents.** The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all registered Bidders. Bidders cannot rely upon approvals made in any other manner. **Substitutes and "or-equal" materials and equipment may be proposed by Contractor in accordance with Paragraphs 7.05 and 7.06 of the General Conditions after the Effective Date of the Contract. Each such request shall include Manufacturer's Certification letter to document compliance with AIS requirements of Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents.**

10.03 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.

ARTICLE 11-SUBCONTRACTORS, SUPPLIERS, AND OTHERS

11.01 ~~A Bidder must be prepared to retain specific Subcontractors and Suppliers for the performance of the Work if required to do so by the Bidding Documents or in the Specifications. If a prospective Bidder objects to retaining any such Subcontractor or Supplier and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.~~

Deleted

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11.02 The apparent Successful Bidder, and any other Bidder so requested, must submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work within five days after Bid opening:

[List key categories of the Work. Depending on the Project this might include electrical, fire protection, major equipment items].

11.03 If requested by Owner, such list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or Supplier. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder will submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

11.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors and Suppliers. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor or Supplier, so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

11.05 – The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 7.07A.

ARTICLE 12-PREPARATION OF BID

12.01 The Bid Form is included with the Bidding Documents.

A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."

12.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.

12.03 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.

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12.04 A Bid by a partnership must be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership must be shown.

12.05 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.

12.06 A Bid by an individual must show the Bidder's name and official address.

12.07 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.

12.08 All names must be printed in ink below the signatures.

12.09 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.

12.10 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.

12.11 The Bid must contain evidence of Bidder's authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.

12.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder's licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and attach such certification to the Bid. Bidder's state contractor license number, if any, must also be shown on the Bid Form.

ARTICLE 13-BASIS OF BID

13.01 Lump Sum

A. Bidders must submit a Bid on a lump sum basis as set forth in the Bid Form.

13.02 Base Bid with Alternates

A. Bidders must submit a Bid on a lump sum basis for the base Bid and include a separate price for each alternate described in the Bidding Documents and as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the base Bid if Owner selects the alternate.

B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form.

13.03 Sectional Bids

A. Bidders may submit a Bid on any individual section or any combination of sections, as set forth in the Bid Form.

B. Submission of a Bid on any section signifies Bidder's willingness to enter into a Contract for that section alone at the price offered.

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C. If Bidder submits Bids on individual sections and a Bid based on a combination of those sections, such combined Bid need not be the sum of the Bids on the individual sections.

D. Bidders offering a Bid on one or more sections must be capable of completing the Work covered by those sections within the time period stated in the Agreement.

13.04 ~~Cost-Plus-Fee Bids~~

~~A. Bidders must submit a Bid on the Contractor's fee, which must be in addition to compensation for Cost of the Work. Such fee must be either (1) a fixed fee, (2) percentages of specified categories of costs, or (3) a percentage applicable to the Cost of the Work as a whole, as set forth in the Bid Form.~~

~~B. If the Contractor's fee, as set forth in the Bid Form, is to be based on percentages of categories of cost, or on a percentage applicable to the Cost of the Work as a whole, then Bidders must enter a maximum amount limiting the total fee if required by the Bid Form to do so.~~

~~C. Bidders must submit a Bid on the Guaranteed Maximum Price, setting a maximum amount on the compensable Cost of the Work plus Contractor's fee, if required by the Bid Form to do so.~~

Deleted

13.05 Unit Price

A. Bidders must submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.

B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity", which Owner or its representative has set forth in the Bid Form, for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.

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

13.06 Allowances

For cash allowances the Bid price must include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.

13.07 Price-Plus-Time Bids

~~The Owner will consider the time of Substantial Completion commitment made by the Bidder in the comparison of Bids.~~

~~Bidder must designate the number of days required to achieve Substantial Completion of the Work and enter that number in the Bid Form as the total number of calendar days to substantially complete the Work.~~

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~~The total number of calendar days for Substantial Completion designated by Bidder must be less than or equal to a maximum of **[number]**, but not less than the minimum of **[number]**. If Bidder purports to designate a time for Substantial Completion that is less than the allowed minimum, or greater than the allowed maximum, Owner will reject the Bid as nonresponsive.~~

~~The Agreement as executed will contain the Substantial Completion time designated in Successful Bidder's Bid, and the Contractor will be assessed liquidated damages at the rate stated in the Agreement for failure to attain Substantial Completion within that time.~~

~~Bidder must also designate the time in which it will achieve Milestones, and achieve readiness for final payment. Such time commitments must be consistent with the "Time of Substantial Completion" to which Bidder commits. The Agreement as executed will contain, as binding Contract Times, Successful Bidder's time commitments regarding Milestones, as applicable, and readiness for final payment.~~

Deleted

ARTICLE 14-SUBMITTAL OF BID

14.01 The Bidding Documents include one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 2 of the Bid Form.

14.02 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must be enclosed in a plainly marked package with the Project title, and, if applicable, the designated portion of the Project for which the Bid is submitted, the name and address of Bidder, and must be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid must be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid must be addressed to the location designated in the Advertisement.

14.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 15-MODIFICATION AND WITHDRAWAL OF BID

15.01 An unopened Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.

15.03 If within 24 hours 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, the Bidder may withdraw its Bid,

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and the Bid security will be returned. Thereafter, if the Work is rebid, the Bidder will be disqualified from further bidding on the Work.

ARTICLE 16-OPENING OF BIDS

16.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

~~16.02 Bids will be opened privately.~~

ARTICLE 17-BIDS TO REMAIN SUBJECT TO ACCEPTANCE

17.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 18-EVALUATION OF BIDS AND AWARD OF CONTRACT

18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.

18.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.

18.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.

18.04 If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid.

18.05 Evaluation of Bids

A. In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form. To determine the Bid prices for purposes of comparison, Owner will announce to all bidders a "Base Bid plus alternates" budget after receiving all Bids, but prior to opening them. For comparison purposes alternates will be accepted, following the order of priority established in the Bid Form, until doing so would cause the budget to be exceeded. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions, the award may be made to said Successful Bidder on its base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award.

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C. For determination of the apparent low Bidder(s) when sectional bids are submitted, Bids will be compared on the basis of the aggregate of the Bids for separate sections and the Bids for combined sections that result in the lowest total amount for all of the Work.

D. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.

E. ~~For the determination of the apparent low Bidder when cost-plus-fee bids are submitted, Bids will be compared on the basis of the Guaranteed Maximum Price set forth by Bidder on the Bid Form.~~

Deleted

F. ~~Bid prices will be compared after adjusting for differences in time of Substantial Completion (total number of calendar days to substantially complete the Work) designated by Bidders. The adjusting amount will be determined at the rate set forth in the Agreement for liquidated damages for failing to achieve Substantial Completion, or such other amount that Owner has designated in the Bid Form.~~

1. ~~The method for calculating the lowest bid for comparison will be the summation of the Bid price shown in the Bid Form plus the product of the Bidder-specified time of Substantial Completion in calendar days times the rate for liquidated damages **[or other Owner-designated daily rate]** in dollars per day.~~

2. ~~This procedure is only used to determine the lowest bid for comparison and contractor selection purposes. The Contract Price for compensation and payment purposes remains the Bid price shown in the Bid Form.~~

Deleted

18.06 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

18.07 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 19-BONDS AND INSURANCE

19.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds, other required bonds (if any),

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and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by required bonds and insurance documentation.

19.02 Article 8, Bid Security, of these Instructions, addresses any requirements for providing bid bonds as part of the bidding process.

ARTICLE 20-SIGNING OF AGREEMENT

20.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder must execute and deliver the required number of counterparts of the Agreement and any bonds and insurance documentation required to be delivered by the Contract Documents to Owner. Within 10 days thereafter, Owner will deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 21-SALES AND USE TAXES

21.01 Owner is exempt from **[name of state]** state sales and use taxes on materials and equipment to be incorporated in the Work. (Exemption No. **[number]**). Said taxes must not be included in the Bid. Refer to Paragraph SC-7.10 of the Supplementary Conditions for additional information.

ARTICLE 22-CONTRACTS TO BE ASSIGNED

ARTICLE 23 – FEDERAL REQUIREMENTS

23.01 If the contract price is in excess of $100,000, provisions of the Contract Work Hours and Safety Standards Act at 29 CFR 5.5(b) apply.

23.02 Federal requirements at Article 19 of the Supplementary Conditions apply to this Contract.

23.03 American Iron and Steel requirements apply to this project.

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APPENDIX B
EJCDC FORM C-520:
CONSTRUCTION CONTRACT
(STIPULATED PRICE)

AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between Columbia County Board of County Commissioners

(Owner) and _____

(Contractor).

Owner and Contractor, in consideration of the mutual covenants set forth herein, agree as follows:

ARTICLE 1 - WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Construction of:

A. Wastewater pump station, forcemain and appurtenances.

ARTICLE 2 - THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

A. Ellisville – FDOT Wastewater Interconnect
B. Columbia County, FL

ARTICLE 3 - ENGINEER

3.01 The Project has been designed by

North Florida Professional Services, Inc.
1450 SW State Road 47
Lake City, FL 32025

(Engineer), 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 the completion of the Work in accordance with the Contract Documents.

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ARTICLE 4 - CONTRACT TIMES

4.01 Time of the Essence

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

~~4.02 Contract Times: Dates~~

~~A. The Work will be substantially complete on or before [date], and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before [date].~~

Deleted

4.03 Contract Times: Days

A. The Work will be substantially complete within **210** days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions. The Work shall be finally complete and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within **240** days after the date when the Contract Times commence to run.

~~4.04 Milestones~~
~~A. Parts of the Work must be substantially completed on or before the following Milestone(s):~~
~~1. Milestone 1 [event & date/days]~~
~~2. Milestone 2 [event & date/days]~~
~~3. Milestone 3 [event & date/days~~

Deleted

4.05 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the Contract Times, as duly modified. The parties also recognize the delays, expense, and difficulties involved in proving, in a legal or arbitration proceeding, the actual loss suffered by Owner if the Work is not 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):

1. Substantial Completion: Contractor shall pay Owner $2,500.00 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion, until the Work is substantially complete.

2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner $2,500.00 for each day that expires after such time until the Work is completed and ready for final payment.

3. Milestones: Contractor shall pay Owner $2500.00 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for achievement of Milestone 1, until Milestone 1 is achieved, or until the time specified for Substantial Completion is reached, at which time the rate indicated in Paragraph 4.05.A.1 will apply, rather than the Milestone rate.

4. Liquidated damages for failing to timely attain Milestones, Substantial Completion, and final completion are not additive, and will not be imposed concurrently.

B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages,

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whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.

~~C. Bonus: Contractor and Owner further recognize the Owner will realize financial and other benefits if the Work is completed prior to the time specified for Substantial Completion. Accordingly, Owner and Contractor agree that as a bonus for early completion, Owner shall pay Contractor $[number] for each day prior to the time specified above for Substantial Completion (as duly adjusted pursuant to the Contract) that the Work is substantially complete. The maximum value of the bonus will be limited to $[number].~~

Deleted

4.06 Special Damages

A. Contractor shall reimburse Owner (1) for any fines or penalties imposed on Owner as a direct result of the Contractor's failure to attain Substantial Completion according to the Contract Times, and (2) for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.

B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted pursuant to the Contract), until the Work is completed and ready for final payment.

C. The special damages imposed in this paragraph are supplemental to any liquidated damages for delayed completion established in this Agreement.

ARTICLE 5 - CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:

A. For all Work other than Unit Price Work, a lump sum of $[number].
All specific cash allowances are included in the above price in accordance with Paragraph 13.02 of the General Conditions.

B. For all Unit Price Work, an amount equal to the sum of the extended prices (established for each separately identified item of Unit Price Work by multiplying the unit price times the actual quantity of that item).

Total of all Extended Prices for Unit Price Work (subject to final adjustment based on actual quantities)

The extended prices for Unit Price Work set forth as of the Effective Date of the Contract are based on estimated quantities. As provided in Paragraph 13.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer.

C. Total of Lump Sum Amount and Unit Price Work (subject to final Unit Price adjustment) $[number].

D. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6 - PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

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6.02 Progress Payments; Retainage

A. Owner shall make progress payments on the basis of Contractor's Applications for Payment on or about the 20th day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.

a. 95 percent of the value of the Work completed (with the balance being retainage).

~~1) If 50 percent or more of the Work has been completed, as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and~~

Deleted

b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. Upon Substantial Completion of the entire construction to be provided under the construction Contract Documents, Owner shall pay an amount sufficient to increase total payments to Contractor to [number] percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less [number] percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 Final Payment

A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

6.04 Consent of Surety

A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.

6.05 Interest

A. All amounts not paid when due will bear interest at the rate of [number] percent per annum.

ARTICLE 7—CONTRACT DOCUMENTS

7.01 Contents

A. The Contract Documents consist of all of the following:

1. This Agreement.

2. Bonds:
   a. Performance bond (together with power of attorney).
   b. Payment bond (together with power of attorney).

3. General Conditions.

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4. Supplementary Conditions.

5. Specifications as listed in the table of contents of the project manual (copy of list attached).

6. Drawings (not attached but incorporated by reference) consisting of [number] sheets with each sheet bearing the following general title: [title on Drawings].

~~7. Drawings listed on the attached sheet index~~.

8. Addenda (numbers [number] to [number], inclusive).

9. Exhibits to this Agreement (enumerated as follows):
   a. [list exhibits]

10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:

    a. Notice to Proceed.

    b. Work Change Directives.

    c. Change Orders.

    d. Field Orders.

    e. Warranty Bond, if any.

B. The Contract Documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 7.

D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 8 –REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

8.01 Contractor's Representations

A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:

1. Contractor has examined and carefully studied the Contract Documents, including Addenda.

2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.

4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.

5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.

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6. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.

7. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.

8. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

9. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

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

11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

8.02 Contractor's Certifications

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

8.03 Standard General Conditions

A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C 700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or "track changes" (redline/strikeout), or in the Supplementary Conditions.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

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This Agreement will be effective on [indicate date on which Contract becomes effective] (which is the Effective Date of the Contract).

Owner:	Contractor:
_____	_____
(typed or printed name of organization)	*(typed or printed name of organization)*
By: _____	By: _____
(individual's signature)	*(individual's signature)*
Date: _____	Date: _____
(date signed)	*(date signed)*
Name: _____	Name: _____
(typed or printed)	*(typed or printed)*
Title: _____	Title: _____
(typed or printed)	*(typed or printed)*
	*(If **[Type of Entity]** is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)*
Attest: _____	Attest: _____
(individual's signature)	*(individual's signature)*
Title: _____	Title: _____
(typed or printed)	*(typed or printed)*
Address for giving notices:	Address for giving notices:
_____	_____
_____	_____
_____	_____
Designated Representative:	Designated Representative:
Name: _____	Name: _____
(typed or printed)	*(typed or printed)*
Title: _____	Title: _____
(typed or printed)	*(typed or printed)*
Address:	Address:
_____	_____
_____	_____
_____	_____
Phone: _____	Phone: _____
Email: _____	Email: _____
*(If **[Type of Entity]** is a corporation, attach evidence of authority to sign. If **[Type of Entity]** is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)*	License No.: _____ *(where applicable)*
	State: _____

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APPENDIX C
EJCDC FORM C-700:
STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. 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, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. *Bidder*—An individual or entity that submits a Bid to Owner.

6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document 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, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*

a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the

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requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.

b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.

c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.

d. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.

21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

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recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.

23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.

    a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.

    b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.

    c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.

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

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

27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.

28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

29. *Notice to Proceed*—A written notice 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.

30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.

32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

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33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.

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

35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals.

36. *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.

37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

38. *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, and such other lands or areas furnished by Owner which are designated for the use of Contractor.

39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

40. *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.

41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.

42. *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 of such Work.

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43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.

44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

45. *Supplier*—A manufacturer, fabricator, supplier, distributor, 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 a Subcontractor.

46. *Technical Data*

    a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.

    b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.

    c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.

47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.

48. *Unit Price Work*—Work to be paid for on the basis of unit prices.

49. *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; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

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1.02 *Terminology*

A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*: 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 information in the Contract Documents and with the design concept of the 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 Article 10 or any other provision of the Contract Documents.

C. *Day*: The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

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

1. does not conform to the Contract Documents;

2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

3. 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 15.03 or Paragraph 15.04).

E. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, means 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, means 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, means to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

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F. *Contract Price or Contract Times*: References to a change in "Contract Price or Contract Times" or "Contract Times or Contract Price" or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term "or both" is not expressed.

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

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).

B. *Evidence of Contractor's Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.

C. *Evidence of Owner's Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), 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;

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

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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.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

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 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *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 the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will 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 the component parts of the Work.

4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.

B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

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ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one Contract Document 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.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

G. Nothing in the Contract Documents creates:

1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or

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

3.02 *Reference Standards*

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

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract 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, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility

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inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then 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 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

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 had actual knowledge thereof.

B. *Resolving Discrepancies*

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

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

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.

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B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers 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 its consultants, including electronic media versions, or reuse any 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; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

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

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract 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 Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

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

4.03 *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

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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.

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 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 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, 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 Contract Price or Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. Abnormal weather conditions;

3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and

4. Acts of war or terrorism.

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D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:

1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.

2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.

3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.

E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:

1. The circumstances that form the basis for the requested adjustment;

2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;

3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;

4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and

5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.

Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.

F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.

G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor in writing 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.

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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 permanent improvements are to be made 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.

5.02 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all 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 directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will 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 and adjacent areas all tools, appliances, construction equipment

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and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading of 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 structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

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

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;

2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and

3. Technical Data contained in such reports and drawings.

B. *Underground Facilities*: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

C. *Reliance by Contractor on Technical Data*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.

D. *Limitations of Other Data and Documents*: Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, 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;

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

3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or

4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

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5.04 *Differing Subsurface or Physical Conditions*

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

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;

2. is of such a nature as to require a change in the Drawings or Specifications;

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 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

E. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related

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delay, disruption, or interference, 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 fall within any one or more of the categories described in Paragraph 5.04.A;

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 Paragraph 13.03; and,

c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a 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 otherwise;

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

c. Contractor failed to give the written notice required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

F. *Underground Facilities; Hazardous Environmental Conditions*: Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:

1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

2. complying with applicable state and local utility damage prevention Laws and Regulations;

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3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;

4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then 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 7.15), notify Owner and Engineer in writing regarding such Underground Facility.

C. *Engineer's Review*: Engineer will:

1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;

2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;

3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and

4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.

During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

F. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown or

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indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. 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 Paragraph 13.03;

b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and

c. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

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

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;

2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, 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

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of construction to be employed by Contractor, and safety precautions and programs incident thereto;

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 removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) 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. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. 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, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.

H. 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

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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, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, 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, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, 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 failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.

B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.

C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

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Regulations, and must be issued and signed by a surety named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.

E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.

F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.

H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Alternative forms of insurance coverage, including but not limited to self-insurance and "Occupational Accident and Excess Employer's Indemnity Policies," are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.

D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

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Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.

F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

H. Contractor shall require:

1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and

2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.

I. If either party does not purchase or maintain the insurance required of such party by the Contract, 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.

J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.

K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

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L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.

M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.

N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

A. *Required Insurance*: Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.

B. *General Provisions*: The policies of insurance required by this Paragraph 6.03 as supplemented must:

1. include at least the specific coverages required;

2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;

3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;

4. apply with respect to the performance of the Work, whether such performance is 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; and

5. include all necessary endorsements to support the stated requirements.

C. *Additional Insureds*: The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:

1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;

2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;

3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

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4. not seek contribution from insurance maintained by the additional insured; and

5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.

B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.

C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.

E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against

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Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, 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, risks, 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 Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.

2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.

1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, 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 fire or any of the perils, risks, or causes of loss covered by such policies.

C. The waivers in this Paragraph 6.05 include the waiver of rights 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 insured peril, risk, or cause of loss.

D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, 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 fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

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6.06 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *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.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *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 maintain good discipline and order at the Site.

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B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.

C. 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 will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.04 *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, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will 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 must 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.

7.05 *"Or Equals"*

A. *Contractor's Request; Governing Criteria*: Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item 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 is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:

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

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

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

4) is not objectionable to Owner.

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

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

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

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

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 *Substitutes*

A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

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

    a. will certify that the proposed substitute item will:

        1) perform adequately the functions and achieve the results called for by the general design;

        2) be similar in substance to the item specified; and

        3) be suited to the same use as the item specified.

    b. will state:

        1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;

        2) whether 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

        3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

    c. will identify:

        1) all variations of the proposed substitute item from the item specified; and

        2) available engineering, sales, maintenance, repair, and replacement services.

    d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

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

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable 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.

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E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.

B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.

E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.

F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

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H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.

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

K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.

L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.

M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *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 an 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 will be disclosed in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors, 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 specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, 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.

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7.09 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. 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 the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.10 *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.

7.11 *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. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, 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 such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.

C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *Record Documents*

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

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7.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.

B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.

C. 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, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.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 at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer 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).

E. 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.

F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.

H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

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I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).

J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as 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.

7.15 *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 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 by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

1. Before submitting a Shop Drawing or Sample, Contractor shall:

a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determine and verify:

1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;

2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

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

c. confirm that the Submittal is complete with respect to all related data included in the Submittal.

2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.

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3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.

1. *Shop Drawings*

a. Contractor shall submit the number of copies required in the Specifications.

b. Data shown on the Shop Drawings must 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 7.16.C.

2. *Samples*

a. Contractor shall submit the number of Samples required in the Specifications.

b. Contractor shall 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 7.16.C.

3. 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. *Engineer's Review of Shop Drawings and Samples*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. 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, comply with the requirements of 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, or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.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 will

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document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. *Resubmittal Procedures for Shop Drawings and Samples*

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.

2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. *Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs*

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:

a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.

b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.

c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

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d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.

2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03. 2.04, and 2.05.

F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 *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 is entitled to rely on Contractor's warranty and guarantee.

B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:

1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and

2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.

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

1. abuse, or improper modification, 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.

D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:

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;

6. The issuance of a notice of acceptability by Engineer;

7. The end of the correction period established in Paragraph 15.08;

8. Any inspection, test, or approval by others; or

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9. Any correction of defective Work by Owner.

E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (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 from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage 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 officers, directors, members, partners, employees, agents, consultants, or subcontractors, 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 7.18.A will 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.

7.19 *Delegation of Professional Design Services*

A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.

B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.

C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

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D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.

E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:

1. Checking for conformance with the requirements of this Paragraph 7.19;

2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and

3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.

F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.

G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.

D. 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 such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

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E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, 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.

F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. An itemization of the specific matters to be covered by such authority and responsibility; and

3. The extent of such authority and responsibilities.

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

8.03 *Legal Relationships*

A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

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B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.

1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.

2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.

C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all 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 damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will be that of the former Engineer.

9.03 *Furnish Data*

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

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

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9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *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.

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

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ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *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.

10.02 *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 10.07. 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.

10.03 *Resident Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.

B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

A. Engineer has the authority to reject Work in accordance with Article 14.

B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.

C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.

D. Engineer's authority as to changes in the Work is set forth in Article 11.

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E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.06 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.07 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, 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, will 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 Contractor under Paragraph 15.06.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 10.07 also apply to the Resident Project Representative, if any.

10.08 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs of which Engineer has been informed.

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ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.

C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

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

1. Changes in 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;

2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and

4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.

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B. If Owner has issued a Work Change Directive and:

1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.

2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

A. Engineer may authorize minor changes in the Work if the changes 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. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.

B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-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. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.

B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.

C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *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, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

11.07 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

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1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or
3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit will 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 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;
    b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 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 Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
    d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
    e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
    f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

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11.08 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.

B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

A. *Purpose and Content*: Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

B. *Change Proposal Procedures*

1. *Submittal*: Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.

2. *Supporting Data*: The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.

   a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.

   b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

   The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

3. *Engineer's Initial Review*: Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.

4. *Engineer's Full Review and Action on the Change Proposal*: Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change

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Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

C. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety 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), 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.

ARTICLE 12—CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and

4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge

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and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

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2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:

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 in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will 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 accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will 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, which 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 will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

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

5. Other costs consisting of 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, which are

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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.

1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.

2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.

3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as 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 builder's risk or other property insurance established in accordance with Paragraph 6.04), 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 include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

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

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

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

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

1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, 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 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. The cost of purchasing, renting, or furnishing small tools and hand tools.

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

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

5. 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.

6. Expenses incurred in preparing and advancing Claims.

7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*

1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:

a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.

b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:

1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.

2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.

2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change Order,

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Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

13.02 *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*: Contractor agrees that:

1. 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

2. 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 for any of the foregoing will be valid.

C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's 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 for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

13.03 *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. Payments to Contractor for Unit Price Work will be based on actual quantities.

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. 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

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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, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:

a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.

2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.

3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

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

14.02 *Tests, Inspections, and Approvals*

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

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.

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.

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D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
3. by manufacturers of equipment furnished under the Contract Documents;
4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. 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, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs,

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losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then 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, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages 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 pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. 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, 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, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *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, then Owner may order Contractor to stop the Work,

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or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will 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.

14.07 *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 defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, 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, 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 incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. 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 14.07.

ARTICLE 15—PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *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.

2. 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 must also be accompanied by: (a) a bill of sale, invoice, copies of

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subcontract or purchase order payments, or other documentation establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

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

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

C. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, 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 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, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and 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; or

   b. 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.

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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;
    b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
    c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
    d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; 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 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
    a. the Work is defective, requiring correction or replacement;
    b. the Contract Price has been reduced by Change Orders;
    c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
    d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
    e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*

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

E. *Reductions in Payment by Owner*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
    a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

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b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. The Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. The Contract Price has been reduced by Change Orders;

i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;

j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. 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; or

l. Other items entitle Owner to a set-off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, 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, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

15.03 *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 and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit

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to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

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 preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

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. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner,

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and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.

2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work 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 15.03 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 6.04 regarding builder's risk or other property insurance.

15.05 *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, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *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, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.

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

a. all documentation called for in the Contract Documents;

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

c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

d. a list of all duly pending Change Proposals and Claims; and

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

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3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, 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, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Final Application and Recommendation of Payment*: 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 have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. 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. *Notice of Acceptability*: In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.

D. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.

E. *Final Payment Becomes Due*: Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim, appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

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B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

15.08 *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 Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

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

B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.

C. If, after receipt of a notice of defect within 60 days and within the correction period, 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. Contractor shall pay all 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). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.

D. 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.

E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, 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.

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F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *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 written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and 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);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, 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 complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.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 the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects,

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attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds 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.

F. 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, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

A. Upon 7 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; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 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 16.03.

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, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such

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amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal 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 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and

2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:

1. in person, by a commercial courier service or otherwise, to the recipient's place of business;

2. by registered or certified mail, postage prepaid, to the recipient's place of business; or

3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract 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.

18.03 *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

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imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. 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.

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Assignment of Contract*

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

18.09 *Successors and Assigns*

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

18.10 *Headings*

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

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APPENDIX D
EJCDC FORM C-940:
WORK CHANGE DIRECTIVE

WORK CHANGE DIRECTIVE NO.: [Number of Work Change Directive]

Owner:	Owner's Project No.:
Engineer:	Engineer's Project No.:
Contractor:	Contractor's Project No.:
Project:	
Contract Name:	
Date Issued:	Effective Date of Work Change Directive:

Contractor is directed to proceed promptly with the following change(s):

Description:

[Description of the change to the Work]

Attachments:

[List documents related to the change to the Work]

Purpose for the Work Change Directive:

[Describe the purpose for the change to the Work]

Directive to proceed promptly with the Work described herein, prior to agreeing to change in Contract Price and Contract Time, is issued due to:

Notes to User—Check one or both of the following

☐ Non-agreement on pricing of proposed change. ☐ Necessity to proceed for schedule or other reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Contract Price: $ _____ **[increase] [decrease] [not yet estimated]**.

Contract Time: _____ days **[increase] [decrease] [not yet estimated]**.

Basis of estimated change in Contract Price:

☐ Lump Sum ☐ Unit Price ☐ Cost of the Work ☐ Other

	Recommended by Engineer	Authorized by Owner
By:		
Title:		
Date:		

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APPENDIX E
EJCDC FORM C-941:
CHANGE ORDER

CHANGE ORDER NO.: [Number of Change Order]

Owner: Owner's Project No.:
Engineer: Engineer's Project No.:
Contractor: Contractor's Project No.:
Project:
Contract Name:
Date Issued: Effective Date of Change Order:

The Contract is modified as follows upon execution of this Change Order:

Description:

[Description of the change]

Attachments:

[List documents related to the change]

Change in Contract Price	**Change in Contract Times [State Contract Times as either a specific date or a number of days]**
Original Contract Price: $ _____	Original Contract Times: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] from previously approved Change Orders No. 1 to No. **[Number of previous Change Order]**: $ _____	**[Increase] [Decrease]** from previously approved Change Orders No.1 to No. **[Number of previous Change Order]**: Substantial Completion: _____ Ready for final payment: _____
Contract Price prior to this Change Order: $ _____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] this Change Order: $ _____	**[Increase] [Decrease]** this Change Order: Substantial Completion: _____ Ready for final payment: _____
Contract Price incorporating this Change Order: $ _____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for final payment: _____

Recommended by Engineer (if required)	Authorized by Owner
By: _____	_____
Title: _____	_____
Date: _____	_____

Authorized by Owner	Approved by Funding Agency (if applicable)
By: _____	_____
Title: _____	_____
Date: _____	_____

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APPENDIX F
EJCDC FORM C-410:
BID FORM

BID FORM FOR CONSTRUCTION CONTRACT

ARTICLE 1 – OWNER AND BIDDER

1.01 This Bid is submitted to: Columbia County Board of County Commissioners

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents

ARTICLE 2 – ATTACHMENTS TO THIS BID

2.01 The following documents are submitted with and made a condition of this Bid:

A. Required Bid security;

B. List of Proposed Subcontractors;

C. List of Proposed Suppliers;

D. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;

E. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids;

F. Required Bidder Qualification Statement with supporting data; ~~and~~

~~**G. [List other documents and edit above as pertinent].**~~

ARTICLE 3-BASIS OF BID—LUMP SUM BID AND UNIT PRICES

~~*3.01 Lump Sum Bids*~~

~~Bidder will complete the Work in accordance with the Contract Documents for the following lump sum (stipulated) price(s), together with any Unit Prices indicated in Paragraph 3.02:~~

~~Lump Sum Price (Single Lump Sum)~~

~~Lump Sum Bid Price~~	~~$~~

~~Lump Sum Price (Base Bid and Alternates)~~

~~Lump Sum Bid Price for Base Bid~~	~~$~~
~~Alternate A **[Add] [Deduct]**~~	~~$~~
~~Alternate B **[Add] [Deduct]**~~	~~$~~

~~Lump Sum Price (Sectional Lump Sum Bids)~~

~~Lump Sum Bid Price for Section I only~~	~~$~~
~~Lump Sum Bid Price for Section II only~~	~~$~~
~~Lump Sum Bid Price for Section I and II~~	~~$~~

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~~All specified cash allowance(s) are included in the price(s) set forth below, and have been computed in accordance with Paragraph 13.02 of the General Conditions.~~

~~Lump Sum for Cash Allowance 1~~	~~$~~
~~Lump Sum for Cash Allowance 2~~	~~$~~
~~Lump Sum for Cash Allowance 3~~	~~$~~
~~Total for all Lump Sum for Cash Allowances~~	~~$~~

~~All specified contingency allowances are included in the price(s) set forth below, and have been computed in accordance with Paragraph 13.02 of the General Conditions.~~

~~Lump Sum Contingency Allowance 1~~	~~$~~
~~Lump Sum Contingency Allowance 2~~	~~$~~
~~Lump Sum Contingency Allowance 3~~	~~$~~
~~Total for all Lump Sum Contingency Allowances~~	~~$~~

Unit Price Bids

A. Bidder will perform the following Work at the indicated unit prices:

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PROJECT NAME: ELLISVILLE-FDOT WASTEWATER INTERCONNECT
COLUMBIA CO. BID NO: 2025-13

BID SUBMITTED BY: _____

PROJECT BID FORM

Pay Item	Pay Item Description	Notes*	Bid Qty	Unit	Unit Price	Extended Price
1	Mobilization		1	LS	$	$
2	Erosion Control	*A*	1	LS	$	$
3	Layout, Clearing & Grading	*B*	1	LS	$	$
4	Packaged Duplex Pump Station, Wetwell & Controls - at Ellisville WWTP	*C*	1	EA	$	$
5	Concrete Pad, Pipe Supports & Appurtenances at Pump Station		1	LS	$	$
6	4" DIP Pipe & Fittings, Flg - Aboveground at Pump Station	*D*	1	LS	$	$
7	4" DIP Pipe & Fittings, MJ - Buried at Ellisville WWTP Site	*D*	440	LF	$	$
8	4" PVC C900 (DR 18) Pipe & DIP Fittings, MJ - Buried Offsite	*D*	1,130	LF	$	$
9	6" PVC C900 (DR 18) Pipe & DIP Fittings, MJ - Buried Offsite	*D*	2,000	LF	$	$
10	6" DIP Pipe & Fittings, MJ - Buried at Roadway Crossings	*D*	100	LF	$	$
11	4" PVC (Sch 80) Pipe & Valve Assy, SW - Aboveground at FDOT WWTP	*D*	1	LS	$	$
12	4" Swing Check Valve, Flg - Aboveground at Pump Station		2	EA	$	$
13	4" Magnetic Flow Meter, Flg - Aboveground at Pump Station		2	EA	$	$
14	4" Gate Valve, Flg - Aboveground at Pump Station		6	EA	$	$
15	4" Plug Valve, Flg - Aboveground at Pump Station		1	EA	$	$
16	4" Isolation Gate Valve, MJ, w/ Box - Buried Offsite	*E*	1	EA	$	$
17	6" Isolation Gate Valve, MJ, w/ Box - Buried Offsite	*E*	2	EA	$	$
18	2" Wastewater ARV Assy - Aboveground at Pump Station		2	EA	$	$
19	2" Wastewater ARV Assy w/ MH - Buried Offsite and at FDOT WWTP	*E*	3	EA	$	$
20	Bar Screen (304 SS) & Hardware - Aboveground at FDOT WWTP		1	LS	$	$
21	Misc Site Electrical at Pump Station	*F*	1	LS	$	$
22	25 kVA Portable Diesel Generator w/ ATS & Trailer at Pump Station	*G*	1	EA	$	$
23	Misc Restoration, Bahia Seed & Mulch		1	LS	$	$
					TOTAL CONTRACTOR BID AMOUNT:	**$**

TOTAL BID AMOUNT (IN WORDS): _____

* *Notes*:

- *A* *Includes staked silt fence and other items necessary to minimize erosion and to prevent sediment transport to beyond the Project limits.*
- *B* *Item pertains to pump station site and areas needed to install forcemain piping along forcemain route.*
- *C* *Includes wetwell, ballast, pumps, guide rails, wetwell piping, fittings, valves, pump controls, instrumentation, accessories, startup and testing.*
- *D* *Includes all required pipe, fittings, PE encasement (for buried DIP components), appurtenances, and testing.*
- *E* *Includes all joint accessories, PE encasement (for buried DIP components), identification and valve boxes (for buried installations).*
- *F* *Includes onsite electrical power and control devices, grounding, site lighting and appurtenances.*
- *G* *Includes portable generator with fuel tank & enclosure, FDOT rated transport trailer, No. 57 crushed stone pad, electrical plug, multi-port receptacle, automatic transfer switch with controls and accessories.*

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B. Bidder acknowledges that:

1. each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and

2. estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Work will be based on actual quantities, determined as provided in the Contract Documents.

3.03 Total Bid Price (Lump Sum and Unit Prices)

Total Bid Price (Total of all Lump Sum and Unit Price Bids)	$

~~**ARTICLE 4-BASIS OF BID—COST-PLUS FEE**~~

~~*4.01 The Contract Price will be the Cost of the Work, determined as provided in Paragraph 13.01 of the General Conditions, together with the following fee, and subject to the Guaranteed Maximum Price.*~~

~~*4.02 Contractor's Fee*~~

~~Contractor's fee will be **[number]** percent of the Cost of the Work. No fee will be payable on the basis of costs itemized as excluded in Paragraph 13.01.C of the General Conditions.~~

~~The maximum amount payable by Owner as a percentage fee (Guaranteed Maximum Fee) will not exceed $**[insert cap amount]**, subject to increases or decreases for changes in the Work.~~

~~Contractor's fee will be determined by applying the following percentages to the various portions of the Cost of the Work as defined in Article 13 of the General Conditions. No fee will be payable on the basis of costs itemized as excluded in Paragraph 13.01.C of the General Conditions:~~

~~**Costs**~~	~~**Percent**~~
~~Payroll costs (See Paragraph 13.01.B.1, General Conditions)~~	
~~Materials and Installed Equipment cost (GC-13.01.B.2)~~	
~~Amounts to be paid to Subcontractors (GC-13.01.B.3)~~	
~~Amount to be paid to special consultants (GC-13.01.B.4)~~	
~~Other costs (GC-13.01.B.5)~~	

~~The maximum amount payable by Owner as a percentage fee (Guaranteed Maximum Fee) will not exceed $**[insert cap amount]**, subject to increases or decreases for changes in the Work.~~

~~Contractor's fee will be the fixed sum of $**[number]**.~~

~~*4.03 Guaranteed Maximum Price*~~

~~The Guaranteed Maximum Price to Owner of the Cost of the Work including Contractor's Fee will not exceed $**[Bidder fill in GMP]**.~~

Deleted

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ARTICLE 5 ~~PRICE-PLUS-TIME BID~~

~~*5.01 Price-Plus-Time Contract Award (Stipulated Price Contract)*~~

~~The Bidder to which an award of the Contract will be made will be determined in part on the basis of the Total Bid Price and the total number of calendar days to substantially complete the Work, in accordance with the following:~~

	~~**Description**~~		~~**Amount**~~
~~A~~	~~1. Total Bid Price~~		~~$**[number]**~~
	~~2. Total number of calendar days to substantially complete the Work~~	~~**[number]** days~~	
	~~3. Liquidated Damages Rate (from Agreement)~~	~~$**[number]**/day~~	
~~B~~	~~4. Adjustment Amount (2 x 3)~~		~~$**[number]**~~
~~A+B~~	~~5. Amount for Comparison of Bids~~		~~$**[number]**~~

~~The purpose of the process in the table above is only to calculate the lowest price-plus-time (A+B) bid amount for bid comparison purposes. The price for completion of the Work (the Contract Price) is the Total Bid Price.~~

~~Bonds required under Paragraph 6.01 of the General Conditions will be based on the Contract Price.~~

~~*5.02 Price-Plus-Time Contract Award (Cost Plus Fee with Guaranteed Maximum Price Contract)*~~

~~The Bidder to which an award of Contract will be made will be determined in part on the basis of the Guaranteed Maximum Price and the total number of calendar days to substantially complete the Work, in accordance with the following:~~

	~~**Description**~~		~~**Amount**~~
~~A~~	~~1. Guaranteed Maximum Price~~		~~$**[number]**~~
	~~2. Total number of calendar days to substantially complete the Work~~	~~**[number]** days~~	
	~~3. Liquidated Damages Rate (from Agreement)~~	~~$**[number]**/day~~	
~~B~~	~~4. Adjustment Amount (2 x 3)~~		~~$**[number]**~~
~~A+B~~	~~5. Amount for Comparison of Bids~~		~~$**[number]**~~

~~The purpose of the process in the table above is only to calculate the lowest price-plus-time (A+B) bid amount for bid comparison purposes. The price for completion of the Work (the Contract Price) is based on the cost of the Work, plus a fee, subject to a guaranteed maximum price, as set forth in the Agreement.~~

~~Bonds required under Paragraph 6.01 of the General Conditions will be based on the Contract Price.~~

Deleted

ARTICLE 6-TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

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~~*6.02 Bidder agrees that the Work will be substantially complete on or before **[Bidder inserts date]**, and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before **[Bidder inserts date]**.*~~

Deleted

~~*6.03 Bidder agrees that the Work will be substantially complete within **[Bidder inserts number]** calendar days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within **[Bidder inserts number]** calendar days after the date when the Contract Times commence to run.*~~

Deleted

6.04 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7-BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

7.01 Bid Acceptance Period

This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

7.02 Instructions to Bidders

Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

7.03 Receipt of Addenda

A. Bidder hereby acknowledges receipt of the following Addenda: **[Add rows as needed. Bidder is to complete table.]**

Addendum Number	Addendum Date

ARTICLE 8-BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

8.01 Bidder's Representations

A. In submitting this Bid, Bidder represents the following:

1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work**, including all American Iron and Steel requirements.**
4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing

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surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.

5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.

6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.

7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.

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

9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

8.02 Bidder's Certifications

A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.

2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.

3. Bidder has not solicited or induced any individual or entity to refrain from bidding.

4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:

a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.

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b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.

c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.

d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

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APPENDIX G
EJCDC FORM C-430:
BID BOND

BID BOND (PENAL SUM FORM)

Bidder	**Surety**
Name: **[Full formal name of Bidder]** Address *(principal place of business)*: **[Address of Bidder's principal place of business]**	Name: **[Full formal name of Surety]** Address *(principal place of business)*: **[Address of Surety's principal place of business]**
Owner	**Bid**
Name: **[Full formal name of Owner]** Address *(principal place of business)*: **[Address of Owner's principal place of business]**	Project *(name and location)*: **[Owner project/contract name, and location of the project]** Bid Due Date: **[Enter date bid is due]**

Bond

Penal Sum: **[Amount]**

Date of Bond: **[Date]**

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

Bidder	Surety
_____ *(Full formal name of Bidder)*	_____ *(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)*	By: _____ *(Signature) (Attach Power of Attorney)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____
Attest: _____ *(Signature)*	Attest: _____ *(Signature)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title:	Title:

Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.

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1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation will be null and void if:
   3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
   3.2. All Bids are rejected by Owner, or
   3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond will be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the

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provision of said statute governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.

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

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APPENDIX H
EJCDC FORM C-451:
QUALIFICATIONS STATEMENT

ARTICLE 1-GENERAL INFORMATION

1.01 Provide contact information for the Business:

Legal Name of Business:			
Corporate Office			
Name:		Phone number:	
Title:		Email address:	
Business address of corporate office:			
Local Office			
Name:		Phone number:	
Title:		Email address:	
Business address of local office:			

1.02 Provide information on the Business's organizational structure:

Form of Business:	☐ Sole Proprietorship ☐ Partnership ☐ Corporation		
☐ Limited Liability Company ☐ Joint Venture comprised of the following companies:			
	1.		
	2.		
	3.		
Provide a separate Qualification Statement for each Joint Venturer.			
Date Business was formed:		State in which Business was formed:	
Is this Business authorized to operate in the Project location?	☐ Yes ☐ No ☐ Pending		

1.03 Identify all businesses that own Business in whole or in part (25% or greater), or that are wholly or partly (25% or greater) owned by Business:

Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	
Address:			

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1.04 Provide information regarding the Business's officers, partners, and limits of authority.

Name:		Title:	
Authorized to sign contracts: ☐ Yes ☐ No		Limit of Authority:	$
Name:		Title:	
Authorized to sign contracts: ☐ Yes ☐ No		Limit of Authority:	$
Name:		Title:	
Authorized to sign contracts: ☐ Yes ☐ No		Limit of Authority:	$
Name:		Title:	

ARTICLE 2-LICENSING

2.01 Provide information regarding licensure for Business:

Name of License:			
Licensing Agency:			
License No:		Expiration Date:	
Name of License:			
Licensing Agency:			
License No:		Expiration Date:	

ARTICLE 3-DIVERSE BUSINESS CERTIFICATIONS

3.01 Provide information regarding Business's Diverse Business Certification, if any. Provide evidence of current certification.

Certification	Certifying Agency	Certification Date
☐ Disadvantaged Business Enterprise		
☐ Minority Business Enterprise		
☐ Woman-Owned Business Enterprise		
☐ Small Business Enterprise		
☐ Disabled Business Enterprise		
☐ Veteran-Owned Business Enterprise		
☐ Service-Disabled Veteran-Owned Business		
☐ HUBZone Business (Historically Underutilized) Business		
☐ Other		
☐ None		

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ARTICLE 4-SAFETY

4.01 Provide information regarding Business's safety organization and safety performance.

Name of Business's Safety Officer:	

Safety Certifications		
Certification Name	Issuing Agency	Expiration

4.02 Provide Worker's Compensation Insurance Experience Modification Rate (EMR), Total Recordable Frequency Rate (TRFR) for incidents, and Total Number of Recorded Manhours (MH) for the last 3 years and the EMR, TRFR, and MH history for the last 3 years of any proposed Subcontractor(s) that will provide Work valued at 10% or more of the Contract Price. Provide documentation of the EMR history for Business and Subcontractor(s).

Year									
Company	EMR	TRFR	MH	EMR	TRFR	MH	EMR	TRFR	MH

ARTICLE 5-FINANCIAL

5.01 Provide information regarding the Business's financial stability. Provide the most recent audited financial statement, and if such audited financial statement is not current, also provide the most current financial statement.

Financial Institution:	
Business address:	

Date of Business's most recent financial statement:		☐ Attached
Date of Business's most recent audited financial statement:		☐ Attached
Financial indicators from the most recent financial statement		
Contractor's Current Ratio (Current Assets ÷ Current Liabilities)		
Contractor's Quick Ratio ((Cash and Cash Equivalents + Accounts Receivable + Short Term Investments) ÷ Current Liabilities)		

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ARTICLE 6-SURETY INFORMATION

6.01 Provide information regarding the surety company that will issue required bonds on behalf of the Business, including but not limited to performance and payment bonds.

Surety Name:			
Surety is a corporation organized and existing under the laws of the state of:			
Is surety authorized to provide surety bonds in the Project location?	☐ Yes ☐ No		
Is surety listed in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" published in Department Circular 570 (as amended) by the Bureau of the Fiscal Service, U.S. Department of the Treasury? ☐ Yes ☐ No			
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

ARTICLE 7-INSURANCE

7.01 Provide information regarding Business's insurance company(s), including but not limited to its Commercial General Liability carrier. Provide information for each provider.

Name of insurance provider, and type of policy (CLE, auto, etc.):			
Insurance Provider	Type of Policy (Coverage Provided)		
Are providers licensed or authorized to issue policies in the Project location?	☐ Yes ☐ No		
Does provider have an A.M. Best Rating of A-VII or better?	☐ Yes ☐ No		
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

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ARTICLE 8-CONSTRUCTION EXPERIENCE

8.01 Provide information that will identify the overall size and capacity of the Business.

Average number of current full-time employees:	
Estimate of revenue for the current year:	
Estimate of revenue for the previous year:	

8.02 Provide information regarding the Business's previous contracting experience.

Years of experience with projects like the proposed project:				
As a general contractor:		As a joint venturer:		
Has Business, or a predecessor in interest, or an affiliate identified in Paragraph 1.03:				
Been disqualified as a bidder by any local, state, or federal agency within the last 5 years? ☐ Yes ☐ No				
Been barred from contracting by any local, state, or federal agency within the last 5 years? ☐ Yes ☐ No				
Been released from a bid in the past 5 years? ☐ Yes ☐ No				
Defaulted on a project or failed to complete any contract awarded to it? ☐ Yes ☐ No				
Refused to construct or refused to provide materials defined in the contract documents or in a change order? ☐ Yes ☐ No				
Been a party to any currently pending litigation or arbitration? ☐ Yes ☐ No				
Provide full details in a separate attachment if the response to any of these questions is Yes.				

8.03 List all projects currently under contract in Schedule A and provide indicated information.

8.04 List a minimum of three and a maximum of six projects completed in the last 5 years in Schedule B and provide indicated information to demonstrate the Business's experience with projects similar in type and cost of construction.

8.05 In Schedule C, provide information on key individuals whom Business intends to assign to the Project. Provide resumes for those individuals included in Schedule C. Key individuals include the Project Manager, Project Superintendent, Quality Manager, and Safety Manager. Resumes may be provided for Business's key leaders as well.

ARTICLE 9-REQUIRED ATTACHMENTS

9.01 Provide the following information with the Statement of Qualifications:

A. If Business is a Joint Venture, separate Qualifications Statements for each Joint Venturer, as required in Paragraph 1.02.

B. Diverse Business Certifications if required by Paragraph 3.01.

C. Certification of Business's safety performance if required by Paragraph 4.02.

D. Financial statements as required by Paragraph 5.01.

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E. Attachments providing additional information as required by Paragraph 8.02.

F. Schedule A (Current Projects) as required by Paragraph 8.03.

G. Schedule B (Previous Experience with Similar Projects) as required by Paragraph 8.04.

H. Schedule C (Key Individuals) and resumes for the key individuals listed, as required by Paragraph 8.05.

I. Additional items as pertinent.

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This Statement of Qualifications is offered by:

Business: _____
(typed or printed name of organization)

By: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Date: _____
(date signed)

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

Attest: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address for giving notices:

_____

_____

_____

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

_____

_____

_____

Phone: _____

Email: _____

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Schedule A—Current Projects

Name of Organization					
Project Owner			Project		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent		Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent		Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent		Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					

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Designer					
Construction Manager					

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Schedule B—Previous Experience with Similar Projects

Name of Organization					
Project Owner			Project		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent		Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent		Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent		Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					

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Designer					
Construction Manager					

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Schedule B—Previous Experience with Similar Projects

Name of Organization					
Project Owner			Project		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent		Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent		Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent		Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					

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Designer					
Construction Manager					

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Schedule C—Key Individuals

Project Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	
Project Superintendent			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date

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Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

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Safety Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	
Quality Control Manager			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date

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Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

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APPENDIX I
EJCDC FORM C-510:
NOTICE OF AWARD

NOTICE OF AWARD

Date of Issuance:

Owner: Owner's Project No.:

Engineer: Engineer's Project No.:

Project:

Contract Name:

Bidder:

Bidder's Address:

You are notified that Owner has accepted your Bid dated **[date]** for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

[Describe Work, alternates, or sections of Work awarded]

The Contract Price of the awarded Contract is $**[Contract Price]**. Contract Price is subject to adjustment based on the provisions of the Contract, including but not limited to those governing changes, Unit Price Work, and Work performed on a cost-plus-fee basis, as applicable.

[Number of copies sent] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically.

☐ Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner **[number of copies sent]** counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any): **[Describe other conditions that require Successful Bidder's compliance]**

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within 10 days after you comply with the above conditions, Owner will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: **[Full formal name of Owner]**

By *(signature)*: _____

Name *(printed)*: _____

Title: _____

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APPENDIX J
EJCDC FORM C-550:
NOTICE TO PROCEED

NOTICE TO PROCEED

Owner: _____ Owner's Project No.: _____

Engineer: _____ Engineer's Project No.: _____

Contractor: _____ Contractor's Project No.: _____

Project: _____

Contract Name: _____

Effective Date of Contract: _____

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on **[date Contract Times are to start]** pursuant to Paragraph 4.01 of the General Conditions.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work will be done at the Site prior to such date.

In accordance with the Agreement: **[Select one of the following two alternatives, insert dates or number of days, and delete the other alternative.]**

The date by which Substantial Completion must be achieved is **[date for Substantial Completion, from Agreement]**, and the date by which readiness for final payment must be achieved is **[date for readiness, from Agreement]**.

[or]

The number of days to achieve Substantial Completion is **[number of days, from Agreement]** from the date stated above for the commencement of the Contract Times, resulting in a date for Substantial Completion of **[date, calculated from commencement date above]**; and the number of days to achieve readiness for final payment is **[number of days, from Agreement]** from the commencement date of the Contract Times, resulting in a date for readiness for final payment of **[date, calculated from commencement date above]**.

Before starting any Work at the Site, Contractor must comply with the following:

[Note any access limitations, security procedures, or other restrictions]

Owner: **[Full formal name of Owner]**

By *(signature)*: _____

Name *(printed)*: _____

Title: _____

Date Issued: _____

Copy: Engineer

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APPENDIX K
EJCDC FORM C-610:
PERFORMANCE BOND

PERFORMANCE BOND

Contractor	**Surety**
Name: **[Full formal name of Contractor]**	Name: **[Full formal name of Surety]**
Address *(principal place of business)*: **[Address of Contractor's principal place of business]**	Address *(principal place of business)*: **[Address of Surety's principal place of business]**
Owner	**Contract**
Name: **[Full formal name of Owner]**	Description *(name and location)*: **[Owner's project/contract name, and location of the project]**
Mailing address *(principal place of business)*: **[Address of Owner's principal place of business]**	Contract Price: **[Amount from Contract]**
	Effective Date of Contract: **[Date from Contract]**

Bond

Bond Amount: **[Amount]**

Date of Bond: **[Date]**

(Date of Bond cannot be earlier than Effective Date of Contract)

Modifications to this Bond form:

☐ None ☐ See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

Contractor as Principal	Surety
_____ *(Full formal name of Contractor)*	_____ *(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)*	By: _____ *(Signature)(Attach Power of Attorney)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____
Attest: _____ *(Signature)*	Attest: _____ *(Signature)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.

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1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:

   3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;

   3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

   3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

   5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

   5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

   5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

   5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances

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5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

   7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

   7.2. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

   7.3. liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

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

11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.

12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears

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

14. Definitions

    14.1. *Balance of the Contract Price*—The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

    14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

    14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

    14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

    14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

16. Modifications to this Bond are as follows: **None**

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APPENDIX L
EJCDC FORM C-615:
PAYMENT BOND

PAYMENT BOND

Contractor	**Surety**
Name: **[Full formal name of Contractor]** Address *(principal place of business)*: **[Address of Contractor's principal place of business]**	Name: **[Full formal name of Surety]** Address *(principal place of business)*: **[Address of Surety's principal place of business]**
Owner	**Contract**
Name: **[Full formal name of Owner]** Mailing address *(principal place of business)*: **[Address of Owner's principal place of business]**	Description *(name and location)*: **[Owner's project/contract name, and location of the project]** Contract Price: **[Amount, from Contract]** Effective Date of Contract: **[Date, from Contract]**

Bond

Bond Amount: **[Amount]**

Date of Bond: **[Date]**

(Date of Bond cannot be earlier than Effective Date of Contract)

Modifications to this Bond form:

☐ None ☐ See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

Contractor as Principal	Surety
_____ *(Full formal name of Contractor)*	_____ *(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)*	By: _____ *(Signature)(Attach Power of Attorney)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____
Attest: _____ *(Signature)*	Attest: _____ *(Signature)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.

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

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond will arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond will arise after the following:

    5.1. Claimants who do not have a direct contract with the Contractor

        5.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

        5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).

    5.2. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

    7.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

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

    7.3. The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant

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8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Owner to the Contractor under the Construction Contract will be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfying obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

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

12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit will be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.

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

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. Definitions

    16.1. *Claim*—A written statement by the Claimant including at a minimum:

        16.1.1. The name of the Claimant;

        16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;

        16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;

        16.1.4. A brief description of the labor, materials, or equipment furnished;

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16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;

16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;

16.1.7. The total amount of previous payments received by the Claimant; and

16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

18. Modifications to this Bond are as follows: **None**

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APPENDIX M

EJCDC FORM C-620:

CONTRACTOR PAYMENT APPLICATION

Contractor's Application For Payment No. _____

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer)
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

APPLICATION FOR PAYMENT

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE	$	
2. Net change by Change Orders	$	
3. CURRENT CONTRACT PRICE (Line 1 □ 2)	$	
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)	$	
5. RETAINAGE:		
a. _____ % x $_____ Work Completed	$	
b. _____ % x $_____ Stored Material	$	
c. Total Retainage (Line 5a + Line 5b)	$	
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)	$	
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	$	
8. AMOUNT DUE THIS APPLICATION	$	
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above)	$	

CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies that: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of 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 (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

By:	Date:

Payment of: $_____
(Line 8 or other - attach explanation of other amount)

is recommended by: _____ _____
(Engineer) (Date)

Payment of: $_____
(Line 8 or other - attach explanation of other amount)

is approved by: _____ _____

Approved by: _____ _____
Funding Agency (if applicable) (Date)

Prepared by the Engineers' Joint Contract Documents Committee and endorsed by the Associated General Contractors of America and the Construction Specifications Institute.

Progress Estimate

Contractor's Application

For (contract):							Application Number:	
Application Period:							Application Date:	
A		B	Work Completed		E	F		G
Item			C	D		Total Completed and Stored to Date (C + D + E)	% (E) B	Balance to Finish (B - F)
Specification Section No.	Description	Scheduled Value	From Previous Application (C + D)	This Period	Materials Presently Stored (not in C or D)			
	Totals							

Prepared by the Engineers' Joint Contract Documents Committee and endorsed by the Associated General Contractors of America and the Construction Specifications Institute.

Progress Estimate

Contractor's Application

For (contract):	Application Number:
Application Period:	Application Date:

A				B	C	D	E	F		G
Item		Bid Quantity	Unit Price	Bid Value	Estimated Quantity Installed	Value	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F) B	Balance to Finish (B - F)
Bid Item No.	Description									
	Totals									

Prepared by the Engineers' Joint Contract Documents Committee and endorsed by the Associated General Contractors of America and the Construction Specifications Institute.

Stored Material Summary

Contractor's Application

For (contract):					Application Number:				
Application Period:					Application Date:				
A	B	C	D		E		F		G
Invoice No.	Shop Drawing Transmittal No.	Materials Description	Stored Previously		Stored this Month		Incorporated in Work		Materials Remaining in Storage ($) (D + E - F)
			Date (Month/Year)	Amount ($)	Amount ($)	Subtotal	Date (Month/Year)	Amount ($)	
		Totals							

Prepared by the Engineers' Joint Contract Documents Committee and endorsed by the Associated General Contractors of America and the Construction Specifications Institute.

APPENDIX N
EJCDC FORM C-625:
CERTIFICATE OF SUBSTANTIAL COMPLETION

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner: Owner's Project No.:
Engineer: Engineer's Project No.:
Contractor: Contractor's Project No.:
Project:
Contract Name:

This ☐ Preliminary ☐ Final Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

[Describe the portion of the work for which Certificate of Substantial Completion is issued]

Date of Substantial Completion: **[Enter date, as determined by Engineer]**

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work must be as provided in the Contract, except as amended as follows:

Amendments to Owner's Responsibilities: ☐ None ☐ As follows:

[List amendments to Owner's Responsibilities]

Amendments to Contractor's Responsibilities: ☐ None ☐ As follows:

[List amendments to Contractor's Responsibilities]

The following documents are attached to and made a part of this Certificate:

[List attachments such as punch list; other 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.

Engineer

By *(signature)*: _____

Name *(printed)*: _____

Title: _____

ELLISVILLE – FDOT WASTEWATER INTERCONNECT

COLUMBIA COUNTY, FLORIDA

PROJECT MANUAL VOLUME 2 OF 2 (TECHNICAL SPECIFICATIONS)

Ricky L. Hendrix, PE
FL License No. 45239
Date:_____

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SECTION 032000 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Reinforcing bars.
2. Reinforcement accessories.

B. Related Requirements:

1. Section 033000 - Cast-in-Place Concrete: Cast-in-place or in-situ concrete for structural building frame, slabs on grade, and other concrete components associated with building.

1.2 REFERENCE STANDARDS

A. American Concrete Institute:

1. ACI 301 - Specifications for Structural Concrete.
2. ACI 318 - Building Code Requirements for Structural Concrete.

1.3 COORDINATION

A. Section 013000 - Administrative Requirements.

B. Coordinate Work of this Section with placement of formwork, formed openings, and other Work.

1.4 PREINSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements.

1.5 SUBMITTALS

A. Section 013300 - Submittal Procedures.

B. Shop Drawings:

1. Indicate bar sizes, spacings, locations, splice locations, and quantities of reinforcing steel.
2. Indicate bending schedules.
3. Indicate materials used for supporting and spacing devices.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

A. Perform Work according to ACI 301 and ACI 318.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements.

B. Protection:

1. Protect materials from moisture by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.8 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel:

1. Comply with ASTM A615 (A615M).
2. Yield Strength: 60ksi
3. Billet Bars: Deformed.
4. Finish: Uncoated.

2.2 FABRICATION

A. Fabricate concrete reinforcement according to ACI 318.

B. Splicing:

1. If not indicated on Drawings, locate reinforcement splices at point of minimum stress.

2.3 ACCESSORY MATERIALS

A. Special Chairs, Bolsters, Bar Supports, and Spacers Adjacent to Weather-Exposed Concrete Surfaces:

1. Material: Plastic-coated or Stainless steel.
2. Size and Shape: To meet Project conditions.

2.4 SOURCE QUALITY CONTROL

A. Section 014000 - Quality Requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Place, support, and secure reinforcement against displacement.

B. Do not weld crossing reinforcement bars for assembly, except as permitted by ENGINEER.

C. Accommodate placement of formed openings.

D. Maintain minimum concrete cover around reinforcement according to ACI 318as follows:

1. Footings and Concrete Formed against Earth: 3 inches
2. Concrete Exposed to Earth or Weather: 2 inches

E. Splice reinforcing48 bar diameters, unless detailed otherwise on Drawings.

3.2 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements.

B. Section 017000 - Execution and Closeout Requirements.

C. Reinforcement Inspection:

1. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.

END OF SECTION 032000

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Related Requirements:

1. Section 032000 - Concrete Reinforcing: Requirements for reinforcing steel and supports.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Section 012000 - Price and Payment Procedures.

1.3 REFERENCE STANDARDS

A. American Concrete Institute:

1. ACI 301 - Specifications for Structural Concrete.
2. ACI 305R - Guide to Hot Weather Concreting.
3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
4. ACI 308.1 - Specification for Curing Concrete.
5. ACI 318 - Building Code Requirements for Structural Concrete.

B. ASTM International:

1. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
2. ASTM C33 - Standard Specification for Concrete Aggregates.
3. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
4. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
5. ASTM C143 - Standard Test Method for Slump of Hydraulic-Cement Concrete.

1.4 COORDINATION

A. Section 013000 - Administrative Requirements.

1.5 SUBMITTALS

A. Section 013300 - Submittal Procedures.

B. Product Data: Submit data on admixtures.

C. Design Data:

1. Submit concrete mix design for each concrete strength.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.6 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements.

B. Project Record Documents: Record actual locations of embedded utilities and components concealed from view in finished construction.

1.7 QUALITY ASSURANCE

A. Perform Work according to ACI 301 and318.

B. Comply with ACI 305R when pouring concrete during hot weather.

C. Comply with ACI 306.1 when pouring concrete during cold weather.

D. Acquire cement and aggregate from one source for Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete:

1. Cement:

a. Comply with ASTM C150.

b. Type: Portland.

2. Normal Weight Aggregates:

a. Comply with ASTM C33.

3. Water:

a. Comply with ACI 318.

B. Admixtures:

1. Air Entrainment: Comply with ASTM C260 (C260M).
2. Chemical:

a. Comply with ASTM C494 (C494M).

3. Fly Ash of Calcined Pozzolan: Comply with ASTM C618, Class C or F.

C. Joint Devices and Filler:

1. Joint Filler, silicone sealant and backer rod.

2.2 CONCRETE MIX

A. Select proportions for concrete according to ACI 318 field test data, unless approved otherwise by ENGINEER.

B. Performance and Design Criteria:

1. Compressive Strength: 4500 psi at 28 days.)
2. Cement Type: ASTM C150 or C595.
3. Aggregate Type: Normal weight.
4. Maximum Water-Cement Ratio: 0.45 by weight
5. Aggregate Size:

    a. Maximum: 3/4 inch.

6. Air Content: 6 percent, plus or minus 1.5 percent.
7. Maximum Fly Ash or Pozzolan Content: 20 percent of cementitious materials by weight.
8. Slump: 4 inches, plus or minus 1 inch.

C. Admixtures:

1. Cold Weather:

    a. Use accelerating admixtures in cold weather.

    b. Use of admixtures will not relax cold-weather placement requirements.

2. Hot Weather: Use set-retarding admixtures.
3. Do not use calcium chloride or admixtures containing calcium chloride.
4. Add air entrainment admixture to concrete mix for Work exposed to freezing and thawing.

D. Ready-Mixed Concrete: Mix and deliver concrete according to ASTM C94.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements.

B. Verify requirements for concrete cover over reinforcement.

C. Verify that anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements.

B. Remove water from areas receiving concrete before concrete is placed.

3.3 INSTALLATION

A. Placing Concrete:

1. Place concrete according to ACI 301 and318.
2. Notify testing laboratory minimum 24 hours prior to commencement of operations.
3. Ensure that reinforcement, inserts, and embedded parts are not disturbed during concrete placement.
4. Deposit concrete at final position, preventing segregation of mix.

5. Consolidate concrete.
6. Maintain records of concrete placement, including date, location, quantity, air temperature, and test samples taken.

B. Concrete Finishing:

1. Finish shall be slip-resistant and not prone to delamination.

C. Curing and Protection:

1. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
2. Cure exposed surfaces according to ACI 301 and ACI 318.

3.4 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements.

B. Section 017000 - Execution and Closeout Requirements.

C. Perform inspection and testing according to ACI 318 (318M).

D. Provide unrestricted access to Work and cooperate with appointed testing and inspection firm.

E. Submit proposed mix design to inspection and testing firm for review prior to commencement of Work.

F. Concrete Inspections:

1. Pre-Pour Inspection: Inspect for placement of steel reinforcing in accordance with the Drawings.
2. Continuous Placement Inspection: Inspect for proper installation procedures.
3. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.

G. Strength Test Samples:

1. Sampling Procedures: Comply with ASTM C172 (C172M).
2. Cylinder Molding and Curing Procedures:

a. Comply with ASTM C31 (C31M).

b. Cylinder Specimens: [Standard] [Field] cured.

3. Sample concrete and make one set of three cylinders for each class of concrete placed each day.
4. Make one additional cylinder during cold weather concreting and field cure.

H. Field Testing:

1. Slump Test Method: Comply with ASTM C143 (C143M).
2. Air Content Test Method: Comply with ASTM [C173 (C173M)] [C231 (C231M)].
3. Temperature Test Method: Comply with ASTM C1064 (C1064M).
4. Compressive Strength Concrete:

a. Measure slump and temperature for each sample.

b. Measure air content in air-entrained concrete for each sample.

I. Cylinder Compressive Strength Testing:

1. Test Method: Comply with ASTM C39 (C39M).
2. Test Acceptance: According to ACI 318..
3. Test one cylinder 7days.
4. Test two cylinders] at 28 days.

J. Patching:

1. Honeycombing or Embedded Debris in Concrete:

a. Not acceptable.

b. Notify ENGINEER upon discovery.

K. Defective Concrete:

1. Description: Concrete not conforming to required lines, details, dimensions, tolerances, or specified requirements.
2. Repair or replacement of defective concrete will be determined by ENGINEER.
3. Do not patch, fill, touch up, repair, or replace exposed concrete except upon express direction of ENGINEER for each individual area.

END OF SECTION 033000

SECTION 099000 - PAINTING AND COATING

PART 1 - GENERAL

1.1 GENERAL INTENT

A. The intent of these Specifications is to provide the material and workmanship necessary to produce complete protection of the surfaces to be coated for Columbia County. This includes all surface preparation, pre-treatment, coating application, touch-up of factory coated surfaces, protection of surfaces not to be coated, clean-up, and appurtenant work, all in accordance with the requirements of the Contract Documents. Throughout this specification “ENGINEER” refers to North Florida Professional Services or Contract Manager. And “OWNER” refers to Columbia County .

B. Related Sections:
   1. Section 331419 - Valves and Hydrants for Water Utility Service.
   2. Section 333123 - Sanitary Sewerage Force Main Piping.
   3. Section 333213 - Packaged Wastewater Pumping Stations.

1.2 PURPOSE

A. The purpose of this Specification is to generally outline the work contemplated for the painting and protective coating work performed for the Columbia County, including Capital Improvement Projects as defined under Scope below; together with the General Conditions, Special Provisions and all other Technical Specifications included herewith. All paints and materials used on interior tank or treatment unit surfaces shall conform to AWWA and/or Florida Department of Environmental Protection (FDEP) regulations as they may apply to potable water or wastewater service. The manufacturer furnishing the coating material may be required to furnish certification to the ENGINEER/OWNER that the materials meet these provisions.

1.3 DESCRIPTION

A. The extent of painting work is shown on Project Drawings, contracts and schedules, and as specified herein.

B. The work includes painting and finishing of interior and exterior exposed items and surfaces throughout the project, except as otherwise specified or shown on Project Drawings.

   1. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of the work.

C. The work includes field painting of exposed bare and covered pipes and ducts including color coding, and of hangers, exposed steel and iron work, tanks, vessels, and primed metal surfaces of equipment installed under the mechanical and electrical work, except as otherwise indicated.

D. Paint all exposed surfaces normally painted in the execution of a building project whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, or are not specifically excluded from the painting work, paint these the same as adjacent similar materials or areas. If color or finish is not designated, the OWNER will select these from standard colors available for the materials systems specified.

1.4 PAINTING NOT INCLUDED

A. The following categories of work are not included as part of the field-applied finish work, unless otherwise noted on Project Drawings or in the Contract Documents.

1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under the various sections for structural steel, miscellaneous metal, metal fabrications, hollow metal work, and similar items. Also, for fabricated components such as shop-fabricated or factory-built mechanical and electrical equipment or accessories.
2. Pre-Finished Items: Unless otherwise shown or specified, do not include painting when factory-finishing or installer finishing is specified for such items as, but not limited to, finished electrical equipment including light fixtures, switchgear and distribution cabinets.
3. Concealed Surfaces: Unless otherwise shown or specified, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas. Painting of galvanized work that will be concealed in the completed work is not required. Do not paint structural steel to be encased in concrete, nor structural steel specified not to be painted under Division S. Except for touch-up as specified in Part 3, painting of shop primed structural steel and ferrous metals that will be concealed in the completed work is not required.
4. Finished Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plating, copper, bronze and similar finished materials will not require finish painting, unless otherwise specified.
5. Operating and Machined Parts and Labels: Moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, machined surfaces, grease fittings, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting unless otherwise specified.

    a. Do not paint over any code-requiring labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

6. Other Surfaces: Do not apply to glass, manhole frames and covers, concrete wearing surfaces, or other walking surfaces unless otherwise specified.

1.5 CODES, STANDARDS AND REGULATIONS

A. The work herein specified shall be performed in a legally acceptable manner, and it shall be the responsibility of the CONTRACTOR to obtain any and all licenses, permits, and legal approvals required to perform the work specified.

B. All material and work covered by this specification shall comply with all currently approved or accepted provisions of applicable codes and standards published by the following organizations:

ANSI	American National Standards Institute 25 West 43rd Street New York, NY 10036 212-642-4900
API	American Petroleum Institute 1220 L Street NW Washington, DC 20005 202-682-8000

ASTM	American Society for Testing and Materials 100 Barr Harbor Drive West Conshohocken, PA 9428 610-832-9500
AWS	American Welding Society 550 NW LeJeune Road Miami, FL 33126 305-443-9353
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235 303-794-7711
FM	Factory Mutual Research 1151 Boston-Providence Turnpike Norwood, MA 02062 617-762-4300
NACE	National Association of Corrosion Engineers P.O. Box 218340 Houston, TX 77218 1440 South Creek Drive Houston, TX. 77084-4906 713-492-0535
NEMA	National Electrical Manufacturer's Association 2101 L Street NW, Suite. 300 Washington, DC 20037 202-457-8400
NFPA	National Fire Protection Association 1 Battery March Park Quincy, MA 02269-9101 617-770-3000
OSHA	Occupational Safety and Health Act U.S. Department of Labor Occupational Safety & Health Administration 8040 Peters Road, Building H-100 Fort Lauderdale, FL 33324 954-424-0242
SAE	Society of Automotive Engineers 400 Commonwealth Drive Warrendale PA 15096-0001 412-776-4841
SSPC	Steel Structures Painting Council 40 24th Street Pittsburgh, PA 15222 412-281-2331
SSPWC	Standard Specifications for Public Works

Construction	Building News, Inc. 3055 Overland Avenue Los Angeles, CA 90034 310-202-7775
UBC	Uniform Building Code Published by ICBO
UL	Underwriter's Laboratories, Inc. 333 Pfingsten Road Northbrook, IL 67062 312-273-4255

C. The CONTRACTOR shall comply with all applicable Federal, state, and local laws and ordinances.

1.6 ACCEPTABLE COATING MANUFACTURERS

A. Except as otherwise indicated herein, materials specified are from the catalog of the Kop-Coat, Inc. listed below. Materials by other manufacturers approved by the Engineer are acceptable provided that they are established to the satisfaction of the ENGINEER as being compatible with and of equal quality to the coatings of the company listed. The CONTRACTOR shall provide satisfactory documentation from the firm manufacturing the proposed material that the material meets the specified requirements and is equivalent or better than the listed materials in the following properties:

1. Quality
2. Durability
3. Resistance to abrasion and physical damage
4. Life expectancy
5. Ability to recoat in future
6. Solids content by volume
7. Dry film thickness per coat
8. Compatibility with other coatings
9. Suitability for the intended service
10. Resistance to chemical attack
11. Temperature limitations in service and during application
12. Type and quality of recommended undercoats and topcoats
13. Ease of application
14. Ease of repairing damaged areas
15. Stability of colors

B. The cost of all testing and analyzing of the proposed substitute materials that may be required by the ENGINEER, shall be paid by the CONTRACTOR. If the proposed substitution requires changes in the contract work, the CONTRACTOR shall bear all such costs involved and the costs of allied trades affected by the substitution. These substitutions for other manufacturers must be made and approved prior to the bid date opening.

C. Material Sources: Kop-Coat Inc. is the standard of quality for the industrial coating materials specified in this Section. Where paint numbers are listed, it is to show the type and quality of

coatings that are required. For convenience of reference, this specification includes product designations for coatings and coating colors as manufactured by the Kop-Coat Inc., St. Louis, MO. 800-547-2468. Other acceptable manufacturers are, Keeler and Long, Watertown, CT. 203-274-6701, and Tnemec Co., Kansas City, MO. 816-483-3400, and Porter International, Louisville, Ky. 502- 588-9769. Proposed substitute materials must be shown to satisfy the material descriptions and to equal or exceed the properties of the listed materials as required above in Paragraph 1-06 A.

1.7 SUBMITTALS

A. Section 013300 - Submittal Procedures.

B. Coating Materials List: The CONTRACTOR shall provide six (6) copies of a coating materials list which indicates the manufacturer and the coating number, keyed to the coating schedule herein, for approval of the ENGINEER. The submittals shall be made sufficiently in advance of the coating operations to allow ample time for checking, correcting, resubmitting and rechecking.

C. Paint Manufacturer’s Information: For each paint system to be used, the CONTRACTOR shall submit the following listed data prior to beginning painting operations.

1. Paint manufacturer’s data sheet for each product used.
2. Paint manufacturer’s instructions and recommendations on surface preparation and application.
3. Colors available for each product (where applicable).
4. Compatibility of shop and field applied coatings (where applicable).
5. Material safety data sheet for each product used.

D. Samples and Manufacturer’s Certificate: Provide all submittals, including the following, as specified in Division 1.

1. Submit manufacturer’s standard color chart for color selection.
2. Submit specimens, approximately 8 by 10 inches in size, for custom mixed colors for approval, not including color coding colors.
3. Where equipment is customarily shipped with a standard finish, submit samples of the proposed color and finish for approval prior to shipping.
4. Furnish affidavits from the manufacturer certifying that materials furnished conform to the requirements specified and that paint products have been checked for compatibility.
5. Submit a supplementary schedule of paint products with mil thickness, and solids by volume, including all paint applied in the shop and in the field. Provide a schedule that is in accordance with the recommendations of the paint manufacturer.
6. Furnish affidavits from the manufacturer certifying that coatings in immersion service contain no water-soluble solvents or corrosion inhibitive (active) pigments with slight water solubility.

1.8 DELIVERY AND STORAGE

A. Deliver all coating materials to the job site in original, new and unbroken, sealed packages and containers bearing manufacturer's name and label, and the following information, all of which shall be plainly legible at the time of use:

1. Name or title of material.

2. Fed. Spec. number, if applicable.
3. Manufacturer's stock number and date of manufacturer.
4. Manufacturer's formula or specification number.
5. Manufacturer's batch number.
6. Manufacturer's name.
7. Contents by volume, for major pigment and vehicle constituents.
8. Thinning instructions.
9. Application instructions.
10. Color name and number.
11. Expiration date.

B. Store paint materials and painting tools and equipment, including solvents and cleaning materials, in a well-ventilated, dry area and away from high heat. Do not store in building or structure being painted, nor leave overnight therein. Follow manufacturer's recommendations for the safe storage of paints and solvents. CONTRACTOR shall store materials in compliance with all local, state, and federal regulations.

1.9 QUALITY ASSURANCE

A. Inspection by the ENGINEER, or the waiver of inspection of any particular portion of the work, shall not relieve the CONTRACTOR of his responsibility to perform the work in accordance with these Specifications.

B. Inspection Devices: The CONTRACTOR shall furnish, until final acceptance of the work, inspection devices in good working condition for the detection of holidays, measurement of surface profile, and measurement of dry film thicknesses of the protective coatings. Surface preparation comparison visual standards, profile and dry film thickness devices shall be made available for the ENGINEER's use at all times while coating is being done. The CONTRACTOR shall provide the services of a trained operator of the holiday detection devices until the final acceptance of such coatings. Holiday detection devices shall be operated only in the presence of the ENGINEER.

C. Surface Cleanliness: Preparation of metallic surfaces shall be based upon comparison with SSPC-VIS 1 (ASTM D2200), and as described herein. The CONTRACTOR shall furnish the photographic standards. To facilitate inspection, the CONTRACTOR shall, on the first day of abrasive blasting operations, abrasive blast metal panels to the standards specified. Plates shall measure a minimum of 8.5 inches by 11 inches. Panels meeting the requirements of the Specifications shall be initiated by the CONTRACTOR and the OWNER's representative and coated with a clear non-yellowing finish. One of these panels shall be prepared for each type of abrasive blasting and shall be used as a comparison standard throughout the project. The CONTRACTOR shall provide SSPC-VIS 1 Surface Preparation Standards for use during the abrasive blasting operations.

D. Surface Profile: The blast abrasive shall be suitable to achieve the blast profile as required for the coating system used. The CONTRACTOR shall furnish for the ENGINEER's use, a Keane-Tator Surface Comparator No. 372 or approved equal.

E. Film Thickness Testing: On ferrous metals, the dry film coating thickness shall be measured in accordance with the SSPC "Paint Application Specification No. 2" (SSPC-PA2), using a magnetic-type dry film thickness gauge such as Mikrotest Model FM, Elcometer Model 111/1EZ, Positector 2000 or approved equal. Each coat shall be tested for the correct thickness. No

measurements shall be made until at least eight (8) hours after application of the coating. On non-ferrous metals and other substrates, the coating thicknesses shall be measured at the time of application using a wet film gauge.

F. Holiday Testing: The CONTRACTOR shall holiday test all coated ferrous surfaces inside a steel reservoir, or other surfaces which will be submerged in water or other liquids, or surfaces which are enclosed in a vapor space in such structures. Areas which contain holidays shall be marked and repaired or recoated in accordance with the coating manufacturer's printed instructions and then retested.

1. Coatings With Thickness Exceeding 20 Mils: For surfaces having a total dry film coating thickness exceeding 20 mils: Pulse-type holiday detector such as Tinker & Rasor Model AP-W, D.E. Stearns Co. Model 14/20, or approved equal shall be used. The unit shall be adjusted to operate at the voltage required to cause a spark jump across an air gap equal to twice the specified coating thickness.
2. Coatings With Thickness of 20 Mils or Less: For surfaces having a total dry film coating thickness of 20 mils or less: Tinker & Rasor Model M-1 non-destructive type holiday detector, K-D Bird Dog or approved equal shall be used. The unit shall operate at less than 75-volts. For thicknesses between 10 and 20 mils, a non-sudsing type wetting agent, such as Kodak Photo-Flo, or equal shall be added to the water prior to wetting the detector sponge.

1.10 MANUFACTURER'S REPRESENTATIVE

A. The CONTRACTOR shall require the protective coating manufacturer to furnish a qualified technical representative to visit the project site for technical support and as may be necessary to resolve field problems attributable or associated with the manufacturer's products furnished under this contract or the application thereof.

1.11 SAFETY AND HEALTH REQUIREMENTS

A. General: The CONTRACTOR shall provide and require use of personal protective and safety equipment for persons working in or about the project site, in accordance with requirements of OSHA Safety and Health Standards for Construction (29CFR 1910, 1915, and 1926) its revisions, and all other applicable regulations. The CONTRACTOR shall also comply with the coating manufacturer's printed instructions, appropriate technical bulletins, manuals, and material safety data sheets in the handling of potentially hazardous or harmful materials.

B. Head and Face Protection and Respiratory Devices: The CONTRACTOR shall require all persons to wear protective helmets while in the vicinity of the work. In addition, workers engaged in or near the work during sandblasting shall wear eye and face protection devices and air purifying, half-mask or mouthpiece respirators with appropriate filters. Barrier creams shall be used on any exposed areas of skin.

C. Ventilation: Where ventilation is used to control hazardous exposure, all equipment shall be explosion proof. Forced air ventilation shall be provided to reduce the concentration of air contaminants to the degree such that a hazard does not exist and to assist in the proper curing of coatings applied in a confined area. Air circulation and exhausting of solvent vapors shall be continued until coatings have fully cured.

D. Sound Levels: Whenever the occupational noise exposure exceeds maximum allowable sound levels permitted under OSHA regulations, the CONTRACTOR shall provide and require the use of approved hearing protection devices.

E. Illumination: Adequate illumination shall be provided while work is in progress, including explosion-proof lights and electrical equipment. Whenever required by the ENGINEER, the CONTRACTOR shall provide additional illumination to cover all areas to be inspected. The level of illumination for inspection purposes shall be determined by the ENGINEER.

F. Temporary Access: All temporary ladders and scaffolding shall conform to applicable safety requirements. Scaffolding shall be erected where requested by the ENGINEER to facilitate inspection and shall be moved by the CONTRACTOR to locations as requested by the ENGINEER.

G. Cloths and cotton waste that might constitute a fire hazard shall be placed in fire resistant closed metal containers until removed from the project site or destroyed at the end of each workday.

1.12 WARRANTY

A. All work covered under the Contract shall be guaranteed against defective workmanship and materials for a period of one (1) year after completion and acceptance of the work. A first anniversary inspection will be scheduled by the CONTRACTOR during the eleventh (11th) month following acceptance of the work. A report shall be furnished to the OWNER describing the condition of the paint system and other work covered under the Contract. Tank draining shall be coordinated with the OWNER. Any latent defects found during this inspection shall be promptly repaired by the CONTRACTOR at no additional cost to the OWNER. Any location where coats of paint have peeled off, bubbled or cracked, and any location where rusting is evident, shall be considered a failure of the paint system. The CONTRACTOR shall make repairs at all points where failures are observed by removing the deteriorated coating, cleaning the surfaces and recoating with the same paint system. Any such repair work shall be completed by the CONTRACTOR within thirty (30) days after written notice of such defects unless otherwise negotiated.

B. Failure on the part of the CONTRACTOR to schedule this warranty inspection will not relieve him of warranty responsibility and any defects found by the OWNER after the normal warranty period will be assumed to have occurred during the one (1) year while the warranty was in effect.

PART 2 - PRODUCTS AND COATING SYSTEMS

2.1 GENERAL

A. Definitions: The term "paint", "coatings", or "finishes" as used herein, shall include surface treatments, emulsions, enamels, paints, epoxy resins, and all other protective coatings, excepting galvanizing or anodizing, whether used as a pre-treatment, primer, intermediate coat, or finish coat. The term "DFT" means minimum dry film thickness.

B. Compatibility: In any coating system, only compatible materials from a single manufacturer shall be used in the work. Particular attention shall be directed to compatibility of primers and finish coats. If necessary, subject to the approval of the ENGINEER, a barrier coat shall be applied between all existing prime coats and subsequent field coats to insure compatibility.

2.2 COLORS AND FINISHES

A. All colors and shades of colors for all coats of paint shall be as selected or specified. Paint colors, surface treatment, gloss, and finishes, are indicated or specified in the "schedules" of the contract documents. Color and gloss not indicated or specified will be selected by the OWNER.

B. Each coat shall be of a slightly different shade, as directed by the ENGINEER, to facilitate inspection of surface coverage of each coat. Finish colors shall be as selected from the manufacturer's standard color samples or shall be customer mixed to match color samples furnished by the ENGINEER. Final acceptance of colors will be from samples applied on the job.

C. Color Pigments: Pure, non-fading, applicable types to suit the substrates and service indicated.

D. Paint Coordination: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Furnish information to manufacturers, fabricators, suppliers and others where necessary on the characteristics of the finish materials to be used, to ensure compatible prime coats of use. Provide barrier coats over incompatible primers or remove and re-prime as required.

E. Color Coding: All exposed piping in structures, aboveground or in pipe trenches, shall be color code painted in strict accordance with the color code chart presented in Paragraph 3-15 of this section. All colors shall be as specified or as selected by the OWNER.

2.3 UNDERCOATS AND THINNERS

A. Undercoats: Provide undercoat paint produced by the same manufacturer as the finish coats.

B. Thinners: Use only thinners approved by the paint manufacturer and use only within recommended limits.

2.4 INDUSTRIAL COATING SYSTEMS

A. The CONTRACTOR shall use coating materials suitable for the intended use and recommended by their manufacturer for the intended service.

B. Protective Coating Materials: Products shall be standard coatings produced by recognized manufacturers regularly engaged in production of such materials for application on essentially identical facilities to those proposed in this project. Where requested, the CONTRACTOR shall provide the ENGINEER with the names of not less than ten (10) successful applications of the proposed manufacturer's products, which have been proven over a three (3) year period of time, demonstrating compliance with this specification requirement.

C. System 1 - Alkyd Enamel: High quality gloss or semi-gloss, long oil alkyd finish with a minimum solids content of 57% by volume. Primer as recommended by the manufacturer.

1. Painting New Construction

   a. Prime coat except wood surfaces (DFT=3.0 mils) Kop-Coat 622-LCF Primer.
   b. Prime coat for wood surfaces (DFT = 1.5 mils) Kop-Coat Rustarmor 500 enamel thinned 15% with Kop-Coat 4000 Thinner.
   c. Finish coats, two (Total DFT = 3.0 mils) Kop-Coat Rustarmor 500 Enamel.

d. Total system DFT except wood surfaces = 6.0 mils Total system DFT for wood surfaces = 4.5 mils

2. Repainting Existing Surfaces

a. The cleaned steel is to be hand brushed twice with (DFT = 4.0 mils) Kop- Coat 622-LCF Primer. Completely work the primer into all the irregular surface faces of the steel.
b. Finish coats, two (total DFT = 3.0 mils) Kop-Coat Rustarmor 500 Enamel.
c. Total millage shall be at least 7.0 mils.

D. System 2 - Silicone Alkyd Enamel: High quality gloss alkyd, medium long oil alkyd finish. Minimum solids content of 48% by volume. Prime coat to be as recommended by manufacturer.

1. Painting New Construction

a. Prime coat (DFT = 3.0 mils) Kop-Coat 622-LCF Primer.
b. Finish coats, two (Total DFT = 3.0 mils) Kop-Coat Sub-SiI B
c. Total system DFT = 6.0 mils.

2. Repainting Existing Surfaces

a. The cleaned steel is to be hand brushed twice with (DFT = 4.0 mils) Kop- Coat 622-LCF Primer.
b. Finish coats, two (Total DFT = 3.0 mils) Kop-Coat 1515 Silicone Alkyd.
c. Total millage shall be at least 7.0 mils.

E. System 3 - High Build Epoxy: High build polyamide epoxy coating, resistant to splash, spillage and fumes of dilute acids, bases and salts, and with high resistance to weathering. Coating material shall have a minimum solids content of 56% by volume. Prime coat to be a rust inhibitive epoxy primer as recommended by the manufacturer.

1. Prime coat (DFT = 1.5 mils) Kop-Coat 294 Epoxy Primer.
2. Finish coats, two (Total DFT = 10.0 mils) Kop-Coat Hi-Gard Epoxy Coating.
3. Total system DFT = 11.5 mils.

F. System 4 Acrylic Latex (High Sheen): Single component, water based acrylic latex with a fungicide additive and minimum solids content of 35% by volume. Prime coat to be as recommended by manufacturer.

1. Prime coat (DFT = 2.0 mils) as recommended by manufacturer, if needed.
2. Finish coats, two (Total DFT = 3.0 mils) Kop-Coat 620 Acrylic Emulsion.
3. Total system DFT = 5.0 mils (with prime coat). 3.0 mils (without prime coat).

G. System 5 - Acrylic, Concrete and Masonry (Flat): High molecular weight acrylic coating material with a minimum solids content of 41% by volume. Prime coat shall be an acrylic filler and sealer for concrete surfaces.

1. Painting New Construction

a. Prime coat (filler/sealer) Kop-Coat Concrete and Masonry Filler.

b. Finish coats, two (Total DFT = 3.0 mils) Kop-Coat 600 Interior-Exterior Acrylic Emulsion.
c. Total system DFT = 3.0 mils.

2. Repainting Existing Surfaces

a. Spot prime if needed with Kop-Coat Concrete and Masonry Filler to insure a consistent total finish appearance.
b. Finish coats, two (Total DFT 3.0 mils) Kop-Coat 600 Interior-Exterior
c. Acrylic Emulsion.
d. Total millage shall be at least 3.0 mils.

H. System 6 - Coal Tar Epoxy, Steel: High build, 2-component amine or polyamide cured coal tar epoxy, solids content of at least 74% by volume, suitable for long term immersion in wastewater and for coating of buried surfaces and conforming to or exceeding Corps of Engineers Specification C-200, or SSPC Paint 16. Prime coats are for use as a shop primer only. Prime coat shall be omitted when both surface preparation and coating are to be performed in the field.

1. Prime coat (DFT = 1.5 mils) Kop-Coat 654 Epoxy Primer.
2. Finish coats, two (Total DFT = 20.0 mils) Kop-Coat Bitumastic No. 300-M.

Note: Time between coats is critical and maximum times as stated by the manufacturer must not be exceeded.

3. Total system DFT = 21.5 mils (with prime coat). 20.0 mils (without prime coat).

Notes:

a. Spot sandblast to SSPC-SP1O all areas damaged during erection, or areas not precoated before application of coating.
b. All edges, nuts, bolts, lap joints, weld seams and the roof rim angle shall receive one brush-applied coat prior to the application of the complete spray coat.

I. System 7 - Coal Tar Epoxy, Concrete: High build, 2-component amine or polyamide cured coal tar epoxy, solids content of at least 74% by volume, suitable for long term immersion in wastewater and for coating of buried surfaces and conforming to or exceeding Corps. of Engineers Specification C-200, or SSPC Paint 16. Filler compound shall be a 2-component epoxy material used to fill voids and provide a suitable surface for the application of the coal tar epoxy. Filler is worked into the concrete surface with a wide blade putty knife or a squeegee.

1. First coat - Kop-Coat Bitumastic No. 300-M, thinned 33 percent with Thinner 2000 and apply at the rate of 200-300 sq. ft. per gallon. Allow not more than 24 hours before applying additional coats at the normal, unthinned rate.
2. Finish coats, two (Total DFT = 20.0 mils) Kop-Coat Bitumastic No. 300-M.

Note: Time between coats is critical and maximum times as stated by the manufacturer must not be exceeded.

3. Total system DFT = 20.0 mils.

J. System 8-PoIyamide Cured Epoxy for Steel or Concrete Potable Water Storage Tanks or Treatment Units: High build polyamide cured epoxy coating with solids contents of at least 56% by volume and a finish coat color of white. The material shall be capable of achieving at least 5

mils dry film thickness per coat. The epoxy coating material shall be suitable for long-term immersion service in potable water. The materials used shall appear on the latest published list of approved coatings for use in potable water issued by the Florida Department of Environmental Protection. Submit a written certification that the proposed materials meet the above regulatory agency standards and policies. Apply the material with a primer if recommended by the coating manufacturer. Thinners and additives shall also be in compliance with this paragraph.

1. Steel Tanks or Treatment Units

    a. First coat (DFT=5.0 mils) Kop-Coat Hi-Gard Epoxy. See notes (1), (2) and (3)
    b. Finish coat (DFT = 5.0 mils) Kop-Coat Hi-Gard Epoxy
    c. Total system DFT = 10.0 mils

    Notes:

    d. All sharp edges, weld burrs, weld spatter and surface irregularities shall be ground smooth before applying coating.
    e. Touch-up coating to be done for areas damaged during erection, or areas not pre-coated. Spot sandblast to SSPC-SP1O before application of coating.
    f. All edges, nuts, bolts, lap joints, weld seams and the roof rim angle shall receive one brush-applied coat prior to the application of the complete spray coat.

2. Concrete Tanks or Treatment Units

    a. First coat (DFT = 4.0 mils) Kop-Coat Hi-Gard Epoxy thinned 20% with Kop-Coat 2,000 Thinner.
    b. Finish coat (DFT = 6.0 mils) Kop-Coat Hi-Gard Epoxy.
    c. Total system DFT = 10.0 mils.

3. Curing Period: Prior to immersion, subject the completed system to at least 7 days of curing time with the substrate temperature at a minimum of 70 degrees F, or 10 days at a minimum of 60 degrees F. More curing time or a higher temperature shall be provided if recommended by the manufacturer. If the environmental conditions do not provide the necessary minimum temperature, use heated air to provide the necessary heat for curing. Other combinations of curing time and temperature may be used if the coating manufacturer presents satisfactory documentation and test results to substantiate that the degree of curing is equal or greater than curing for 7 days at 70 degrees F.

K. System 9 - Polyurethane: High gloss, 2 - component aliphatic polyurethane for use on steel, fiberglass and PVC. Coating material shall have a minimum solids content of 56% by volume. Prep surface as recommended by the manufacturer. Product is not recommended for interior building surfaces or continuous immersion.

1. Prime coat (DFT = 3.0 mils) Hi-GARD Epoxy
2. Finish coats, two (total DFT=3.0 mils) Kop-Coat 1122 BRS Linear Polyurethane
3. Total system = 6.0 mils minimum

PART 3 - EXECUTION

3.1 STORAGE, MIXING AND THINNING OF MATERIALS

A. Manufacturer's Recommendations: Unless otherwise specified herein, the coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protecting its coating materials, for preparation of surfaces for coating, and for all other procedures relative to coating shall be strictly observed. No substitutes or other deviations will be permitted without written permission of the ENGINEER. The CONTRACTOR shall supply the ENGINEER with copies of each manufacturer's instructions in accordance with the requirements of Paragraph 1-07, "SUBMITTALS".

B. All protective coating materials shall be used within the manufacturer's recommended shelf life.

C. Storage and mixing of paint or other coating materials shall be performed only in those areas designated by the ENGINEER.

3.2 PREPARATION FOR COATING

A. General: All surfaces to receive protective coatings shall be cleaned as specified herein prior to application of said coatings. The CONTRACTOR shall examine all surfaces to be coated and shall correct all surface defects before application of any coating material. All marred or abraded spots on shop-primed and on factory-finished surfaces shall receive touch-up restoration prior to any coating application. Do not paint over dirt, rust, scale, oil, grease, moisture, scuffed surfaces or other foreign material or in conditions otherwise detrimental to the formation of a durable paint bond and film.

B. Protection of Surfaces Not to be Coated: Surfaces which are not to receive protective coatings shall be protected during surface preparation, cleaning, and coating operations. All hardware, lighting fixtures, switch plates, machined surfaces, couplings, shafts, bearings, nameplates on machinery and other surfaces not to be painted shall be removed, masked or otherwise protected. Drop cloths shall be provided to prevent coating materials from falling on or marring adjacent surfaces. The working parts of all mechanical and electrical equipment shall be protected from damage during surface preparation and coating operations. Openings in motors shall be masked to prevent entry of coating or other materials.

C. Protection of Adjacent Work and Areas: Care shall be exercised not to damage adjacent work during blast cleaning operations. Spray painting shall be conducted under carefully controlled conditions. The CONTRACTOR shall be fully responsible for and shall promptly repair to the satisfaction of the OWNER all damage to adjacent work or adjoining property occurring from blast cleaning or coating operations.

D. Protection of Painted Surfaces: Cleaning and coating shall be so programmed that dust and other contaminants from the cleaning process will not fall on wet, newly coated surfaces.

3.3 SURFACE PREPARATION STANDARDS

A. The following referenced surface preparation specifications of the Steel Structures Painting Council shall form a part of this Specification:

1. Solvent Cleaning (SSPC-SP1): The method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants from steel surfaces through the use of solvent, vapor, emulsion, alkaline, and/or steam.
2. Hand Tool Cleaning (SSPC-SP2): The method for removing all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter through the use of non-power hand tools.
3. Power Tool Cleaning (SSPC-SP3): The method for removing all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter through the use of power assisted hand tools.
4. White Metal Blast Cleaning (SSPC-SPS): The method of preparing steel surfaces which, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, and paint.
5. Commercial Blast Cleaning (SSPC-SP6): The method of preparing steel surfaces which, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, and paint. Evenly dispersed very light shadows, streaks, and discolorations caused by stains of rust, mill scale, and previously applied paint may remain on no more than 33% of the surface.
6. Brush-off Blast Cleaning (SSPC-SP7): The method of preparing steel surfaces which, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface.
7. Near-White Blast Cleaning (SSPC-SP1O): The method of preparing steel surfaces which, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, and paint. Evenly dispersed very light shadows, streaks, and discolorations caused by stains of rust, mill scale, and previously applied paint may remain on no more than 5% of the surface.

3.4 SURFACE PREPARATION

A. General: Perform preparation and cleaning procedures in strict accordance with the paint manufacturer’s instructions and as herein specified, for each particular substrate condition.

1. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for the complete painting of the items and adjacent surfaces. Following completion of painting of each space or area, reinstall the removed items by workmen skilled in the trades involved.
2. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program the cleaning and painting so that contaminants from the cleaning process will not fall onto wet, newly painted surfaces. Remove mildew in accordance with the paint manufacturer’s recommendations.

3.5 NEW FERROUS METAL SURFACE PREPARATION (UNGALVANIZED)

A. The minimum abrasive blasting surface preparation shall be as specified in the coating system schedules included at the end of this section. Where there is a conflict between these Specifications and the coating manufacturer’s printed recommendations for the intended service, the higher degree of cleaning shall apply.

B. Workmanship for metal surface preparation shall be in conformance with the current SSPC Standards and this section. Blast cleaned surfaces shall match the standard samples available from the National Association of Corrosion Engineers (NACE) Standard TM-01-70.

C. All oil, grease, welding fluxes and other surface contaminants shall be removed by alkaline cleaning per SSPC-SP1 prior to blast cleaning.

D. All sharp edges shall be rounded or chamfered and all burrs, surface defects and weld splatter shall be ground smooth prior to blast cleaning.

E. The type and size of abrasive shall be selected to produce a surface profile that meets the coating manufacturer's recommendation for the particular coating and service conditions. CONTRACTOR shall submit data and samples for approval on abrasives to be used on the Project. Abrasives that are used shall be designed for the specific purpose of blast cleaning. Abrasives shall be free of contaminants and chlorides. Ordinary builder’s sand shall not be considered to be approved abrasive material. ENGINEER will periodically sample abrasives used at the job site for comparison with approved submitted materials.

F. The abrasive shall not be reused unless otherwise approved by the ENGINEER. For automated shop blasting systems, clean oil and moisture-free abrasives shall be maintained.

G. The CONTRACTOR shall comply with the applicable federal, state, and local air pollution control regulations for blast cleaning.

H. Compressed air for air blast cleaning shall be supplied at adequate pressure from well-maintained compressors equipped with oil/moisture separators which remove all contaminants.

I. Surfaces shall be cleaned of all dust and residual particles of the cleaning operation by dry air blast cleaning, vacuuming or other approved method prior to painting.

J. Enclosed areas and other areas where dust settling is a problem shall be vacuum cleaned and wiped with a tack cloth.

K. Damaged or defective coating shall be removed by the specified blast cleaning to meet the clean surface requirements before recoating.

L. If the specified abrasive blast cleaning will damage adjacent work, the area to be cleaned is less than 100 square feet, and the coated surface will not be submerged in service, the SSPC-SP2, Hand Tool Cleaning, or SSPC-SP3, Power Tool Cleaning, will be permitted.

M. Shop applied coatings of unknown composition shall be completely removed before the specified coatings are applied. Valves, castings, ductile iron pipe, and fabricated pipe or equipment shall be examined for the presence of shop-applied temporary coatings. Temporary coatings shall be completely removed by Solvent Cleaning per SSPC-SP1 before the abrasive blast cleaning work has been started.

N. Shop primed equipment shall be alkaline cleaned in the field before finish coats are APPLIED

3.6 FERROUS METAL SURFACE PREPARATION (GALVANIZED)

A. All installation and erection caused blemishes to galvanized surfaces shall be touched up in accordance with ASTM A780 prior to coating.

B. Galvanized ferrous metal shall be alkaline cleaned per SSPC-SP1 to remove oil, grease, and other contaminants detrimental to adhesion of the protective coating system to be used.

C. Surfaces shall be pretreated with Kop-Coat 40 Passivator, one coat 0.4 mil DFT, prior to finish coating, in accordance with the printed recommendations of the coating manufacturer.

3.7 SURFACE PREPARATION OF FERROUS SURFACES WITH EXISTING COATINGS, EXCLUDING STEEL TANK OR TREATMENT UNIT INTERIORS (IN ADDITION TO REQUIREMENTS IN PARAGRAPHS 3-05 AND 3-06).

A. General: All grease, oil, heavy chalk, dirt, or other contaminants shall be removed by solvent or detergent cleaning prior to abrasive blast cleaning. The CONTRACTOR shall determine the generic type of the existing coatings by laboratory testing, at no additional cost to the OWNER.

B. Abrasive Blast Cleaning: The CONTRACTOR shall provide the degree of cleaning specified in the coating system schedule for the entire surface to be coated. If the degree of cleaning is not specified in the schedule, deteriorated coatings shall be removed by abrasive blast cleaning to SSPC-SP6, Commercial Blast Cleaning. Areas of tightly adhering coatings shall be cleaned to SSPC-SP7, Brush-Off Blast Cleaning, with the remaining thickness of existing coating not to exceed 3 mils.

C. Incompatible Coatings: If coatings to be applied are not compatible with existing coatings, the CONTRACTOR shall apply intermediate coatings per the paint manufacturer’s recommendation for the specified abrasive blast cleaning. A small trial application shall be conducted for compatibility prior to painting large areas.

D. Unknown Coatings: Coatings of unknown composition shall be completely removed prior to the application of new coatings.

3.8 SURFACE PREPARATION FOR REPAINTING EXISTING STEEL

A. The entire structure is to be completely pressure washed at 3,000 to 5,000 psi with potable water.

B. All areas shall be cleaned/sandblasted to the surface preparation standards as specified herein, or as superseded by the bid form.

C. All cleaned areas are to be primed the same workday that they are cleaned and blasted.

3.9 PRESSURE WASH CLEANING FOR REPAINTING EXISTING CONCRETE

A. The entire structure is to be pressure washed at 3,000 to 5,000 psi with a solution of 50% water and bleach to yield a mixture with a minimum concentration of 2-1/2% sodium hypochlorite.

B. The entire structure is to be completely rinsed by pressure washing at 3,000 to 5,000 psi with potable water.

3.10 CONCRETE AND CONCRETE BLOCK MASONRY SURFACE PREPARATION

A. Surface preparation shall not begin until at least 30 days after the concrete has been placed.

B. All efflorescence, chalk, dust, dirt, oil and grease shall be removed by Detergent Cleaning per SSPC-SP1 before abrasive blast cleaning.

C. Concrete, concrete block masonry surfaces, previously painted concrete and masonry and deteriorated concrete and masonry surfaces to be coated shall be abrasive blast cleaned to remove laitance, paint, deteriorated concrete, and roughen the entire surface equivalent to the surface of the No. 80 grit flint sandpaper. Concrete shall have a consistent, even texture (void free) and shall be patched where needed.

D. Determine the alkalinity and moisture content of the surfaces to be painted by performing appropriate tests. If the surfaces are found to be sufficiently alkaline to cause blistering and burning of the finish paint, correct this condition before application of paint. Do not paint over surfaces where the moisture content exceeds that permitted in the manufacturer's printed directions.

E. If acid etching is required by the coating application instructions, the treatment shall be made after sandblasting. After acid etching, rinse surfaces with clean water to neutralize the acid and test the Ph. The pH shall be between 7.0 and 8.0.

F. Surfaces shall be clean and dry and as recommended by the coating manufacturer before coating is started.

G. Unless required for proper adhesion, surfaces shall be dry prior to coating. The presence of moisture shall be determined with a moisture detection device such as Delmhors Model DB, or approved equal.

3.11 PLASTIC, FIBERGLASS AND NONFERROUS METALS SURFACE PREPARATI ON

A. Plastic and Fiberglass surfaces shall be sanded or Brush Off Blast Cleaned, SSPC-SP7, prior to solvent cleaning with a chemical compatible with the coating system primer. If blast cleaned, use 60-80 mesh abrasive.

B. Non-ferrous metal surfaces shall be Solvent Cleaned, SSPC-SP1, followed by sanding or Brush Off Blast Cleaning, SSPC-SP7.

C. All surfaces shall be clean and dry prior to coating application.

3.12 WOOD SURFACE PREPARATION

A. Clean wood surfaces to be painted of all dust, dirt, grease, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, with either manual or mechanical means, as applicable, and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of the priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sandpaper smooth when dried and dust off.

B. Prime or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood.

3.13 WORKMANSHIP

A. Skilled craftsmen and experienced supervision shall be used on all work.

B. Clean drop cloths shall be used. All damage to surfaces resulting from the work hereunder shall be leaned, repaired, and refinished to the complete satisfaction of the ENGINEER, at no cost to the OWNER.

C. All coatings shall be applied under dry and dust-free conditions. Coating shall be done in a workmanlike manner so as to produce an even film of uniform thickness. Edges, corners, crevices, and joints shall receive special attention to ensure that they have been thoroughly cleaned and that they receive an adequate thickness of coating material. The finished surfaces shall be free from runs, drops, ridges, waves, laps, alligatoring, brush marks, and variations in color, texture, and finish. The hiding shall be so complete that the addition of another coat would not increase the hiding. Special attention shall be given to ensure that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas, and installations shall be protected using drop cloths or other approved precautionary measures.

3.14 SHOP COATING REQUIREMENTS

A. All items of equipment, or parts of equipment which are not submerged in service, shall be shop primed and then finish coated in the field after installation with the specified or approved color. The methods, materials, application, equipment and all other details of shop painting shall comply with these Specifications. If the shop primer requires top- coating within a specified period of time, the equipment shall be finish coated in the shop and then touch-up painted after installation.

B. All items of equipment, or parts and surfaces of equipment which are submerged when in service, with the exception of pumps and valves shall have all surface preparation and coating work performed in the field.

C. The interior surfaces of steel water reservoirs shall have all surface preparation and coating work performed in the field.

D. For certain pieces of equipment, it may be undesirable or impractical to apply finish coatings in the field. Such equipment may include engine generator sets, equipment such as electrical control panels, switchgear or main control boards, submerged parts of the pumps, ferrous metal passages in valves, or other items where it is not possible to obtain the specified quality in the field. Such equipment shall be shop primed and finish coated in the field with the identical material after installation. The CONTRACTOR shall require the manufacturer of each such piece of equipment to certify as part of its shop drawings that the surface preparation is in accordance with these Specifications. The coating material data sheet shall be submitted with the shop drawings for the equipment.

E. For certain small pieces of equipment, the manufacturer may have a standard coating system which is suitable for the intended service conditions. In such cases, the final determination of suitability will be made during review of the shop drawing submittals. Equipment of this type generally includes only indoor equipment such as instruments, small compressors, and chemical metering pumps.

F. Shop painted surfaces shall be protected during shipment and handling by suitable provisions including padding, blocking, and the use of canvas or nylon slings. Primed surfaces shall not be exposed to the weather for more than 6 months before finish coating, or less time if recommended by the coating manufacturer.

G. Damage to shop-applied coatings shall be repaired in accordance with this section and the coating manufacturer's printed instructions prior to finish painting.

H. The CONTRACTOR shall make certain that the shop primers and field topcoats are compatible and meet the requirements of this section. Copies of applicable coating manufacturer’s data sheets shall be submitted with equipment shop drawings.

3.15 APPLICATION OF COATINGS

A. The application of protective coatings to steel substrates shall be in accordance with "Paint Application Specification No. 1", (SSPC-A-1), Steel Structures Painting Council.

B. Cleaned surfaces and all coats shall be inspected prior to each succeeding coat. The CONTRACTOR shall schedule such an inspection with the ENGINEER in advance.

C. Blast cleaned ferrous metal surfaces shall be painted before any rusting or other deterioration of the surface occurs. Blast cleaning shall be limited to only those surfaces that can be painted in the same working day.

D. Coatings shall be prepared, mixed and applied in accordance with the manufacturer’s instructions and recommendations, and these Specifications. If directions differ, the most stringent requirements shall be followed.

E. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.

F. Stir materials before application to produce a mixture of uniform density and stir as required during the application of the materials. Do not stir surface film into the coating materials. Remove the film, and if necessary, strain the material before using.

G. Special attention shall be given to edges, angles, weld seams, flanges, nuts and bolts, and other places where insufficient film thicknesses are likely to be present. Use stripe (brushed or gloved) painting for these areas.

H. Finish coats, including touch-up and damage repair coats shall be applied in a manner which will present a uniform texture and color matched appearance.

I. Job Conditions: The following job conditions will be strictly enforced during the application of coatings for the project.

1. Apply water-base coatings only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 degrees F and 90 degrees F unless otherwise permitted by the paint manufacturer's printed instructions.
2. Apply solvent-thinned coatings only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45 degrees F and 95 degrees F unless otherwise permitted by the paint manufacturer's printed instructions.

3. Do not apply paint in dust or smoke laden atmosphere, high winds, rain, fog or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.
4. Do not apply coatings when the temperature is less than 5 degrees F above the dewpoint. Dewpoint shall be determined by use of a sling psychrometer in conjunction with U.S. Weather Bureau psychometric tables.
5. Do not apply coatings when the outside air temperature is expected to drop below 45 degrees F or less than 5 degrees F above the dewpoint, within 8 hours after application of the coating.
6. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

J. The finish coat on all work shall be applied after all concrete, masonry, and equipment installation is complete and the work areas are clean and dust-free.

K. General Considerations:

1. Apply paint as specified and in accordance with the manufacturer's directions. Use brushes for applying first coat on wood and on metals other than steel and sheet metal and items fabricated from steel and sheet metal. For other coats on wood, metal and other substrates, use applicators and techniques best suited for the type of material being applied.
2. Apply additional coats when undercoats, stains or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. ensure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
3. Paint surfaces behind movable equipment the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment with prime coat only before final installation of equipment.
4. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
5. Paint the back sides of removable or hinged covers to match the exposed surfaces.
6. Finish exterior doors on tops, bottoms and side edges the same as the exterior faces, unless otherwise indicated or specified.
7. Sand lightly between each succeeding enamel coat.
8. Omit the field prime coat on shop-primed surfaces and touch up painted metal surfaces which are not to be finished painted and which will not be exposed to view in the completed work. Do not omit primer on metal surfaces specified to be finish coated or on metal surfaces that will be exposed to view in the completed work.

L. Scheduled Painting:

1. Apply the first coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
2. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

M. Minimum Coating Thickness: Apply each material at not less than the manufacturer's recommended spreading rate, to establish a total dry film thickness as specified or, if not specified, as recommended by coating manufacturer.

N. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to those items exposed in mechanical equipment rooms and in occupied spaces, and on the outside or exterior of buildings or structures:

1. Mechanical items to be painted include, but are not limited to, the following:

a. Piping, valves, pipe hangers, and supports.
b. Pumps
c. Tanks
d. Duct work, insulation
e. Motors, mechanical equipment, and supports
f. Accessory items

2. Electrical items to be painted include, but are not limited to, the following:

a. Conduit and fittings
b. Switchgear

O. Prime Coats: Apply a prime coat to material, equipment and surfaces which are required to be painted or finished, and which have not been prime coated by others. Clean and prime unprimed ferrous metals as soon as possible after delivery of the metals to the job site. Recoat primed and sealed surfaces where there is evidence of suction spots or /unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

P. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks, or other surfaces imperfections.

Q. Pigmented, Opaque Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.

R. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

3.16 CURING OF COATINGS

A. The CONTRACTOR shall provide curing conditions in accordance with the conditions recommended by the coating material manufacturer or by these Specifications, whichever is the more stringent requirement, prior to placing the completed coating system into service.

B. Forced Air Ventilation of Steel Reservoirs and Enclosed Hydraulic Structures: Forced air ventilation is required for the application and curing of coatings on the interior surfaces of steel reservoirs and enclosed hydraulic structures. During curing periods, continuously exhaust air from a manhole in the lowest shell ring or in the case of an enclosed hydraulic structure, from the lowest level of the structure using portable ducting. After all interior coating operations have been completed, provide a final curing period for a minimum of 10 days, during which time the forced

air ventilation system shall operate continuously. For additional requirements, refer to the specific written instructions of the manufacturer for the coating system being applied.

3.17 COLOR CODING

A. All exposed piping shall be color coded. After the finish coat has been applied, label each line with stenciled legends identifying the nature of the pipe contents and the direction of flow. This stenciled identification shall appear in one or more places in the line as deemed necessary by the ENGINEER. Stencil legends shall be white for all pipe except white color-coded pipe, which shall have black legends. Labels shall occur a minimum of every 15 feet of straight piping and at all bends. Minimum stencil size shall be two-inch letters for 4-inch and larger diameter piping and one-inch letters for 2-inch to 3-1/2-inch diameter piping. Piping 1-1/2-inch diameter and smaller shall be identified using plastic wrap-around pipe markers.

B. Items to be coded but not specifically mentioned shall be coated in a color selected by the ENGINEER or OWNER.

C. All paints/coatings used in potable water contact areas must have AWWA and EPA classification and approvals.

D. All requirements of the Occupational Safety and Health Act (OSHA) concerning color coding and safety markings shall be considered part of these Specifications unless specifically excluded.

E. Any paint/coating requirements/specifications not specifically addressed in the foregoing shall be decided upon as required by the ENGINEER.

F. Every valve or connection, where it may be possible for a worker to be exposed to a hazardous substance, shall be labeled per General Industry Safety Orders, Article 112, OSHA Occupational Safety and Health Standards 29CFR1910.

Color Code Chart:

APPLICATION	COLOR
	Orange - Kop-Coat OSHA Safety Orange #J498
Water Lines/Piping	
Raw Settled or Clarified Finished or Potable Reuse Water	Olive Green - Kop-Coat OSHA Safety Green #2383 Aqua - Kop-Coat Marine Green #7333 Dark Blue - Kop-Coat OSHA Safety Blue A#183 Pantone Purple 522C - Kop-Coat OSHA Safety
Chemical Lines/Piping	
Alum or Sodium Aluminate Ammonia Carbon Slurry Chlorine (Gas/Solution) Fluoride Methanol	Orange - Kop-Coat OSHA Safety Orange#J498 White - Kop-Coat #0800 Black - Kop-Coat#C900 Yellow - Kop-Coat OSHA Safety Yellow #625 Light Blue w/Red Band - Kop-Coat Dawn Blue #8155 with 6 " bands of Kop-Coat OSHA Safety Red #0508 Red w/Yellow Band - Kop-Coat OSHA Safety Red #0508 with 6" bands of Kop-Coat OSHA Safety Yellow #S625
Lime Slurry Odophos Sulfuric Acid or Sulfur Dioxide	Light Green — Kop-Coat Eye-Rest Green #2369 Violet — Kop-coat OSHA Safety Purple #S585 Light Green w/Yellow Band, Kop-Coat Eye-Rest Green #2369 with 6" bands of Kop-Coat OSHA Safety Yellow #S625

3.18 COATING SYSTEM SCHEDULES

A. COATING SYSTEM SCHEDULE, FERROUS METAL - NOT GALVANIZED (FM):

Schedule No.	Item	Surface Prep.	System No.
FM-1	All exposed surfaces outdoors, exposed to normal industrial exposure	Commercial Blast Cleaning, SSPC-SP6	Urethane #9
FM-2	All exposed surfaces indoors and outdoors, exposed to moderate and severe industrial exposure	Commercial Blast Cleaning, SSPC-SP6	(2b) Urethane #9
FM-3	Surfaces in Chlorination room, chlorine gas exposure	Commercial Blast Cleaning, SSPC-SP6	(3) High Build Epoxy
FM-4	Surfaces submerged or intermittently submerged in potable water, including all surfaces lower than 2' above high water level and all surfaces inside enclosed hydraulic structures, tanks and treatment units, and all surfaces of valves, couplings and pumps	Near White Metal Blast Cleaning, SSPC- SP10	(3) or (8) High Build Epoxy
FM-5	Surfaces submerged or intermittently submerged in wastewater, including all surfaces lower than 2' above high water level and all surfaces inside enclosed hydraulic structures, tanks and treatment units and all surfaces of valves, couplings and pumps	Near White Metal Blast Cleaning, SSPC- SP10	(6) Coal Tar Epoxy or (3) High Build Epoxy (if color desired)
FM-6	Buried surfaces that are not specified to be coated elsewhere	Near White Metal Blast Cleaning, SSPC- SP10	(6) Coal Tar Epoxy
FM-7	Indoor architectural sheet metal, flashings, door frames, and exposed ducts	Commercial Blast Cleaning, SSPC-SP6	(1) Alkyd Enamel
FM-8	Surfaces of indoor equipment	Commercial Blast Cleaning, SSPC-SP6	(1) Alkyd Enamel

B. COATING SYSTEM SCHEDULE, FERROUS METAL - GALVANIZED (FMG):
All galvanized surfaces except for the following items shall be coated unless required by other Sections: (1) Floor gratings and frames, (2) Handrails, (3) Stair treads, (4) Chain link fencing and appurtenances.

Schedule No.	Item	Surface Prep.	System No.
FMG-1	All exposed surfaces indoors and outdoors, except those included below	Solvent Cleaning per Paragraph 3-06	(1) Alkyd Enamel
FMG-2	All exposed surfaces indoors and outdoors, including surfaces in chlorinator room and chlorine storage room, except those included below	Solvent Cleaning per Paragraph 3-06	(3) or (8) High Build Epoxy
FMG-3	Surfaces buried or submerged in wastewater	Solvent Cleaning per Paragraph 3-06 or Brush Off Grade Blast Cleaning SSPC-SP7	(6) Coal Tar Epoxy
FMG-4	Indoor architectural sheet metal, flashings, doors, frames, and exposed ducts	Solvent Cleaning per Paragraph 3-06	(1) Alkyd Enamel

C. COATING SYSTEM SCHEDULE, STEEL DIGESTER FLOATING COVERS AND DIGESTER GASHOLDERS (SD):

Schedule No.	Item	Surface Prep.	System No.
SD-1	All ferrous surfaces submerged in water or sludge, including rim plate	White Metal Blast Cleaning, SSPC-SPS	(6) Coal Tar Epoxy
SD-2	All ferrous surfaces exposed to digester gas	White Metal Blast Cleaning, SSPC-SPS	(6) Coal Tar Epoxy
SD-3	All interior ferrous surfaces of gasholder shell, including top angle	White Metal Blast Cleaning, SSPC-SPS	(6) Coal Tar Epoxy
SD-4	Exposed, outdoors	Commercial Blast Cleaning, SSPC-SP6	(2) Silicone Alkyd Enamel or Urethane

D. COATING SYSTEM SCHEDULE, NON-FERROUS METAL, PLASTIC, FIBERGLASS (NFM):

Where isolated non-ferrous parts are associated with equipment or piping, the CONTRACTOR shall use the coating system for the adjacent connected surfaces. Do not coat handrails, gratings, frames or hatches. Only primers recommended by the coating manufacturer shall be used.

Schedule No.	Item	Surface Prep.	System No.
NFM-1	All exposed surfaces indoors and outdoors, except those included below	Solvent Cleaning per Paragraph 3-09	(1) Alkyd Enamel
NFM-2	Chlorination room and chlorine storage room	Solvent Cleaning per Paragraph 3-09	(3) or (8) High Build Epoxy
NFM-3	Polyvinyl chloride plastic piping, and fiberglass surfaces, indoor and outdoors, or in structures not submerged	Solvent Cleaning per Paragraph 3-09	(4) Acrylic Latex

E. COATING SYSTEM SCHEDULE – CONCRETE AND CONCRETE BLOCK MASONRY (C):

Schedule No.	Item	Surface Prep.	System No.
C-1	Exposed, indoors and outdoors, as indicated on the Drawings.	Per Paragraph 3-09	(5b) Acrylic-Concrete Repainting
C-2	Submerged in wastewater as indicated on the Drawings.	Per Paragraph 3-10	(7) Coal Tar Epoxy-Concrete
C-3	Interior surfaces of sewer manholes, including sidewalls, bottom, and metal appurtenances, for manholes and L/S's indicated on the Drawings.	Per Paragraph 3-10	See Specification 09950

F. COATING SYSTEM SCHEDULE - WOOD (W):

Schedule No.	Item	Surface Prep.	System No.
W-1	Exposed, indoors and outdoors, as indicated on the Drawings.	Per Paragraph 2-12	(1) Alkyd Enamel
W-2	Exposed, indoors and outdoors, as indicated on the Drawings.	Per Paragraph 3-12	(4) Acrylic Latex

3.19 CLEAN-UP AND PROTECTION

A. Clean Up: During the progress of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each workday. Upon completion of painting work, clean window glass and other paint-spattered surfaces located on site and off site. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

B. Protection: Protect work of other trades located on site and off site, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting.

1. Provide "Wet Paint" signs, as required, to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.
2. At the completion of work of other trades, touch up and restore all damaged or defaced painted surfaces.

3.20 APPEARANCE AND INSPECTION

A. All painting shall be accomplished in a workmanlike manner and shall be free of unsightly sags, runs, bubbles, drips, waves, laps, alligatoring, unnecessary brush marks and overspray or other physical defects and shall be uniform in color.

B. The CONTRACTOR shall provide all rigging, scaffolding and other equipment necessary for a satisfactory inspection of a complete paint system and acceptance by the ENGINEER/OWNER.

C. Inspection shall be conducted by an inspector selected by the ENGINEER/OWNER in the presence of the OWNER’s representative and the CONTRACTOR or his representative. Provisions for calibrated and functional test equipment is the responsibility of the CONTRACTOR.

D. The paint film shall be free of pinholes and holidays as determined by the use of an approved holiday detector as defined in Paragraph 1-09 of this Section.

E. The paint film shall be randomly checked for dry film thickness as stipulated in the "Coating System" sections of these specifications. Thicknesses shall be checked with a properly calibrated and approved magnetic gauge as defined in Paragraph 1-09 of this Section.

3.21 REPAIR OF DEFECTS IN PAINT

A. Any defects discovered during inspection, such as low film millage, holidays or pinholes, shall be repaired with the same materials as used for the original finish coat(s). Excessive low millage could require extra full coat(s) of paint.

B. A final inspection will be conducted by the ENGINEER/OWNER or his representative after any necessary repairs and prior to final acceptance of the job.

3.22 DISINFECTION OF POTABLE WATER STORAGE TANKS

A. Description: This paragraph specifies disinfection procedures for potable water storage tanks.

B. Quality Assurance: The following documents are a part of this section as specified and modified. In case of conflict between the requirements of this paragraph and those of the listed documents, the requirements of this paragraph shall prevail.

C. Information to be Provided: Affidavit of Compliance as described in AWWA D105.

D. After the tank has been painted and the interior surfaces have thoroughly dried, the CONTRACTOR shall remove all visible dirt and contaminating materials. The interior of the tank shall be disinfected in accordance with Chlorination Method 2 of AWWA D105. The CONTRACTOR shall furnish all of the chlorine required.

E. The CONTRACTOR shall be responsible for obtaining proper disinfection as determined by bacteriological testing. Samples for bacterial analyses will be taken and analyzed by the OWNER. Two consecutive samples are required to pass the bacteriological tests for the tank to comply with these disinfection requirements.

F. Water for filling the tank after the initial disinfection will be provided by the OWNER. If bacteriological testing shows the presence of coliform bacteria, the tank shall be re-disinfected. The CONTRACTOR shall pay the OWNER for water required to fill the tank after the first filling at currently approved General Service water rates for the OWNER.

END OF SECTION 099000

SECTION 260000 - ELECTRICAL GENERAL

PART 1 - GENERAL

1.1 Work

1. The work covered by this division consists of providing all labor, equipment and materials and performing all operations necessary for the installation of the electrical work as herein called for and shown on the drawings.

1.2 Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
2. This is a Basic Electrical Requirements Section. Provisions of this section apply to work of all Division 26 Sections.
3. Review all other contract documents to be aware of conditions affecting work herein.
4. Definitions:

    a. Provide: Furnish, install, and test, complete and ready for intended use.

    b. Furnish: Supply and deliver to project site, ready for subsequent requirements.

    c. Install: Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, test complete ready for intended use, and similar requirements.

1.3 Permits and Fees

1. Contractor shall obtain all necessary permits, meters, and inspections required for his work and Contractor shall pay all fees and charges incidental thereto.

1.4 Verification of Owner's Data

1. Prior to commencing work the Contractor shall satisfy himself as to the accuracy of all data indicated on the Drawings and/or provided by the Owner. Should the Contractor discover any inaccuracies, errors, or omissions in the data, he shall immediately notify the Engineer. Commencement of work by the Contractor shall be held as an acceptance of the data by him after which time the Contractor has no claim against the Owner resulting from alleged errors, omissions or inaccuracies of the said data.

1.5 Delivery and Storage of Materials

1. Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. All material shall be stored to provide protection from the weather and accidental damage.

1.6 Scope

1. Extent of work is indicated in the Drawings, Schedules, and Specifications. Singular references shall not be construed as requiring only one device if multiple devices are shown on the Drawings or are required for proper system operation.

1.7 Field Measurements and Coordination

1. The intent of the Drawings and Specifications is to obtain a complete and satisfactory installation. Separate divisional Drawings and Specifications shall not relieve the Contractor from full compliance of work indicated on any of the Drawings or in any Section of the Specifications. Report conflicts prior to start of work.
2. Verify all field dimensions and locations of equipment to ensure close, neat fit with other trades' work. Make use of all Contract Documents and approved shop drawings to verify exact dimension and locations. Do not scale electrical drawings, rely on dimensions shown on architectural or structural drawings.
3. Coordinate work in this Division in proper sequence to ensure that the total work is completed within Contract time schedule and with minimum cutting and patching.
4. Locate all equipment, materials, and apparatus symmetrical with architectural elements. Install to exact height and locations when shown on architectural drawings. When locations are shown only on electrical drawings, be guided by architectural details and conditions existing at job and correlate this work with that of others.
5. Install work as required to fit structure, avoid obstructions, and retain clearance, headroom, openings and passageways. Cut no structural members without written approval from Engineer or Architect.
6. Carefully examine any existing conditions, piping, and premises. Compare Drawings with existing conditions. Report any observed discrepancies. It shall be the Contractor's responsibility to properly coordinate the work and to identify problems in a timely manner. Written instructions will be issued by the Engineer to resolve discrepancies.
7. Because of the small scale of the Drawings, it is not possible to indicate all offsets and fittings or to locate every accessory. Drawings are essentially diagrammatic. Study carefully the sizes and locations of structural members, wall and partition locations, trusses, and room dimensions and take actual measurements on the job. Locate material, equipment and accessories with sufficient space for installing and servicing. Contractor is responsible for accuracy of his measurements and shall not order materials or perform work without verification. No extra compensation will be allowed because field measurements vary from the dimensions on the Drawings. If field measurements show that equipment or material will not fit, the Engineer shall be consulted. Remove and relocate, without additional compensation, any item that is installed and is later found to encroach on space assigned to another use.

1.8 Guarantee

1. Owner reserves the right to make emergency repairs as required to keep equipment in operation without voiding Contractor's Guarantee Bond nor relieving Contractor of his responsibilities during guarantee period.
2. The Contractor shall guarantee labor, materials and equipment for a period of one (1) year from Substantial Completion, or from Owner's occupancy, whichever is earlier. Contractor shall make good any defects and shall include all necessary adjustments to and replacement of defective items without expense to the Owner.

1.9 Action and Informational Submittals

1. Shop drawings, product literature, and other action and informational submittals will only be reviewed if they are submitted in full accordance with the General and Supplementary Conditions and Division 1 and the following.

a. Submittals shall be properly organized in accordance with the approved submittal control log.

b. Submittals for each individual specification section shall contain all the equipment, materials, etc. required for that particular specification section. Multiple submittals for a single specification section are not allowed (exception: Shop Drawings may be separate from Product Data submittals). Incomplete submittals will be returned as Rejected.

c. Submittals shall not include items from more than one specification section in the same submittal package unless approved in the submittal control log.

d. Submittals shall be properly identified by a cover sheet showing the project name, Architect and Engineer names, submittal control number, specification section, a list of products or item names with model numbers in the order they appear in the package, and spaces for approval stamps. A sample cover sheet is included at the end of this section.

e. Submittals shall have been reviewed and approved by the General Contractor (or Prime Contractor). Evidence of this review and approval shall be an "Approved" stamp with a signature and date on the cover sheet.

f. Submittals that include a series of fixtures or devices (such as lighting fixtures) shall be organized by the fixture number and be marked accordingly. Each fixture must include all items associated with that fixture regardless of whether or not those items are used on other fixtures.

g. The electrical design shown on the drawings supports the mechanical equipment basis of design specifications at the time of design. If mechanical equipment is submitted with different electrical requirements, it is the responsibility of the electrical contractor to coordinate with the mechanical contractor and resolve all required electrical design changes (wire and conduit size, breaker size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the electrical submittal(s) with a written statement that this change will be provided at no additional cost. Electrical submittals made with no written reference to the actual mechanical equipment being supplied will be presumed to work with the electrical design. Any corrections required will be at no additional cost.

h. Submittals shall be in searchable PDF format and not a scanned copy.

i. Submittals shall ONLY contain relevant product data. Circle, highlight or otherwise identify all items relevant to the project. Remove or strikeout irrelevant product data.

2. If the shop drawings show variation from the requirements of contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in writing in his letter of transmittal and on the submittal cover sheet in order that, if acceptable, Contractor will not be relieved of the responsibility for executing the work in accordance with the contract.

3. Review of shop drawings, product literature, catalog data, or schedules shall not relieve the Contractor from responsibility for deviations from contract drawings or specifications, unless he has in writing called to the attention of the Architect/Engineer each such deviation in writing at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings, product literature, catalog data, or schedules. Any feature or function specified but not mentioned in the submittal shall be assumed to be included per the specification.
4. Submit shop drawings as called for in other sections after award of the contract and before any material is ordered or fabricated. Shop drawings shall consist of plans, sections, elevations and details to scale (not smaller than 1/4" per foot), with dimensions clearly showing the installation. Direct copies of small-scale project drawings issued to the Contractor are not acceptable. Drawings shall take into account equipment furnished under other sections and shall show space allotted for it. Include construction details and materials.

1.10 Test Reports and Verification Submittals

1. Submit test reports, certifications and verification letters as called for in other sections. Contractor shall coordinate the required testing and documentation of system performance such that sufficient time exists to prepare the reports, submit the reports, review the reports and take corrective action within the scheduled contract time.

1.11 O&M Data Submittals

1. Submit Operation and Maintenance data as called for in other sections. See Section 3 of this specification.

PART 2 - PRODUCTS

2.1 Products

1. All materials shall be new or Owner-supplied reused as shown on the drawings, the best of their respective kinds, suitable for the conditions and duties imposed on them at the building and shall be of reputable manufacturers. The description, characteristics, and requirements of materials to be used shall be in accordance with qualifying conditions established in the following sections.

2.2 Equipment and Materials

1. Shall be new and the most suitable grade for the purpose intended. Equipment furnished under this division shall be the product of a manufacturer regularly engaged in the manufacture of such items for a period of three years. Where practical, all of the components shall be products of a single manufacturer in order to provide proper coordination and responsibility. Where required, Contractor shall furnish proof of installation of similar units or equipment.
2. Each item of equipment shall bear a name plate showing the manufacturer's name, trade name, model number, serial number, ratings and other information necessary to fully identify it. This plate shall be permanently mounted in a prominent location and shall not be concealed, insulated or painted.
3. All materials and equipment shall be UL Certified, UL Listed, UL Labeled, UL Recognized, or UL Classified. The UL label shall be attached to the equipment or product.

4. The equipment shall be essentially the standard product of a manufacturer regularly engaged in the production of such equipment and shall be a product of the manufacturer's latest design.
5. A service organization with personnel and spare parts shall be available within two hours for each type of equipment furnished.
6. Install in accordance with manufacturer's recommendations. Place in service by a factory trained representative where required.
7. Materials and equipment are specified herein by a single or by multiple manufacturers to indicate quality, material and type of construction desired. Manufacturer's products shown on the Drawings have been used as basis for design; it shall be the Contractor's responsibility to ascertain that alternate manufacturer's products meet detailed specifications and that size and arrangement of equipment are suitable for installation.
8. Catalog numbers and model numbers indicated in the Drawings and Specifications are used as a guide in the selection of the equipment and are only listed for the Contractor's convenience. The Contractor shall determine the actual model numbers for ordering equipment and materials in accordance with the written description of each item and with the intent of the Drawings and Specifications.

2.3 Requests for Substitution

1. Where a particular system, product or material is specified by name, consider it as standard basis for bidding, and base proposal on the particular system, product or material specified.
2. Requests by Contractor for substitution will be considered only when reasonable, timely, fully documented, and qualifying under one or more of the following circumstances:

    a. Required product cannot be supplied in time for compliance with Contract time requirements.

    b. Required product is not acceptable to governing authority, or determined to be non-compatible, or cannot be properly coordinated, warranted or insured, or has other recognized disability as certified by Contractor.

    c. Substantial cost advantage is offered Owner after deducting offsetting disadvantages including delays, additional compensation for redesign, investigation, evaluation and other necessary services and similar considerations.

3. All requests for substitution shall contain a "Comparison Schedule" and clearly and specifically indicate any and all differences or omissions between the product specified as the basis of design and the product proposed for substitution. Differences shall include but shall not be limited to data as follows for both the specified and substituted products:

    a. Principal of operation

    b. Materials of construction or finishes

    c. Thickness of gauge of materials

    d. Weight of item

    e. Deleted features or items

f. Added features or items

g. Changes in other work caused by the substitution

h. Performance curves

4. If the approved substitution contains differences or omissions not specifically called to the attention of the Architect/Engineer, the Owner reserves the right to require equal or similar features to be added to the substituted products (or to have the substituted products replaced) at the Contractor's expense.

2.4 Prior Approval

1. Prior approval shall be required for any manufacturer other than those listed for all specified items in the Drawings and Specifications. Submit all requests for approval of the alternate manufacturer's products two weeks prior to bid opening. Approval will be in the form of an Addendum to the Specifications and Drawings. Clearly indicate all differences between the specified and proposed product following the guidelines for "Request for Substitution" herein. This requirement may be waived if, in the opinion of the engineer, it is in the best interest of the Owner. Submittals received after the award of the bid for equipment that has not been Prior Approved are subject to immediate rejection.

PART 3 - EXECUTION

3.1 Workmanship

1. All materials and equipment shall be installed and completed in a first-class workmanlike manner and in accordance with the best modern methods and practice. Any materials installed which do not present an orderly and reasonably neat and/or workmanlike appearance, or do not allow adequate space for maintenance, shall be removed and replaced when so directed by the Architect/Engineer.

3.2 Coordination

1. The Contractor shall be responsible for full coordination of the electrical systems with shop drawings of the building construction so the proper openings and sleeves or supports etc., are provided for conduit, devices, or other equipment passing through slabs or walls.
2. Any supports required for the installation of any electrical equipment, fixtures or conduit shall be provided by the Contractor. Where there are no architectural/structural elements available, the Contractor shall construct support structures as required. For example, an exterior panelboard may require embedded concrete support posts and galvanized unistruts.
3. It shall be the Contractor's responsibility to see that all equipment that may require maintenance and operation are made easily accessible, regardless of the diagrammatic location shown on the Drawings.
4. All connections to fixtures and equipment shown on the Drawings shall be considered diagrammatic unless otherwise indicated by a specific detail on the Drawings. The actual connections shall be made to fully suit the requirements of each case and adequately provide for servicing.

5. The Contractor shall protect equipment and fixtures at all times during storage and construction. He shall replace all equipment and fixtures which are damaged as a result of inadequate protection.
6. Prior to starting and during progress of work, examine work and materials installed by others as they apply to work in this division. Report conditions which will prevent satisfactory installation.
7. Start of work will be construed as acceptance of suitability of work of others.

3.3 Work Required for Equipment Furnished by Other Divisions

1. Provide raceway boxes, fittings, devices and conductors for the electrical power to equipment furnished and installed in the other Divisions.
2. Make connections for the electrical power to equipment furnished and installed in other Divisions.
3. Verify voltage, phase, and current requirements for all equipment being supplied by other divisions. Any modifications shall be incorporated into the electrical submittals with references to any modification and reason. The electrical system is designed around the specified equipment. Any change in the equipment shall be coordinated so that the proper electrical installation is obtained. In addition, if the supplied equipment has higher minimum circuit ampacity that the equipment specified, the contractor shall call the modification to the Engineer's attention and make necessary conduit, wire, circuit breaker and equipment changes to accommodate the higher ampacity requirements.
4. Any change from the specified equipment requirements shall be the responsibility of the contractor.
5. The electrical contractor shall meet with the Divisions 21-25 contractors and fully coordinate locations of mechanical equipment, duct work and piping to ensure that proper working clearance as required in the NEC is obtained. Any conflict shall be reported to the Engineer in writing prior to the installation of any of the equipment. Refer to additional requirements for planning drawings.
6. Coordinate exact locations and electrical rough-in requirements with other Divisions prior to installation to ensure proper clearances and code requirements are met.

3.4 Related Work

1. All Division 1 Sections apply to all Division 26 Sections.
2. Coordinate for all cutting and patching. Contractor shall review all cutting and patching required prior to bidding and shall coordinate installation.
3. Perform the following as part of Division 26 work complying with the requirements of Division 3 Concrete.

    a. Curbs, foundations and pads for electrical equipment.

    b. Encasement of electrical work.

    c. Underground structural concrete to accommodate electrical work.

    d. Rough grouting in and around electrical work.

    e. Patching concrete cut to accommodate electrical work.

4. Refer to Division 4 Masonry for:

a. Patching openings to accommodate electrical work.

5. Refer to Division 5 Metals for:

a. Supports for electrical work.

b. Framing openings for electrical equipment.

6. Refer to Division 6 Wood for:

a. Supports for electrical work.

b. Framing openings for electrical equipment.

7. Refer to Division 07 Thermal and Moisture Protection for:

a. Installation of all supports for electrical work.

b. Caulking and waterproofing of all wall and roof mounted electrical work.

c. Perform the following as part of Division 26 work complying with Division 7 requirements:

1) Fire barrier penetration seals.

2) Caulking and related shielding around ducts and pipes for sound isolation and attenuation.

8. Refer to Division 8 Doors & Windows for:

a. Installation of all access doors for electrical work.

9. Refer to Division 9 Finishes for:

a. Painting exposed conduit and equipment.

b. Painting structural metal and concrete for electrical work.

c. Painting access panels.

d. Colors shall be selected by the Architect for all painting of exposed electrical work unless specified herein.

10. Perform the following as part of Division 26 work.

a. Touch up painting of factory finishes.

11. Division 21 Fire Protection

a. Contractor shall coordinate the exact electrical requirements of all fire protection equipment being provided. Where action and informational submittals are required, this coordination shall be accomplished prior to making the submittals. The

electrical design shown on the drawings supports the fire protection equipment basis of design. If fire protection equipment is submitted with different electrical requirements, it is the responsibility of the Contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the fire protection submittal with a written statement that this design will be provided at no additional cost. Fire protection submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.

b. Contractor shall provide disconnect switches, starters, and contactors for fire protection equipment under Division 26 unless specifically noted as being furnished as part of fire protection equipment.

c. Contractor shall provide all power wiring, raceway and devices, and make final electrical connections to all fire protection equipment, switches, starters, contactors, controllers, and similar equipment.

12. Division 22 Plumbing

a. Contractor shall coordinate the exact electrical requirements of all plumbing equipment being provided. Where action and informational submittals are required, this coordination shall be accomplished prior to making the submittals. The electrical design shown on the drawings supports the plumbing equipment basis of design. If plumbing equipment is submitted with different electrical requirements, it is the responsibility of the Contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the plumbing submittal with a written statement that this design will be provided at no additional cost. Plumbing submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.

b. Contractor shall provide disconnect switches, starters, and contactors for plumbing equipment under Division 26 unless specifically noted as being furnished as part of plumbing equipment.

c. Contractor shall provide all power wiring, raceway and devices, and make final electrical connections to all plumbing equipment, switches, starters, contactors, controllers, and similar equipment.

13. Division 33 Sitework

a. Specific requirements for excavation and backfill for underground conduit are contained in Section 260550.

14. The following is part of Division 26 work.

a. Underground electrical utilities.

B. Construction Electrical Utilities

1. Provide all temporary wiring for power and light required for construction purposes and remove such temporary wiring when use is no longer required.

C. Service Coordination

1. Prior to commencing any work, coordinate with utility/service provider to ensure proper services are available to project when needed.

3.5 Interruption of Service

1. Before any equipment is shut down for disconnecting or tie-ins, arrangements shall be made with the Architect/Engineer and this work shall be done at the time best suited to the Owner. This will typically be on weekends and/or holidays and/or after normal working hours. Services shall be restored the same day unless prior arrangements are made. All overtime or premium costs associated with this work shall be included in the base bid.

3.6 Phasing

1. Provide all required temporary conduit, wiring, equipment and devices as required. Maintain temporary services to areas as required. Remove all temporary material and equipment on completion of work unless Engineer concurs that such material and equipment would be beneficial to the Owner on a permanent basis.

3.7 Cutting and Patching

1. Contractor shall provide all cutting and patching of all holes, chases, sleeves, and other openings required for installation of equipment furnished and installed under this section. Utilize experienced trades for cutting and patching. Obtain permission from Architect/Engineer before cutting any structural items.

3.8 Equipment Setting

1. Bolt equipment directly to concrete pads or foundations, using hot-dipped galvanized anchor bolts, nuts and washers. Level equipment.

3.9 Painting

1. Touch-up factory finishes on equipment located inside and outside shall be done under Division 26. Obtain matched color coatings from the manufacturer and apply as directed by manufacturer. If corrosion is found during inspection on the surface of any equipment, clean, prime, and paint, as required.

3.10 Clean-up

1. Thoroughly clean all exposed parts of apparatus and equipment of cement, plaster, and other materials and remove all oil and grease spots. Repaint or touch up as required to look like new. During progress of work, Contractor is to carefully clean and leave premises free from debris and in a safe condition.

3.11 Start-up and Operational Test

1. Start each item of equipment in strict accordance with the manufacturer's instructions; or where noted under equipment specification, start-up shall be done by a qualified representative of the manufacturer. Alignment, lubrication, safety, and operating control shall be included in start-up check.

3.12 Record (As Built) Drawings

1. During the progress of the work the Contractor shall record on their field set of Drawings the corrections, variations, and deviations for systems which are not installed exactly as shown on the Contract Drawings. Contractor shall review the record (asbuilt) drawings with the Engineer and the field conditions at every regular job-site meeting. Pay requests will not be processed if record drawings are not accurate and current.

3.13 Acceptance

1. Acceptance will be on the basis of tests and inspections of the work. A representative of the firm which performed the testing shall be in attendance to assist during inspection. Contractor shall furnish necessary electricians to operate system, make any necessary adjustments and assist with final inspection.

3.14 Punch List

1. Submit written confirmation that all punch lists have been checked and the required work completed.

3.15 Instructions & Training

1. At completion of the work, provide a competent and experienced person who is thoroughly familiar with the project, for a period deemed necessary by the Owner to instruct permanent operating personnel in the operation of equipment and control systems. This is in addition to any specific equipment operation and maintenance training.
2. Submit training syllabi prior to training for owner review.
3. Provide video recording of Owner instruction and provide a copy of the video recording in appropriate format to the Owner with the O&M Manual.
4. All Owner training shall be scheduled and completed prior to substantial completion. The Owner may reserve the right to reschedule any training or divide any training session for a period of 1 year after building occupancy.

3.16 Operation and Maintenance Manuals

1. Prepare O&M Manuals as required by Division 1 (if applicable) and as described herein. Furnish searchable PDF manuals with Table of Contents, organized, and organized and tabbed by specification section. Submit prior to Substantial Completion Inspection.
2. Each individual tabbed specification section of the O&M Manual shall contain all applicable information for that particular section, including, but not limited to:

    a. Detailed operating instructions and instructions for making minor adjustments.

    b. Complete wiring and control diagrams.

c. Routine maintenance operations.

d. Manufacturer's catalog data, service instructions, and parts lists for each piece of operating equipment.

e. Copies of final approved version of Action and Informational Submittals.

f. Copies of all manufacturer's warranties.

g. Copies of Test Reports and Verification Submittals.

3. All included information shall comply with the following:

a. Remove all non-related information from O&Ms.

b. Manuals shall only include information that is project specific and shall only be relevant to the operation and maintenance of the equipment installed.

4. Basic Electrical Tests: In addition to specific tests required in other sections:

a. Test together and separately to determine that:

1) System is free from short circuits and other faults.

2) Motor starter overload devices are sized correctly.

3) Motors rotate correctly.

4) All equipment operates correctly and as specified.

5. Record Drawings: Submit "Record Drawings".
6. Control Diagrams: Laminate and mount on equipment room wall.
7. Single Line Diagram: Laminate 11"x17" and mount on electrical room wall.

THIS IS A SAMPLE COVER SHEET. USE ONE FOR EACH ACTION AND INFORMATIONAL SUBMITTAL.

PROJECT NAME:
PROJECT NUMBER:
ARCHITECT/ENGINEER: Akin Brooks Engineering
CONTRACTOR: XYZ Construction
SUBCONTRACTOR: ABC Electrical
SUPPLIER: 123 Supply
MANUFACTURER: Various
DATE: 9/16/20
SECTION: 26 05 20 / Interior Lighting

LIST EACH ITEM SEPARATELY
TYPICAL - LIST MFR NAME & MODEL NUMBER

1. Type A,

2. Type B

3. Type C

4. Type D

5. Type E

GENERAL CONTRACTOR'S APPROVAL STAMP MUST BE ON THIS SHEET.

END OF SECTION 260000

SECTION 260010 - ELECTRICAL CODES AND STANDARDS

PART 5 - GENERAL

5.1 General

1. All work under Division 26 shall be constructed in accordance with the codes and standards listed herein. The design has been based on the requirements of these codes and standards. While it is not the responsibility of the Contractor to verify that all work called for complies with these codes and standards, he shall be responsible for calling to the Engineer's attention any details on the Drawings and/or Specifications that are not in conformance with these or other codes and standards. Current issue of code applies unless specifically noted otherwise.
2. Comply with regulations and codes of suppliers of utilities.
3. Where no specific method or form of construction is called for in the Contract Documents, the Contractor shall comply with code requirements when carrying out such work.
4. Where code conflict exists, generally the most stringent requirement applies.
5. Codes or standards applying to a specific part of the work may be included in that section.
6. All electrical materials, installation and systems shall meet the requirements of the listed standards, including the latest addenda and amendments.

PART 6 - CODES

6.1 List of Codes

1. Florida Building Code - Building - Seventh Edition (2020).
2. Florida Building Code - Test Protocols for High Velocity Hurricane Zones - Seventh Edition (2020).
3. National Electrical Code (NFPA 70) – 2017.
4. National Fire Alarm Code (NFPA 72) – 2016.
5. Florida Fire Prevention Code - Seventh Edition (2020).
6. Fire Code (NFPA 1) - 2018 Florida Edition.
7. Life Safety Code (NFPA 101) - 2018 Florida Edition.
8. National Electrical Safety Code (NESC)

PART 7 - STANDARDS

7.1 List of Standards

1. American National Standard Institutes (ANSI).
2. Illuminating Engineering Society (IES).
3. Institute of Electrical and Electronics Engineers (IEEE).
4. National Electrical Manufacturer's Associations (NEMA).
5. National Fire Protection Association (NFPA).
6. National Electrical Contractors Association (NECA).
7. Occupational Safety and Health Act (OSHA).
8. Underwriter's Laboratories, Inc. (UL).
9. Owner’s Construction Standards.

END OF SECTION 260010

SECTION 260511 - REINFORCED CONCRETE FOUNDATIONS FOR ELECTRICAL EQUIPMENT

PART 1 - GENERAL

1.1 Related Documents

1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the work of this Section.

PART 2 - PRODUCTS

2.1 Concrete

1. Concrete shall have a minimum 28-day compressive strength of 3,000 psi when cured and tested per ASTM C 31 and C 39.
2. Concrete shall be placed within 1-1/2 hours after adding cement.
3. Slump range shall be 2 to 4 inches and air entrainment between 3 percent and 6 percent by volume.

2.2 Reinforcing Steel

1. Shall be deformed bars conforming to ASTM A 615, Grade 60 size #4 (unless shown on drawings).
2. Reinforcing steel shall be supported with concrete blocks of the same strength as the concrete mix. Use of broken concrete, brick or stone for supporting reinforcing steel shall not be permitted.

2.3 Wire Mesh

1. 6" x 6" square pattern welded wire mesh.

2.4 Expansion Joint Filler

1. Shall conform to ASTM D 994, 1/2-inch thick.

2.5 Nonshrink Grout

1. Nonshrink grout shall conform to the Corps of Engineers Specification for Nonshrink Grout, CRD-C586-78.
2. Grout shall be fluid and shall be nonmetallic. Grout shall be nongas-liberating type, cement base, premixed product, requiring only the addition of water for the required consistency. All components shall be inorganic.

2.6 Forms

1. Use new plywood for exposed areas, and shiplap or plywood for unexposed areas. Materials shall produce tight forms and an acceptable finish.

2.7 Form Ties

1. Form ties shall be constructed so the tie remains embedded in the wall, except for the removable portion at each end.

2. Form ties shall have conical or spherical type inserts. Inserts shall be fixed to remain in contact with forming material and shall be constructed so that no metal is within one inch of the concrete surface when forms, inserts, and tie ends are removed.
3. Wire ties shall not be used.

2.8 Anchor Bolts

1. Unless otherwise indicated on the Drawings, anchor bolts shall have a minimum yield strength of 75,000 psi.
2. The thread area plus 6 inches of the bolts shall be hot-dip galvanized. In no case shall less than the top 18 inches of the bolt be galvanized. The remainder of the bolt shall not be galvanized, painted, or coated with oil.

PART 3 - EXECUTION

3.1 Exterior On-Grade Pads

1. Remove all mud, organic silt, organic clay, peat or unprepared fill if they exist below pad and replace with clean fill.

3.2 Forms

1. Forms shall be constructed accurately with tight joints to prevent the escape of mortar and to avoid the formation of fins.
2. Brace forms to prevent distortion during concrete placement.

3.3 Wire Mesh

1. Provide in all concrete pads that do not contain rebar.

3.4 Placing Reinforcing Steel

1. Reinforcing steel shall be placed in accordance with CRSI, Recommended Practice for Placing Reinforcing Bars.
2. Minimum length of splices shall be 18 inches. Splices shall be tied with 18-gauge annealed wire.

3.5 Placing Concrete

1. Prior to placing concrete, remove water from excavation and all debris and foreign material from forms.
2. Before depositing new concrete on old concrete, clean surface and pour a 1-inch layer of cement sand grout over the surface of the old concrete.
3. Place concrete in 2 ft. layers without segregation or loss of ingredients and without splashing forms or steel above. Vertical drop to final placement shall not exceed 6 feet.
4. Do not place concrete when ambient temperature is below 40 degrees F or approaching 40 degrees F and dropping.
5. Compaction: Concrete shall be vibrated in place until it becomes uniformly plastic. Vibrators shall penetrate the fresh placed concrete and into the previous layer of concrete below.

3.6 Concrete Finishing

1. Screed surfaces to true level planes. After absorption of initial water, float with wood float and trowel with steel trowel to a smooth finish.
2. Do not absorb wet spots with neat cement.
3. Foundation shall not vary from level more than 1/4 inch in 10 feet.

3.7 Removal of Forms

1. Forms shall not be removed until the concrete has set sufficiently to carry the dead load and construction load it has to sustain. Forms shall be removed with care to minimize scarring or other surface damage.

3.8 Finishing Formed Concrete Surface

1. Cut out honeycombed and defective areas. Cut edges perpendicular to surface at least 1 inch deep, no featheredge shall be allowed. Soak area to be patched for 24 hours. Allow surface to drain free of standing water and patch with non-shrink grout.
2. When forms are removed, remove fins or projections from surface of exposed areas and rub surface with wood float to provide a uniform surface texture.

3.9 Concrete Protection and Curing

1. Protect fresh concrete from direct rays of the sun, drying winds, and wash by rain. When forms are removed and finishing completed, cure formed surfaces with curing compound applied in conformance with manufacturer's directions.

3.10 Concrete Quality Control

1. Contractor shall furnish certified test reports for the concrete used. Cost of taking, storing, and testing of sample cylinders shall be included in the bid price.

3.11 Concrete Testing

1. Three representative cylinders of each batch of concrete shall be taken and tested as follows:

   a. 1 at 7 days

   b. 1 at 28 days

   c. 1 Spare

2. Test cylinders shall be taken at the site of the pour and shall be prepared and cured in a manner similar to the concrete work being done.
3. Cylinders shall be tested by an approved testing laboratory to verify the strength of the concrete.

3.12 Anchor Bolts

1. Anchor bolts shall be set level, square, plumb, to the correct elevation, and properly spaced. Anchor bolts shall not be reinforcing bar.

2. After concrete is set, no force shall be applied to anchor bolts in an attempt to move them and correct their separation.
3. Bolt holes on equipment base plates shall not be reamed or redrilled to fit an improper anchor bolt installation.

END OF SECTION 260511

SECTION 260519 - LOW-VOLTAGE POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary

1. Section Includes:

    a. Copper building wire rated 600 V or less.

    b. Connectors, splices, and terminations rated 600 V and less.

1.3 Action Submittals

1. Product Data: For each type of product.
2. Product Schedule: Indicate type, use, location, and termination locations.

PART 2 - PRODUCTS

2.1 Manufacturers

1. Subject to compliance with requirements, provide products by one of the following:
2. Alpha Wire Company
3. Belden Inc.
4. Cerro Wire LLC
5. Encore Wire Corporation
6. General Cable Technologies Corporation
7. Southwire Company
8. CommScope, Inc.
9. Comtran Corporation
10. Draka Cableteg USA, a Prysmian Group Company
11. West Penn Wire

2.2 Copper Building Wire

1. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
2. Standards:

    a. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

    b. RoHS compliant.

    c. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

3. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
4. Conductor Insulation:

    a. Type RHW-2: Comply with UL 44.

    b. Type THHN and Type THWN-2: Comply with UL 83.

    c. Type XHHW-2: Comply with UL 44.

2.3 Connectors and Splices

1. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. 3M Electrical Products

    b. AFC Cable Systems; a part of Atkore International

    c. Hubbell Power Systems, Inc.

    d. Ideal Industries, Inc.

    e. ILSCO

    f. NSi Industries LLC

    g. O-Z/Gedney; a brand of Emerson Industrial Automation

    h. TE Connectivity Ltd

    i. Thomas & Betts Corporation; A Member of the ABB Group

3. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
4. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

    a. Material: Copper.

    b. Type: Two hole with long barrels.

    c. Termination: Crimp.

PART 3 - EXECUTION

3.1 Conductor Material Applications

1. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

2. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
3. VFC Output Circuits Cable: Extra-flexible stranded for all sizes.
4. Power-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.
5. PV Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 Conductor Insulation and Multiconductor Cable Applications and Wiring Methods

1. Service Entrance: Type XHHW-2, single conductors in raceway.
2. Feeders: Type THHN/THWN-2, single conductors in raceway or Type XHHW-2, single conductors in raceway.
3. Branch Circuits, Including in Crawlspaces: Type THHN/THWN-2, single conductors in raceway.
4. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

3.3 Installation of Conductors and Cables

1. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
2. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
3. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
4. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
5. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.
6. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 Voltage Drop

1. Contractor shall size all wires to accommodate the anticipated voltage drop.
2. For line voltage wires, the minimum size wire shall be #12 AWG. The following indicates the required minimum wire sizes for branch circuits to achieve 3% voltage drop at full load. The contractor shall verify all circuit lengths prior to pulling wire. Wires found to be smaller than those indicated below shall be removed and repulled (including increased conduit size and/or box sizes as required) with the correct wire at the contractor’s expense. The distances indicated below are to be measured to the center of the load.

    a. 120V 100’ and 150’: #10 AWG.

    b. 120V 150’ and 200’: #8 AWG.

    c. 120V 200’: #6 AWG.

    d. 277V >150’: #10 AWG.

3.5 Connections

1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
2. Make splices, terminations, and taps that are compatible with conductor material [and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors].
3. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.6 Identification

1. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
2. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor.

3.7 Sleeve and Sleeve-Seal Installation for Electrical Penetrations

1. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.8 Firestopping

1. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Summary

1. Section includes grounding and bonding systems and equipment.

1.3 Action Submittals

1. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 System Description

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 Manufacturers

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Burndy; Part of Hubbell Electrical Systems.
    b. ERICO; a brand of nVent.
    c. Harger Lightning & Grounding.
    d. ILSCO.
    e. O-Z/Gedney; a brand of Emerson Industrial Automation.
    f. Robbins Lightning, Inc.
    g. Thomas & Betts Corporation; A Member of the ABB Group.

2.3 Conductors

1. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
2. Bare Copper Conductors:
    a. Solid Conductors: ASTM B3.

b. Stranded Conductors: ASTM B8.

c. Tinned Conductors: ASTM B33.

d. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.

e. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

f. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

3. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 Connectors

1. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
2. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
3. Irreversible Compression Connectors: Equivalent to Burndy HyGround system. For use in above and below ground applications.
4. Bus-Bar Connectors: Compression type, copper or copper alloy, with two wire terminals.
5. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.
6. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
7. Conduit Hubs: Mechanical type, terminal with threaded hub.
8. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.
9. Lay-in Lug Connector: Mechanical type, copper rated for direct burial terminal with set screw.
10. Straps: Solid copper, cast-bronze clamp. Rated for 600 A.
11. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.
12. Water Pipe Clamps:

    a. Mechanical type, two pieces with stainless-steel bolts.

    b. Material: Tin-plated aluminum.

    c. Listed for direct burial.

    d. U-bolt type with malleable-iron clamp and copper ground connector.

2.5 Grounding Electrodes

1. Ground Rods: Copper-clad steel, sectional type; 3/4 inch by 10 feet.

PART 3 - EXECUTION

3.1 Applications

1. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
2. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.

    a. Bury at least 30 inches below grade.

3. Grounding Conductors: Green-colored insulation with continuous yellow stripe.
4. Isolated Grounding Conductors: Green-colored insulation with more than one continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

    a. Install bus horizontally, on insulated spacers 2 inches minimum from wall, 6 inches above finished floor unless otherwise indicated.

    b. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.

5. Conductor Terminations and Connections:

    a. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

    b. Underground Connections: Welded connectors except at test wells and as otherwise indicated.

    c. Connections to Ground Rods at Test Wells: Welded connectors.

    d. Connections to Structural Steel: Welded connectors.

3.2 Grounding at the Service

1. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 Grounding Separately Derived Systems

1. Generator: Install grounding electrode(s) at the generator location. The electrode shall be connected to the equipment grounding conductor and to the frame of the generator.

3.4 Equipment Grounding

1. Install insulated equipment grounding conductors with all feeders and branch circuits.
2. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

3. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.
4. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

    a. Grounding Conductor: Bare, tinned copper, not less than No. 8 AWG.

5. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6 inches below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at grounding location.
6. Bonding Method for Gates: Connect bonding jumper between gate post and gate frame.

3.5 Installation

1. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
2. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor and install in conduit.
3. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.

    a. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.

    b. Use exothermic welds for all below-grade connections.

    c. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

4. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
5. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
6. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
7. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
8. Grounding and Bonding for Piping:

a. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

b. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.

c. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.

d. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each steel column, extending around the perimeter of building.

e. Install tinned-copper conductor not less than No. 2/0 AWG for ground ring and for taps to building steel.

f. Bury ground ring not less than 24 inches from building's foundation.

9. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.
10. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
11. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
12. Make connections with clean, bare metal at points of contact.
13. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
14. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
15. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.6 Tests and Inspections

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground resistance level is specified, at service disconnect enclosure grounding terminal, and at individual ground rods. Make tests at ground rods before any conductors are connected.

4. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
5. Perform tests by fall-of-potential method according to IEEE 81.
6. Prepare dimensioned Drawings locating each, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
7. Grounding system will be considered defective if it does not pass tests and inspections.
8. Prepare test and inspection reports.
9. Report measured ground resistances that exceed the following values:

    a. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.

    b. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.

    c. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.

    d. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm(s).

    e. Substations and Pad-Mounted Equipment: 5 ohms.

    f. Manhole Grounds: 10 ohms.

10. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Summary

1. Section Includes:
    a. Steel slotted support systems.
    b. Aluminum slotted support systems.
    c. Nonmetallic slotted support systems.
    d. Conduit and cable support devices.
    e. Support for conductors in vertical conduit.
    f. Structural steel for fabricated supports and restraints.
    g. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
    h. Fabricated metal equipment support assemblies.

1.3 Action Submittals

1. Product Data: For each type of product.
2. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
    a. Slotted support systems, hardware, and accessories.
    b. Clamps.
    c. Hangers.
    d. Sockets.
    e. Eye nuts.
    f. Fasteners.
    g. Anchors.
    h. Saddles.

i. Brackets.

3. Include rated capacities and furnished specialties and accessories.

PART 2 - PRODUCTS

2.1 Support, Anchorage, and Attachment Components

1. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.

   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) B-line, an Eaton business.

      2) CADDY; a brand of nVent.

      3) Flex-Strut Inc.

      4) Unistrut; Part of Atkore International.

   b. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.

   c. Material for Channel, Fittings, and Accessories: Galvanized steel.

   d. Channel Width: Selected for applicable load criteria.

   e. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

2. Aluminum Slotted Support Systems: Extruded-aluminum channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.

   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Cooper Industries, Inc.

      2) Flex-Strut Inc.

      3) Thomas & Betts Corporation; A Member of the ABB Group.

      4) Unistrut; Part of Atkore International.

   b. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.

   c. Channel Material: 6063-T5 aluminum alloy.

   d. Fittings and Accessories Material: 5052-H32 aluminum alloy.

   e. Channel Width: Selected for applicable load criteria.

3. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
4. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.
5. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.
6. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

    a. Powder Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

    b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Hilti, Inc.

        2) ITW Ramset/Red Head; Illinois Tool Works, Inc.

        3) MKT Fastening, LLC.

        4) Simpson Strong-Tie Co., Inc.

    c. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

    d. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) B-line, an Eaton business.

        2) Empire Tool and Manufacturing Co., Inc.

        3) Hilti, Inc.

        4) ITW Ramset/Red Head; Illinois Tool Works, Inc.

        5) MKT Fastening, LLC.

    e. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.

    f. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.

    g. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325.

h. Toggle Bolts: All-steel springhead type.

i. Hanger Rods: Threaded steel.

2.2 Fabricated Metal Equipment Support Assemblies

1. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 Application

1. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:

   a. NECA 1.

   b. NECA 101

   c. NECA 102.

   d. NECA 105.

2. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
3. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings that are less than those stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
4. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

   a. Secure raceways and cables to these supports with two-bolt conduit clamps.

5. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

3.2 Support Installation

1. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
2. Zip ties shall not be used to support conduit.
3. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

4. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

    a. To Wood: Fasten with lag screws or through bolts.

    b. To New Concrete: Bolt to concrete inserts.

    c. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.

    d. To Existing Concrete: Expansion anchor fasteners.

    e. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.

    f. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.

    g. To Light Steel: Sheet metal screws.

    h. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

5. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 Installation of Fabricated Metal Supports

1. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
2. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 Concrete Bases

1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
2. Use 3000-psi, 28-day compressive strength concrete.
3. Anchor equipment to concrete base as follows:

    a. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

    b. Install anchor bolts to elevations required for proper attachment to supported equipment.

c. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 Painting

1. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

   a. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

2. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Summary

1. Section Includes:
    a. Metal conduits and fittings.
    b. Nonmetallic conduits and fittings.
    c. Metal wireways and auxiliary gutters.
    d. Nonmetal wireways and auxiliary gutters.
    e. Surface raceways.
    f. Boxes, enclosures, and cabinets.
    g. Handholes and boxes for exterior underground cabling.

1.3 Definitions

1. GRC: Galvanized rigid steel conduit.
2. IMC: Intermediate metal conduit.

1.4 Action Submittals

1. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 Manufacturers

1. Subject to compliance with requirements, provide products by one of the following:
    a. Allied Tube & Conduit; a part of Atkore International.
    b. O-Z/Gedney; a brand of Emerson Industrial Automation.
    c. Republic Conduit.
    d. Thomas & Betts Corporation; A Member of the ABB Group.
    e. Topaz Electric; a division of Topaz Lighting Corp.

f. Western Tube and Conduit Corporation.

g. Wheatland Tube Company.

h. CANTEX INC.

i. RACO; Hubbell.

j. B-line, an Eaton business.

k. Hoffman; a brand of nVent.

l. MonoSystems, Inc.

m. Square D.

n. Panduit Corp.

o. Wiremold / Legrand.

p. NewBasis.

q. Oldcastle Enclosure Solutions.

r. Quazite: Hubbell Power Systems, Inc.

2.2 Metal Conduit

1. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. GRC: Comply with ANSI C80.1 and UL 6.
3. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
4. Comply with NEMA RN 1.
5. Coating Thickness: 0.040 inch, minimum.
6. EMT: Comply with ANSI C80.3 and UL 797.
7. FMC: Comply with UL 1; zinc-coated steel.
8. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

2.3 Metal Fittings

a. Comply with NEMA FB 1 and UL 514B.

b. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

c. Fittings, General: Listed and labeled for type of conduit, location, and use.

d. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.

e. Fittings for EMT:

1) Material: Steel.

2) Type: Setscrew.

f. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions were installed, and including flexible external bonding jumper.

g. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.

2. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.
3. All connectors shall have insulated throats.

2.4 Nonmetallic Conduits

1. Listing and Labeling: Nonmetallic conduit shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
3. LFNC: Comply with UL 1660.

2.5 Nonmetallic Fittings

1. Fittings, General: Listed and labeled for type of conduit, location, and use.
2. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
3. Fittings for LFNC: Comply with UL 514B.
4. Solvents and Adhesives: As recommended by conduit manufacturer.

2.6 Metal Wireways and Auxiliary Gutters

1. Description: Sheet metal, complying with UL 870 and NEMA 250, NEMA type as required for environment, unless otherwise indicated, and sized according to NFPA 70.

a. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
3. Wireway Covers: Hinged type or Screw-cover type unless otherwise indicated.
4. Finish: Manufacturer's standard enamel finish.

2.7 Nonmetallic Wireways and Auxiliary Gutters

1. Listing and Labeling: Nonmetallic wireways and auxiliary gutters shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2. Description: PVC, extruded and fabricated to required size and shape, and having snap-on cover, mechanically coupled connections, and plastic fasteners.
3. Fittings and Accessories: Couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings shall match and mate with wireways as required for complete system.
4. Solvents and Adhesives: As recommended by conduit manufacturer.

2.8 Boxes, Enclosures, and Cabinets

1. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
2. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
3. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
4. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

2.9 Cast Metal Access, Pull, and Junction Boxes

1. Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.

2.10 Misc. Box Requirements

1. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
2. Device Box Dimensions: Minimum 4 inches square by 1-1/2 inches deep (minimum 2 - 1/8 inches deep for telcom and A/V boxes).
3. Gangable boxes are prohibited.
4. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, NEMA type as required for environment, with continuous-hinge cover with flush latch unless otherwise indicated.

    a. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

    b. Nonmetallic Enclosures: Plastic.

    c. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

5. Cabinets:

    a. NEMA 250, NEMA type as required for environment, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.

    b. Hinged door in front cover with flush latch and concealed hinge.

    c. Key latch to match panelboards.

    d. Metal barriers to separate wiring of different systems and voltage.

    e. Accessory feet where required for freestanding equipment.

f. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.11 Handholes and Boxes for Exterior Underground Wiring

1. General Requirements for Handholes and Boxes:

a. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.

b. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.

a. Tier: 15 minimum.

b. Standard: Comply with SCTE 77.

c. Configuration: Designed for flush burial with open bottom unless otherwise indicated.

d. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.

e. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.

f. Cover Legend: Molded lettering, "ELECTRIC".

g. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.

h. Handholes 12 Inches Wide by 24 Inches Long and Larger: Have inserts for cable racks and pulling-in irons installed before concrete is poured.

PART 3 - EXECUTION

3.1 Outdoor Raceway Application

1. Apply raceway products as specified below unless otherwise indicated:

a. Exposed Conduit: GRC.

b. Concealed Conduit, Aboveground: RNC, Type EPC-40-PVC.

c. Underground Conduit: RNC, Type EPC-40-PVC, direct buried. Elbows 1-1/2” and larger shall be GRC.

d. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

e. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

f. Conduit, boxes and enclosures in corrosive environments (i.e., cooling tower yard): Stainless steel or PVC. This includes all supports and mounting hardware.

3.2 Misc. Raceway Requirements

1. Minimum Raceway Size: 1/2-inch trade size.
2. Raceway Fittings: Compatible with raceways and suitable for use and location.
3. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
4. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
5. EMT: Comply with NEMA FB 2.10.
6. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
7. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
8. Install surface raceways only where indicated on Drawings.
9. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.3 Installation

1. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
2. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
3. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.
4. Do not fasten conduits onto the bottom side of a metal deck roof.
5. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
6. Complete raceway installation before starting conductor installation.
7. Length of flexible conduit shall not exceed 36 inches without written consent of Engineer.
8. Arrange stub-ups so curved portions of bends are not visible above finished slab.
9. Boxes above ceiling shall not be located directly above a ceiling tile containing a light fixture, sprinkler head, HVAC diffuser or other device.
10. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
11. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
12. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
13. Boxes that are required to be mounted in the same stud cavity and face opposite directions (rooms) regardless of vertical separation shall have 3.5" thick sound attenuation batt

insulation installed from stud to stud and to a minimum of 12" above and 12" below the boxes. In no case shall these boxes be closer than 4" measured edge of box to edge of box.

14. Support conduit within 12 inches of enclosures to which attached.
15. Extension rings shall not be used, except when required on device boxes in walls and ceilings where standard mud rings, tile rings, masonry rings, etc. will not work with the specific device type (for example: some manufacturer's fire alarm system horn/strobe devices require extension rings in masonry walls). Any extension rings found not meeting this requirement shall be removed and replaced with appropriately sized boxes at the contractor's expense. The intent of this requirement is to have the contractor plan the raceway system out ahead of time. A well planned and designed raceway system shall have boxes sized appropriately without the need for extension rings.
16. Raceways Embedded in Slabs

    a. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.

    b. Arrange raceways to cross building expansion joints at right angles with expansion fittings.

    c. Arrange raceways to keep a minimum of 2 inches of concrete cover in all directions.

    d. Do not embed threadless fittings in concrete unless specifically approved by Engineer for each specific location.

    e. Change to GRC before rising above floor.

17. Stub-Ups to Above Recessed Ceilings

    a. Use EMT for raceways.

    b. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

18. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
19. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
20. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
21. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
22. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
23. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.

24. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
25. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
26. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
27. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:

    a. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.

    b. Where an underground service raceway enters a building or structure.

    c. Conduit extending from interior to exterior of building.

    d. Conduit extending into pressurized duct and equipment.

    e. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.

    f. Where otherwise required by NFPA 70.

28. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
29. Expansion Joint Fittings

    a. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.

    b. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:

        1) Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.

        2) Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.

        3) Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.

        4) Attics: 135 deg F temperature change.

c. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.

d. Install expansion fittings at all locations where conduits cross building or structure expansion joints.

e. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

30. Flexible Conduit Connections

a. Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semi-recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

b. Use LFMC in damp or wet locations subject to severe physical damage.

c. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

31. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to top of box unless otherwise indicated.
32. Recessed Boxes in Masonry Walls

a. Saw cut opening for box in center of cell of masonry block and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.

33. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
34. Provide UL putty pads for all boxes, cabinets, etc. in rated walls as required.
35. Locate boxes so that cover or plate will not span different building finishes.
36. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
37. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
38. Set metal floor boxes level and flush with finished floor surface.
39. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.4 Installation of Underground Conduit

1. Direct-Buried Conduit:

a. Excavate trench bottom to provide firm and uniform support for conduit.

b. Install backfill.

c. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction.

d. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.

e. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.

f. Underground Warning Tape: Comply with requirements in Section 260553 "Identification for Electrical Systems."

g. Coat all GRC conduit with two coats of bitumastic.

3.5 Installation of Underground Handholes and Boxes

1. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
2. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
3. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

3.6 Sleeve and Sleeve-Seal Installation for Electrical Penetrations

1. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 Firestopping

1. Install firestopping at penetrations of fire-rated floor and wall assemblies.

3.8 Protection

1. Protect coatings, finishes, and cabinets from damage and deterioration.
2. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
3. Repair damage to PVC coatings or paint finishes with matching touchup coating.

END OF SECTION 260533

SECTION 260550 - EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.1 Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
2. Review all project Drawings to be aware of conditions affecting work herein.

PART 2 - PRODUCTS

2.1 Sand

1. Clean, hard, uncoated grains free from organic matter or other deleterious substances. Sand for backfill shall be of a grade equal to mortar sand, with 95% passing a No. 8 sieve, and not more than 8% passing a No. 100 sieve.

2.2 Gravel

1. Clean, well-graded hard stone or lime rock gravel, free from organic material. Size range to be from No. 4 screen retentions to 1".

2.3 Earth

1. Must be free of stones, wood, roots or rubbish.

2.4 Underground-line Warning Tape

1. See specifications Section 260553 Identification for Electrical Systems.

PART 3 - EXECUTION

3.1 Ditching and Excavation

1. Shall be performed by hand wherever the possibility of encountering obstacles or any existing utility lines. The Contractor will be totally responsible to ensure that no utility or service interruptions shall be caused and that no existing utilities or obstructions will prohibit installations of service under this Contract at proper grade and location. Where clear and unobstructed areas are to be excavated, appropriate machine excavation methods may be employed. Avoid use of machine excavations within the limits of the building lines except when machine weights and operation will not damage sub-surface structural components or piping.
2. Excavation shall be maintained in satisfactory condition during the progress of the work. Sub-surface structures shall be constructed in adequately sized excavations and dewatering equipment shall be installed and properly maintained. Shoring shall be employed in the event of unstable soil conditions, and in all cases to protect materials and personnel from injury.

3.2 Bedding

1. Excavate to bottom grade of raceway to be installed, and shape bed of undisturbed earth to contour of conduit for a width of at least 5% of the conduit diameter. If earth conditions necessitate excavation below raceway grade, bring the bed up to the proper elevation with clean, dry sand deposited in 6" layers and firmly tamped by mechanical means. If sub-cut exceeds 12" or if bed is of an unstable nature, a 6" minimum layer of rock will be required before sand bedding begins.

3.3 Placing

1. Conduit shall be carefully handled into place in the excavation. Avoid knocking loose soil from the banks of the trench into the conduit bed. Coated conduit shall have special handling slings to prevent damage to the coating. All holidays in the conduit coating shall be touched in before beginning back filling.
2. Conduits to be installed below the footings or foundations shall be installed prior to the installation of the footings. All soil shall be compacted to meet the structural requirements for the footings. If it is not possible to install the conduit prior to pouring of the footings, it shall be necessary for the contractor to provide a bridge footing to span the excavation plus 2 feet on either side of the excavation. The footing modifications shall be approved prior to installation by the Structural Engineer.

3.4 Backfilling

1. Deposit earth or sand carefully in 6" layers, maintaining adequate side support. Compact fill in 6" layers, using mechanical means up to the top elevation of the conduit and 12" layers to finish grade.

3.5 Identification

1. Provide identifying metalized plastic warning tape above conduit. Replace surface to the original condition, i.e., sodding, sprigging, and fine grading.

END OF SECTION 260550

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary

1. Section Includes:

    a. Color and legend requirements for raceways, conductors, and warning labels and signs.

    b. Labels.

    c. Bands and tubes.

    d. Tapes and stencils.

    e. Tags.

    f. Signs.

    g. Cable ties.

    h. Paint for identification.

    i. Fasteners for labels and signs.

1.3 Action Submittals

1. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 Performance Requirements

1. Comply with ASME A13.1.
2. Comply with NFPA 70.
3. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
4. Comply with ANSI Z535.4 for safety signs and labels.
5. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
6. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

    a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 Color and Legend Requirements

1. Cables Carrying Circuits at 600 V or Less: Color shall be factory applied.
    a. Colors for 208/120-V Circuits:
        1) Phase A: Black.
        2) Phase B: Red.
        3) Phase C: Blue.
        4) Neutral: White.
    b. Colors for 240-V Circuits:
        1) Phase A: Black.
        2) Phase B: Red.
        3) Neutral: White.
    c. Colors for 480/277-V Circuits:
        1) Phase A: Brown.
        2) Phase B: Orange.
        3) Phase C: Yellow.
        4) Neutral: Gray.
        5) Equipment Ground: Green with a yellow stripe.
    d. Colors for Isolated Grounds: Green with two or more yellow stripes.
2. Accessible Raceways, 600 V or Less: Identification shall completely cover the entire length of the conduit. Colors shall be as follows:
    a. 120/208V: Black
    b. 277/480V: Brown
    c. Access Control: Purple
    d. Telecommunications: Blue
    e. BAS/HVAC Controls: White
    f. Other Systems: Provide a unique pre-approved color
3. Warning Label Colors:

a. Identify system voltage with black letters on an orange background.

4. Warning labels and signs shall include, but are not limited to, the following legends:

a. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."

b. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

5. Equipment Identification Labels:

a. Normal Power: Black letters on a white field.

2.3 Labels

1. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
2. Snap-around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameters and that stay in place by gripping action.
3. Self-Adhesive Wraparound Labels: Preprinted, 3-mil-thick, vinyl flexible label with acrylic pressure-sensitive adhesive.
4. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
5. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.

a. Minimum Nominal Size:

1) 1-1/2 by 6 inches for raceway and conductors.

2) 3-1/2 by 5 inches for equipment.

3) As required by authorities having jurisdiction.

2.4 Bands and Tubes

1. Snap-around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches long, with diameters sized to suit diameters and that stay in place by gripping action.
2. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machine-printed identification labels, sized to suit diameter and shrunk to fit firmly. Full shrink recovery occurs at a maximum of 200 deg F. Comply with UL 224.

2.5 Tapes and Stencils

1. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
2. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils thick by 1 to 2 inches wide; compounded for outdoor use.
3. Tape and Stencil: 4-inch-wide black stripes on 10-inch centers placed diagonally over orange background and are 12 inches wide. Stop stripes at legends.
4. Floor Marking Tape: 2-inch-wide, 5-mil pressure-sensitive vinyl tape, with yellow and black stripes and clear vinyl overlay.
5. Underground-Line Warning Tape:

    a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.

    b. Printing on tape shall be permanent and shall not be damaged by burial operations.

    c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.

    d. Color and Printing:

        1) Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.

        2) Inscriptions for Red-Colored Tapes: "ELECTRIC LINE, HIGH VOLTAGE".

        3) Inscriptions for Orange-Colored Tapes: "TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE".

    e. Construction:

        1) Detectable three-layer laminate, consisting of a printed pigmented polyolefin film, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core; bright colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.

        2) Width: 6 inches.

        3) Overall Thickness: 5.5 mils.

        4) Foil Core Thickness: 0.35 mil.

        5) Weight: 28 lb/1000 sq ft.

        6) Tensile according to ASTM D882: 70 lbf and 4600 psi.

2.6 Metal Tags

1. Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.

2. Nonmetallic Preprinted Tags: Polyethylene tags, 0.023 inch thick, color-coded for phase and voltage level, with factory printed permanent designations; punched for use with self-locking cable tie fastener.

B. Write-on Tags

1. Polyester Tags: 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment.
2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.7 Signs

1. Baked-Enamel Signs:

a. Preprinted aluminum signs punched or drilled for fasteners, with colors, legend, and size required for application.

b. 1/4-inch grommets in corners for mounting.

c. Nominal Size: 7 by 10 inches.

2. Metal-Backed Butyrate Signs:

a. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs, with 0.0396-inch galvanized-steel backing, punched and drilled for fasteners, and with colors, legend, and size required for application.

b. 1/4-inch grommets in corners for mounting.

c. Nominal Size: 10 by 14 inches.

3. Laminated Acrylic or Melamine Plastic Signs:

a. Engraved legend.

b. Thickness:

1) For signs up to 20 sq. in., minimum 1/16 inch thick.

2) For signs larger than 20 sq. in., 1/8 inch thick.

3) Engraved legend with black letters on white face.

4) Punched or drilled for mechanical fasteners with 1/4-inch grommets in corners for mounting.

5) Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.8 Cable Ties

1. General Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

    a. Minimum Width: 3/16 inch.

    b. Tensile Strength at 73 Deg F according to ASTM D638: 12,000 psi.

    c. Temperature Range: Minus 40 to plus 185 deg F.

    d. Color: Black, except where used for color-coding.

2. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

    a. Minimum Width: 3/16 inch.

    b. Tensile Strength at 73 Deg F according to ASTM D638: 12,000 psi.

    c. Temperature Range: Minus 40 to plus 185 deg F.

    d. Color: Black.

3. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.

    a. Minimum Width: 3/16 inch.

    b. Tensile Strength at 73 Deg F according to ASTM D638: 7000 psi.

    c. UL 94 Flame Rating: 94V-0.

    d. Temperature Range: Minus 50 to plus 284 deg F.

    e. Color: Black.

2.9 Miscellaneous Identification Products

1. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
2. Fasteners for Labels and Signs: Screws with nuts and flat and lock washers. Material shall be stainless-steel in exterior or corrosive environments.

PART 3 - EXECUTION

3.1 Preparation

1. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 Installation

1. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
2. Install identifying devices before installing acoustical ceilings and similar concealment.
3. Verify identity of each item before installing identification products.
4. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
5. Apply identification devices to surfaces that require finish after completing finish work.
6. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
7. System Identification for Raceways containing cables under 600 V: Identification shall completely cover the entire length of the conduit.
8. System Identification for Cables under 600 V: Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
9. Identify conductors within 3" of terminations to wiring devices.
10. Identify conductors within 3" of terminations to circuit breakers.
11. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
12. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.
13. For conductors No. 1/0 AWG and larger in vaults, pull and junction boxes, manholes, and handholes use color-coding conductor tape. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.
14. Where there are conductors for more than three branch circuits in same junction or pull box, use color-coding conductor tape. Identify each ungrounded conductor according to source and circuit number.
15. Tag and pair each neutral with its respective phase conductor(s).
16. System Identification for Raceways and Cables over 600 V: Identification shall completely encircle cable or conduit. Place adjacent identification of two-color markings in contact, side by side.
17. Secure tight to surface of conductor, cable, or raceway.
18. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
19. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.
20. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
21. Box Covers for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system and pertinent information such as source, destination, system voltage and circuit number, etc. Examples are as follows:

    a. Feeders:

        1) "EMERGENCY POWER 480V FROM 4EDS TO 4EP2"

        2) "NORMAL POWER FROM 208V TO 2MDB”

b. Branch circuits:

1) "EMERGENCY POWER 480V CKT 4MDS-3"

2) "NORMAL POWER 120V CKTS 2P1-6,8,10"

3) "LIGHTING 277V CKT 4L2-13"

4) "UPS POWER 208V CKTS 2P3-1,3,5”

c. Fire Alarm

1) “FIRE ALARM SLC-1 & NAC-2”

2) “F/A NAC-2&3”

d. Telecommunications:

1) “TELECOM”

3.3 Labeling

1. General Wiring Devices (switches, receptacles, etc.): Write on the front of each device the corresponding circuit description (i.e.: 2P2-32) so that it is visible with the cover plate off and not visible with the cover plate on. Use fine point permanent felt-tip black marker.
2. Fire Alarm Devices: Label each device with its circuit number and/or address number. Label shall be visible on cover. Use heat transfer tape type labeler.
3. Devices above ceiling: Label the ceiling grid (not ceiling tile) directly below where a device is located. Use heat transfer tape type labeler. Example devices are:

   a. Lighting relay or controller.

   b. Light fixture remote driver.

4. Vinyl Wraparound Labels:

   a. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.

   b. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.

5. Snap-around Labels: Secure tight to surface at a location with high visibility and accessibility.
6. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.
7. Self-Adhesive Labels:

   a. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.

b. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.

8. Snap-around Color-Coding Bands: Secure tight to surface at a location with high visibility and accessibility.
9. Heat-Shrink, Preprinted Tubes: Secure tight to surface at a location with high visibility and accessibility.
10. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.
11. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.

    a. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.

12. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.
13. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's written instructions.
14. Underground Line Warning Tape:

    a. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 12 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

    b. Limit use of underground-line warning tape to direct-buried cables.

    c. Install underground-line warning tape for direct-buried cables and cables in raceways.

3.4 Tags

1. Metal Tags:

    a. Place in a location with high visibility and accessibility.

    b. Secure using cable ties.

2. Nonmetallic Preprinted Tags:

    a. Place in a location with high visibility and accessibility.

    b. Secure using cable ties.

3. Write-on Tags:

    a. Place in a location with high visibility and accessibility.

    b. Secure using cable ties.

3.5 Signs

1. Baked-Enamel Signs:

   a. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

   b. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.

2. Metal-Backed Butyrate Signs:

   a. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

   b. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high sign; where two lines of text are required, use labels 2 inches high.

3. Laminated Acrylic or Melamine Plastic Signs:

   a. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

   b. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high sign; where two lines of text are required, use labels 2 inches high.

3.6 Identification Schedule

1. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
2. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.

3.7 Conductor Identification

1. Power-Circuit Conductor Identification, 600 V or Less

   a. For conductors in vaults, pull and junction boxes, manholes, and handholes, use vinyl wraparound labels to identify the phase.

   b. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

2. Power-Circuit Conductor Identification, More Than 600 V

a. For conductors in vaults, pull and junction boxes, manholes, and handholes, use nonmetallic preprinted tags colored and marked to indicate phase, and a separate tag with the circuit designation.

3. Control-Circuit Conductor Identification

a. For conductors and cables in pull and junction boxes, manholes, and handholes, use write-on tags with the conductor or cable designation, origin, and destination.

4. Control-Circuit Conductor Termination Identification

a. For identification at terminations, provide heat-shrink preprinted tubes with the conductor designation.

5. Conductors to Be Extended in the Future:

a. Attach write-on tags to conductors and list source.

3.8 Auxiliary Electrical Systems Conductor Identification

1. Self-adhesive vinyl tape that is uniform and consistent with system used by manufacturer for factory-installed connections.
2. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
3. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
4. Concealed Raceways and Duct Banks, More Than 600 V, within Buildings: Apply floor marking tape to the following finished surfaces:

a. Floor surface directly above conduits running beneath and within 12 inches of a floor that is in contact with earth or is framed above unexcavated space.

b. Wall surfaces directly external to raceways concealed within wall.

c. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.

3.9 Instructional Signs

1. Self-adhesive labels, including the color code for grounded and ungrounded conductors.
2. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting:

a. Baked-enamel warning signs.

b. Apply to exterior of door, cover, or other access.

c. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:

1) Power-transfer switches.

2) Controls with external control power connections.

3. Arc Flash Warning Labeling: Self-adhesive labels.
4. Operating Instruction Signs: Laminated acrylic or melamine plastic signs.
5. Emergency Operating Instruction Signs: Baked-enamel warning signs or Laminated acrylic or melamine plastic signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer, load shedding, etc.

3.10 Equipment Identification Labels

1. Indoor Equipment: Laminated acrylic or melamine plastic sign.
2. Outdoor Equipment: Laminated acrylic or melamine sign.
3. Equipment to be Labeled:

   a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of an engraved, laminated acrylic or melamine label.

   b. Enclosures and electrical cabinets.

   c. Access doors and panels for concealed electrical items.

   d. Enclosed switches.

   e. Enclosed controllers.

   f. Push-button stations.

   g. Power-transfer equipment.

   h. Power generating units.

   i. Monitoring and control equipment.

END OF SECTION 260553

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary

1. Section Includes:

    a. Lighting and appliance branch-circuit panelboards.

1.3 Definitions

1. ATS: Acceptance testing specification.
2. GFCI: Ground-fault circuit interrupter.
3. GFEP: Ground-fault equipment protection.
4. MCCB: Molded-case circuit breaker.
5. SPD: Surge protective device.
6. VPR: Voltage protection rating.

1.4 Action Submittals

1. Product Data: For each type of panelboard.

    a. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.

    b. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

2. Shop Drawings: For each panelboard and related equipment.

    a. Include dimensioned plans, elevations, sections, and details.

    b. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.

    c. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.

    d. Detail bus configuration, current, and voltage ratings.

    e. Short-circuit current rating of panelboards and overcurrent protective devices.

    f. Include evidence of NRTL listing for SPD as installed in panelboard.

    g. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

3. Electrical Room Layouts: For each electrical room and room containing a switchboard or panelboard, provide a 1/4” scaled drawing showing equipment layouts for maintenance and code clearance verification. Show all equipment including equipment (ductwork, piping, equipment, etc) in other specifications sections and divisions. Show all equipment’s required maintenance and code clearances.

1.5 Closeout Submittals

1. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

   a. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.

   b. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.6 Maintenance Material Submittals

1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
2. Keys: Two spares for each type of panelboard cabinet lock.

1.7 Quality Assurance

1. Manufacturer Qualifications: ISO 9001 or ISO 9002 certified.

1.8 Delivery, Storage, And Handling

1. Handle and prepare panelboards for installation according to NEMA PB 1.

1.9 Field Conditions

1. Environmental Limitations:

   a. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

   b. Rate equipment for continuous operation under the following conditions unless otherwise indicated:

      1) Ambient Temperature: Not exceeding 23 deg F to plus 104 deg F.

      2) Altitude: Not exceeding 6600 feet.

2. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

a. Notify Owner no fewer than seven days in advance of proposed interruption of electric service.

b. Do not proceed with interruption of electric service without Owner's written permission.

c. Comply with NFPA 70E.

1.10 Warranty

1. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.
2. Panelboard Warranty Period: 18 months from date of Substantial Completion.
3. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace SPD that fails in materials or workmanship within specified warranty period.
4. SPD Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 Panelboards Common Requirements

1. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
2. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Comply with NEMA PB 1.
4. Comply with NFPA 70.
5. Enclosures: Flush and Surface-mounted, dead-front cabinets.

   a. Rated for environmental conditions at installed location.

6. Indoor Dry and Clean Locations: NEMA 250, Type 1.
7. Outdoor Locations: NEMA 250, Type 3R.
8. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
9. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 5.

   a. Height: 84 inches maximum.

10. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.

2.2 Finishes

1. Panels and Trim: Steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
2. Back Boxes: Same finish as panels and trim.
3. Incoming Mains:

a. Location: Convertible between top and bottom.

b. Main Breaker: Main lug interiors up to 400 amperes shall be field convertible to main breaker.

4. Phase, Neutral, and Ground Buses:

a. Material: Hard-drawn copper, 98 percent conductivity.

1) Plating shall run entire length of bus.

2) Bus shall be fully rated the entire length.

b. Interiors shall be factory assembled into a unit. Replacing switching and protective devices shall not disturb adjacent units or require removing the main bus connectors.

5. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
6. Full-Sized Neutral: Equipped with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure. Do not mount neutral bus in gutter.
7. Extra-Capacity Neutral Bus: Neutral bus rated 200 percent of phase bus and listed and labeled by an NRTL acceptable to authority having jurisdiction, as suitable for nonlinear loads in electronic-grade panelboards and others designated on Drawings. Connectors shall be sized for double-sized or parallel conductors as indicated on Drawings. Do not mount neutral bus in gutter.
8. Conductor Connectors: Suitable for use with conductor material and sizes.
9. Material: Hard-drawn copper, 98 percent conductivity.
10. Terminations shall allow use of 75 deg C rated conductors without derating.
11. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.
12. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
13. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.
14. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
15. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
16. Gutter-Tap Lugs: Mechanical type suitable for use with conductor material and with matching insulating covers. Locate at same end of bus as incoming lugs or main device.
17. Extra-Capacity Neutral Lugs: Rated 200 percent of phase lugs mounted on extra-capacity neutral bus.
18. NRTL Label: Panelboards or load centers shall be labeled by an NRTL acceptable to authority having jurisdiction for use as service equipment with one or more main service disconnecting and overcurrent protective devices. Panelboards or load centers shall have meter enclosures, wiring, connections, and other provisions for utility metering. Coordinate with utility company for exact requirements.
19. Future Devices: Panelboards or load centers shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

20. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.
21. Panelboards and overcurrent protective devices rated 240 V or less shall have short-circuit ratings as shown on Drawings, but not less than 10,000 A rms symmetrical.

2.3 Performance Requirements

1. Surge Suppression: Factory installed as an integral part of indicated panelboards, complying with UL 1449 SPD Type 2.

2.4 Manufacturers

1. Subject to compliance with requirements, provide products by one of the following:

    a. Eaton.

    b. General Electric Company; GE Energy Management - Electrical Distribution.

    c. Siemens Industry, Inc., Energy Management Division.

    d. Square D; by Schneider Electric.

2.5 Lighting and Appliance Branch-Circuit Panelboards

1. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
2. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
3. Doors: Door-in-door construction with concealed hinges; secured with multipoint latch with tumbler lock; keyed alike. Outer door shall permit full access to the panel interior. Inner door shall permit access to breaker operating handles and labeling, but current carrying terminals and bus shall remain concealed.

2.6 SPD

1. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per phase shall not be less than 100 kA. The peak surge current rating shall be the arithmetic sum of the ratings of the individual MOVs in a given mode.

    a. Protection modes and UL 1449 VPR for grounded wye circuits with 480Y/277 and 208Y/120, three-phase, four-wire circuits shall not exceed the following:

        1) Line to Neutral: 1200 for 480Y/277 and 700 for 208Y/120.

        2) Line to Ground: 1200 for 480Y/277 and 700 for 208Y/120.

        3) Neutral to Ground: 1200 for 480Y/277 and 700 for 208Y/120.

        4) Line to Line: 2000 for 480Y/277 and 1200 for 208Y/120.

    b. Protection modes and UL 1449 VPR for 240/120-V, single-phase, three-wire circuits shall not exceed the following:

1) Line to Neutral: 700 V.

2) Line to Ground: 700 V.

3) Neutral to Ground: 700 V.

4) Line to Line: 1200 V.

2. SCCR: Equal to the SCCR of the panelboard in which installed.
3. Nominal Rating: 10 kA.
4. Buses:

a. Copper phase and neutral buses; 200 percent capacity neutral bus and lugs.

b. Copper equipment and isolated ground buses.

2.7 Disconnecting and Overcurrent Protective Devices

1. MCCB: Comply with UL 489, with [series-connected rating] [interrupting capacity] to meet available fault currents.
2. Thermal-Magnetic Circuit Breakers:

a. Inverse time-current element for low-level overloads.

b. Instantaneous magnetic trip element for short circuits.

c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

3. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
4. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6-mA trip).
5. GFEP Circuit Breakers: Class B ground-fault protection (30-mA trip).
6. Arc-Fault Circuit Interrupter Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
7. Subfeed Circuit Breakers: Vertically mounted.
8. MCCB Features and Accessories:

a. Standard frame sizes, trip ratings, and number of poles.

b. Breaker handle indicates tripped status.

c. UL listed for reverse connection without restrictive line or load ratings.

9. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
10. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and HID lighting circuits.

2.8 Identification

1. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.

2. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.
3. Circuit Directory: Directory card inside panelboard door, mounted in metal frame with transparent protective cover.

    a. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.

4. Circuit Directory: Computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.

    a. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.

2.9 Accessory Components and Features

1. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.
2. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 - EXECUTION

3.1 Examination

1. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.
2. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.
3. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.
4. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
5. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation

1. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
2. Comply with NECA 1.
3. Install panelboards and accessories according to NEMA PB 1.1.
4. Equipment Mounting:

    a. Attach panelboard to the vertical finished or structural surface behind the panelboard.

5. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.

    a. Mount top of trim 6’-6” above finished floor unless otherwise indicated.

    b. Mount panelboard cabinet plumb and rigid without distortion of box.

    c. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

    d. Mount surface-mounted panelboards to steel slotted supports 5/8 inch in depth. Orient steel slotted supports vertically.

    e. Install overcurrent protective devices and controllers not already factory installed.

    f. Set field-adjustable, circuit-breaker trip ranges.

    g. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written instructions.

    h. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.

    i. Install filler plates in unused spaces.

    j. Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.

    k. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.

    l. Mount spare fuse cabinet in accessible location.

3.3 Identification

1. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems."
2. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.
3. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
4. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

a. Install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems" identifying source of remote circuit.

END OF SECTION 262416

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary

1. Section Includes:
    a. Standard-grade receptacles, 125 V, 20 A.
    b. GFCI receptacles, 125 V, 20 A.
    c. Toggle switches, 120/277 V, 20 A, 30 A and 40 A.
    d. Wall plates.

1.3 Definitions

1. AFCI: Arc-fault circuit interrupter.
2. BAS: Building automation system.
3. EMI: Electromagnetic interference.
4. GFCI: Ground-fault circuit interrupter.
5. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
6. RFI: Radio-frequency interference.
7. SPD: Surge protective device.

1.4 Action Submittals

1. Product Data: For each type of product.
2. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

1.5 Closeout Submittals

1. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

PART 2 - PRODUCTS

2.1 General Wiring Device Requirements

1. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with NFPA 70.
3. RoHS compliant.
4. Comply with NEMA WD 1.

2.2 Devices for Owner-Furnished Equipment

1. Receptacles: Match plug configurations.
2. Cord and Plug Sets: Match equipment requirements.
3. Device Color:

    a. Wiring Devices Connected to Normal Power System: White unless otherwise indicated or required by NFPA 70 or device listing.

    b. Wiring Devices Connected to Essential Electrical System: Red.

    c. SPD Devices: Blue.

    d. Isolated-Ground Receptacles: As specified above, with orange triangle on face.

4. Wall Plate Color: For plastic covers, match device color.
5. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.3 Standard Grade Duplex Receptacles, 125 V, 20 A:

1. Manufacturers: Subject to compliance with requirements, provide one of the following:

    a. Hubbell HBL5362.

    b. Leviton 5362.

    c. Pass & Seymour PS5362.

2. Description: Two pole, three wire, and self-grounding.
3. Configuration: NEMA WD 6, Configuration 5-20R.
4. Standards: Comply with UL 498 and FS W-C-596.

2.4 Weather Resistant Duplex Receptacle, 125 V, 20 A

1. Manufacturers: Subject to compliance with requirements, provide one of the following:

    a. Hubbell GF5362SG.

    b. Leviton G5362-WT.

    c. Pass & Seymour WR5362.

2. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
3. Configuration: NEMA WD 6, Configuration 5-20R.
4. Standards: Comply with UL 498.
5. Marking: Listed and labeled as complying with NFPA 70, "Receptacles in Damp or Wet Locations" Article.

2.5 Duplex GFCI Receptacles, 125 V, 20 A

1. Manufacturers: Subject to compliance with requirements, provide one of the following:

    a. Hubbell GFRST20.

    b. Leviton GFNT2.

    c. Pass & Seymour 2097.

2. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding.
3. Configuration: NEMA WD 6, Configuration 5-20R.
4. Type: Feed through.
5. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.

2.6 Hospital Grade, Duplex SPD Receptacles, 125 V, 20 A

1. Manufacturers: Subject to compliance with requirements, provide one of the following:

    a. Hubbell HBL8362SA.

    b. Leviton 8380.

    c. Pass & Seymour 8300WSP.

2. Description: Two pole, three wire, and self-grounding. Integral SPD in line to ground, line to neutral, and neutral to ground. LED indicator light. With single-piece, rivetless, nickel-plated, all-brass grounding system. Nickel-plated, brass mounting strap.
3. SPD Components: Multiple metal-oxide varistors; with a nominal clamp-level rating of 400 V and minimum single transient pulse energy dissipation of 240 J, according to IEEE C62.41.2 and IEEE C62.45.
4. Active SPD Indication: Visual and audible, with light visible in face of device to indicate device is "active" or "no longer in service."
5. Configuration: NEMA WD 6, Configuration 5-20R.
6. Standards: Comply with UL 498 supplement sd, UL 1449, and FS W-C-596.
7. Marking: Listed and labeled as complying with NFPA 70, "Health Care Facilities" Article.

2.7 Toggle Switches, 120/277 V, 20 A

1. Manufacturers: Subject to compliance with requirements, provide one of the following:

    a. Hubbell HBL122#.

    b. Leviton 122#-2.

    c. Pass & Seymour PS20AC.

    d. Standards: Comply with UL 20 and FS W-S-896.

2.8 Toggle 1-3 Pole Switches, 600 V, 30 A & 40 A

1. Manufacturers: Subject to compliance with requirements, provide one of the following:

a. Hubbell.

b. Leviton.

c. Pass & Seymour.

2. Standards: Comply with UL 20 and FS W-S-896.

2.9 Wall Plates

1. Single Source: Obtain wall plates from same manufacturer of wiring devices.
2. Single and combination types shall match corresponding wiring devices.
3. Plate-Securing Screws: Metal with head color to match plate finish.
4. Material for Finished Spaces: Smooth, high-impact thermoplastic.
5. Material for Unfinished Spaces: Smooth, high-impact thermoplastic.
6. Material for Damp Locations: Cast aluminum with spring-loaded lift cover and listed and labeled for use in wet and damp locations.
7. Wet Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather resistant in use, die cast aluminum with lockable cover.

PART 3 - EXECUTION

3.1 Installation

1. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
2. Coordination with Other Trades:

a. Protect installed devices and their boxes. Do not place wall finish materials over device boxes, and do not cut holes for boxes with routers that are guided by riding against outside of boxes.

b. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.

c. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

d. Install wiring devices after all wall preparation, including painting, is complete.

e. Do not locate outlets/receptacles within 12” of an oxygen outlet/supply.

3.2 Conductors

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall comply with NFPA 70, Article 300, without pigtails.

4. Existing Conductors

    a. Cut back and pigtail or replace all damaged conductors.

    b. Straighten conductors that remain and remove corrosion and foreign matter.

    c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.

    d. Connections to wiring devices (other than cord connected devices) shall be with solid wire not stranded.

3.3 Device Installation

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length. Do not use feed thru terminals
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

3.4 Receptacle Orientation

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the left.
2. Install hospital-grade receptacles in patient-care areas with the ground pin or neutral blade at the top.
3. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

3.5 GFCI Receptacles

1. Install non-feed-through GFCI receptacles where protection of downstream receptacles is not required.

3.6 Identification

1. Comply with Section 260553 "Identification for Electrical Systems."
2. Identify each receptacle with panelboard identification and circuit number. Use engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3. Essential Electrical System: Mark receptacles supplied from the essential electrical system to allow easy identification using a self-adhesive label.

END OF SECTION 262726

SECTION 262813 - FUSES

PART 1 - GENERAL

1.1 Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary

1. Section Includes:
    a. Cartridge fuses rated 600 V ac and less for use in the following:
        1) Control circuits.
        2) Motor-control centers.
        3) Panelboards.
        4) Switchboards.
        5) Enclosed controllers.
        6) Enclosed switches.
    b. Spare-fuse cabinets.

1.3 Action Submittals

1. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:
    a. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
    b. Current limitation curves for fuses with current-limiting characteristics.
    c. Time current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse. Submit in electronic format suitable for use in coordination software and in PDF format.
    d. Coordination charts and tables and related data.

1.4 Maintenance Material Submittals

1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

a. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

PART 2 - PRODUCTS

2.1 Manufacturers

1. Subject to compliance with requirements, provide products by one of the following:

   a. Bussmann, an Eaton business.

   b. Edison; a brand of Bussmann by Eaton.

   c. Littelfuse, Inc.

   d. Mersen USA.

2. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.

2.2 Cartridge Fuses

1. Characteristics: NEMA FU 1, current limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

   a. Type RK-1: zero- to 600-A rating, 200 kAIC, time delay.

   b. Type RK-5: zero- to 600-A rating, 200 kAIC, time delay.

   c. Type J: 600-V, zero- to 600-A rating, 200 kAIC, time delay.

   d. Type L: 600-V, 601- to 6000-A rating, 200 kAIC, time delay.

   e. Type T: 250-V, zero- to 1200-A, 600-V, zero- to 800-A rating, 200 kAIC, time delay.

2. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Comply with NEMA FU 1 for cartridge fuses.
4. Comply with NFPA 70.
5. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

2.3 Spare-Fuse Cabinet

1. Characteristics: Wall-mounted steel unit with full length, recessed piano hinged door and key coded cam lock and pull.

   a. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.

   b. Finish: Gray, baked enamel.

c. Identification: "SPARE FUSES" in 1-1/2-inch-high letters on exterior of door.

d. Fuse Pullers: For each size of fuse, where applicable and available, from fuse manufacturer.

PART 3 - EXECUTION

3.1 Examination

1. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.
2. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
3. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
4. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
5. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Fuse Applications

1. Cartridge Fuses:

a. Service Entrance: Class L, time delay Class RK1, time delay Class J, time delay.

b. Feeders: Class L, time delay Class RK1, time delay Class RK5, time delay Class J, time delay.

c. Motor Branch Circuits: Class RK1 Class RK5, time delay.

d. Large Motor Branch (601-4000 A): Class L, time delay.

e. Power Electronics Circuits: Class J, high speed Class T, fast acting.

f. Other Branch Circuits: Class RK1, time delay Class RK5, time delay Class J, time delay.

g. Control Transformer Circuits: Class CC, time delay, control transformer duty.

h. Provide open fuse indicator fuses or fuse covers with open fuse indication.

3.3 Installation

1. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.
2. Install spare-fuse cabinet(s) in location shown on the Drawings or as indicated in the field by Owner.

3.4 Identification

1. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 262813

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 Summary

1. Section Includes:
    a. Fusible switches.
    b. Nonfusible switches.
    c. Enclosures.

1.3 Definitions

1. NC: Normally closed.
2. NO: Normally open.
3. SPDT: Single pole, double throw.

1.4 Action Submittals

1. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
    a. Enclosure types and details for types other than NEMA 250, Type 1.
    b. Current and voltage ratings.
    c. Short-circuit current ratings (interrupting and withstand, as appropriate).
    d. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF electronic format.
2. Shop Drawings: For enclosed switches and circuit breakers.
    a. Include wiring diagrams for power, signal, and control wiring.
    b. Include plans, elevations, sections, details, and attachments to other work.

1.5 Maintenance Material Submittals

1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

a. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

b. Fuse Pullers: Two for each size and type.

1.6 Field Conditions

1. Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

a. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.

b. Altitude: Not exceeding 6600 feet.

1.7 Warranty

1. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.

a. Warranty Period: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 General Requirements

1. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
2. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
4. Comply with NFPA 70.

2.2 Fusible Switches

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Eaton.

b. General Electric Company.

c. Siemens Industry, Inc., Energy Management Division.

d. Square D; by Schneider Electric.

2. Type HD, Heavy Duty:

a. Single throw.

b. Three pole.

c. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses.

d. Lockable handle with capability to accept three padlocks and interlocked with cover in closed position.

3. Accessories:

a. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.

b. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.

c. Lugs: Mechanical type, suitable for number, size, and conductor material.

d. Service-Rated Switches: Labeled for use as service equipment.

2.3 Nonfusible Switches

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Eaton.

b. General Electric Company.

c. Siemens Industry, Inc., Energy Management Division.

d. Square D; by Schneider Electric.

2. Type HD, Heavy Duty, Three Pole, Single Throw: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
3. Accessories:

a. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.

b. Lugs: Mechanical type, suitable for number, size, and conductor material.

c. Service-Rated Switches: Labeled for use as service equipment.

2.4 Enclosures

1. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
2. Enclosure Finish: The enclosure shall be finished with gray baked enamel paint, electrodeposited on cleaned, phosphatized steel (NEMA 250 Type 1), gray baked enamel paint, electrodeposited on cleaned, phosphatized galvannealed steel (NEMA 250 Types

3R, 12), a brush finish on Type 304 stainless steel (NEMA 250 Type 4-4X stainless steel), copper-free cast aluminum alloy (NEMA 250 Types 7, 9).

3. Conduit Entry: NEMA 250 Types 4, 4X, and 12 enclosures shall contain no knockouts. NEMA 250 Types 7 and 9 enclosures shall be provided with threaded conduit openings in both end walls.
4. Operating Mechanism: The circuit-breaker operating handle shall be externally operable with the operating mechanism being an integral part of the box, not the cover. The cover interlock mechanism shall have an externally operated override. The override shall not permanently disable the interlock mechanism, which shall return to the locked position once the override is released. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.
5. Enclosures designated as NEMA 250 Type 4, 4X stainless steel, 12, or 12K shall have a dual cover interlock mechanism to prevent unintentional opening of the enclosure cover when the circuit breaker is ON and to prevent turning the circuit breaker ON when the enclosure cover is open.
6. NEMA 250 Type 7/9 enclosures shall be furnished with a breather and drain kit to allow their use in outdoor and wet location applications.

PART 3 - EXECUTION

3.1 Examination

1. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

    a. Commencement of work shall indicate the Installer’s acceptance of the areas and conditions as satisfactory.

3.2 Preparation

1. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

    a. Notify Owner no fewer than seven days in advance of proposed interruption of electric service.

    b. Indicate method of providing temporary electric service.

    c. Do not proceed with interruption of electric service without written permission.

    d. Comply with NFPA 70E.

3.3 Enclosure Environmental Rating Applications

1. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.

    a. Indoor, Dry and Clean Locations: NEMA 250, Type 1.

b. Outdoor Locations: NEMA 250, Type 3R.

c. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.

d. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

3.4 Installation

1. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
2. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
3. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
4. Install fuses in fusible devices.
5. Comply with NFPA 70 and NECA 1.

3.5 Identification

1. Comply with requirements in Section 260553 "Identification for Electrical Systems."

a. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.

b. Label each enclosure with engraved metal or laminated-plastic nameplate.

END OF SECTION 262816

SECTION 263213 STANDBY ENGINE GENERATORS

PART 1 - GENERAL

1.1 Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary

1. Section includes packaged engine generators for emergency use with the following features:
    a. Diesel engine.
    b. Control and monitoring.
    c. Generator overcurrent and fault protection.
    d. Generator, exciter, and voltage regulator.
    e. Outdoor engine generator enclosure.
    f. Vibration isolation devices.
    g. Finishes.
2. Related Requirements:
    a. Section 263600 "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine generators.

1.3 Definitions

1. EPS: Emergency power supply.
2. EPSS: Emergency power supply system.
3. LP: Liquid petroleum.
4. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

1.4 Action Submittals

1. Product Data: For each type of product.
    a. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
    b. Include thermal damage curve for generator.
    c. Include time-current characteristic curves for generator protective device.

d. Include fuel consumption in cubic feet per hour at 0.8 power factor at 0.5, 0.75 and1.0 times generator capacity.

e. Include generator efficiency at 0.8 power factor at 0.5, 0.75 and1.0 times generator capacity.

f. Include airflow requirements for cooling and combustion air in cubic feet per minute at 0.8 power factor, with air-supply temperature of 95, 80, 70, and 50 deg F. Provide Drawings indicating requirements and limitations for location of air intake and exhausts.

g. Include generator characteristics, including, but not limited to, kilowatt rating, efficiency, reactance, and short-circuit current capability.

2. Shop Drawings:

a. Include plans and elevations for engine generator and other components specified.

b. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

c. Identify fluid drain ports and clearance requirements for proper fluid drain.

d. Design calculations for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.

3. Vibration Isolation Base Details:

a. Detail fabrication, including anchorages and attachments to structure and supported equipment. Include base weights.

b. Include diagrams for power, signal, and control wiring. Complete schematic, wiring, and interconnection diagrams showing terminal markings for EPS equipment and functional relationship between all electrical components.

1.5 Informational Submittals

1. Source Quality-Control Reports: Including, but not limited to, the following:

a. Certified summary of prototype-unit test report.

b. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.

2. Field quality control reports.
3. Warranty: For special warranty.

1.6 Closeout Submittals

1. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals.

a. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

1) List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.

2) Operating instructions laminated and mounted adjacent to generator location.

3) Training plan.

1.7 Maintenance Material Submittals

1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
2. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
3. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
4. Filters: One set each of lubricating oil, fuel, and combustion-air filters.
5. Tools: Each tool listed by part number in operations and maintenance manual.

1.8 Warranty

1. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.

a. Warranty Period: five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 Manufacturers

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Caterpillar, Inc.; Electric Power Division.

b. Cummins Power Generation.

c. Generac Power Systems, Inc.

d. Kohler Power Systems.

e. MTU Onsite Energy Corporation.

2. Source Limitations: Obtain packaged engine generators and auxiliary components from single source from single manufacturer.

2.2 Performance Requirements

1. B11 Compliance: Comply with B11.19.
2. NFPA Compliance:

a. Comply with NFPA 37.

b. Comply with NFPA 70.

3. UL Compliance: Comply with UL 2200.
4. Engine Exhaust Emissions: Comply with EPA requirements and applicable state and local government requirements.
5. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by engine generator, including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.
6. Environmental Conditions: Engine generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

a. Ambient Temperature: 5 to 104 deg F.

b. Relative Humidity: Zero to 95 percent.

c. Altitude: Sea level to 1000 feet.

2.3 Engine Generator Assembly Description

1. Factory assembled and tested, water-cooled engine, with brushless generator and accessories.
2. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
3. Induction Method: Naturally aspirated.
4. Governor: Adjustable isochronous, with speed sensing.
5. Mounting Frame: Structural-steel framework to maintain alignment of mounted components without depending on concrete foundation. Provide lifting attachments sized and spaced to prevent deflection of base during lifting and moving.

a. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and engine generator center of gravity.

6. Capacities and Characteristics:

a. Power Output Ratings: Nominal ratings as indicated at 0.8 power factor excluding power required for the continued and repeated operation of the unit and auxiliaries, with capacity as required to operate as a unit as evidenced by records of prototype testing.

b. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.

7. Engine Generator Performance:

a. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage, from no load to full load.

b. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.

c. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency, from no load to full load.

d. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.

e. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.

f. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to

2.4 Engine

1. Fuel: Diesel
2. Rated Engine Speed: 1800 rpm.
3. Lubrication System: Engine or skid mounted.

   a. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.

   b. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.

   c. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

4. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine generator mounting frame and integral engine driven coolant pump.
5. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
6. Size of Radiator: Adequate to contain expansion of total system coolant, from cold start to 110 percent load condition.
7. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
8. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging, UV, and abrasion-resistant fabric.

9. Rating: 50-psig maximum working pressure with coolant at 180 deg F, and noncollapsible under vacuum.
10. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

11. Muffler/Silencer:

    a. Critical type sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

    b. Minimum sound attenuation of 25 dB at 500 Hz.

    c. Sound level measured at a distance of 25 feet from exhaust discharge after installation is complete shall be 78 dBA or less.

12. Muffler/Silencer: Semicritical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

    a. Minimum sound attenuation of 18 dB at 500 Hz.

13. Air-Intake Filter: Standard-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.
14. Starting System: 12-V electric, with negative ground.

    a. Components: Sized so they are not damaged during a full engine-cranking cycle, with ambient temperature at maximum specified in "Performance Requirements" Article.

    b. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.

    c. Battery: Lead acid, with capacity within ambient temperature range specified in "Performance Requirements" Article to provide specified cranking cycle at least twice without recharging.

    d. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.

    e. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 50 deg F regardless of external ambient temperature within range specified in "Performance Requirements" Article. Include accessories required to support and fasten batteries in place. Provide ventilation to exhaust battery gases.

    f. Battery Stand: Factory fabricated, two-tier metal with acid-resistant finish designed to hold the quantity of battery cells required and to maintain the arrangement to minimize lengths of battery interconnections.

    g. Battery Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.

    h. Battery Charger: Current limiting, automatic equalizing and float charging type designed for lead acid batteries. Unit shall comply with UL 1236 and include the following features:

1) Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.

2) Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 to 140 deg F to prevent overcharging at high temperatures and undercharging at low temperatures.

3) Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.

4) Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.

5) Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.

6) Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

2.5 Diesel Fuel Oil System

1. Subbase Mounted, Double Wall, Fuel Oil Tank: Factory installed and piped, complying with UL 142 fuel-oil tank. Features include the following:

   a. Tank level indicator.

   b. Fuel-Tank Capacity: Minimum 133 percent of total fuel required for periodic maintenance operations between fuel refills, plus fuel for the hours of continuous operation for indicated EPSS class

   c. Leak detection in interstitial space.

   d. Vandal-resistant fill cap.

   e. Containment Provisions: Comply with requirements of authorities having jurisdiction.

2.6 Control and Monitoring

1. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of engine generator. When mode-selector switch is switched to the on position, engine generator starts. The off position of same switch initiates engine generator shutdown. When engine generator is running, specified system or equipment failures or derangements automatically shut down engine generator and initiate alarms.

2. Manual Starting System Sequence of Operation:

    a. Switching On-Off switch on the generator control panel to the on position starts engine generator. The off position of same switch initiates engine generator shutdown. When engine generator is running, specified system or equipment failures or derangements automatically shut down engine generator and initiate alarms.

    b. Provide minimum run-time control set for 30 minutes, with override only by operation of a remote emergency-stop switch.

    c. Comply with UL 508A.

    d. Include accessories at transfer switches and generator to monitor the integrity of the generator remote start circuits per NEC 700.10.D.3.

3. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the engine generator. Mounting method shall isolate the control panel from engine generator vibration. Panel shall be powered from the engine generator battery.
4. Control and Monitoring Panel:

    a. Digital controller with integrated LCD display, controls, and microprocessor, capable of local and remote control, monitoring, and programming, with battery backup.

    b. Instruments: Located on the control and monitoring panel and viewable during operation.

        1) Engine lubricating-oil pressure gage.

        2) Engine-coolant temperature gage.

        3) DC voltmeter (alternator battery charging).

        4) Running-time meter.

        5) AC voltmeter, for each phase.

        6) AC ammeter, for each phase.

        7) AC frequency meter.

        8) Generator-voltage adjusting rheostat.

    c. Controls and Protective Devices: Controls, shutdown devices, and common visual alarm indication as required by NFPA 110 for Level 1 system, including the following:

        1) Cranking control equipment.

        2) Run-Off-Auto switch.

3) Control switch not in automatic position alarm.

4) Overcrank alarm.

5) Overcrank shutdown device.

6) Low water temperature alarm.

7) High engine temperature pre-alarm.

8) High engine temperature.

9) High engine temperature shutdown device.

10) Overspeed alarm.

11) Overspeed shutdown device.

12) Low-fuel main tank.

13) Low-fuel-level alarm shall be initiated when the level falls below that required for operation for the duration required for the indicated EPSS class.

14) Coolant low-level alarm.

15) Coolant low-level shutdown device.

16) Coolant high-temperature prealarm.

17) Coolant high-temperature alarm.

18) Coolant low-temperature alarm.

19) Coolant high-temperature shutdown device.

20) EPS load indicator.

21) Battery high-voltage alarm.

22) Low-cranking voltage alarm.

23) Battery-charger malfunction alarm.

24) Battery low-voltage alarm.

25) Lamp test.

26) Contacts for local and remote common alarm.

27) Generator overcurrent-protective-device not-closed alarm.

2.7 Generator Overcurrent and Fault Protection

1. Overcurrent protective devices for the entire EPSS shall be coordinated to optimize selective tripping when a short circuit occurs. Coordination of protective devices shall consider both utility and EPSS as the voltage source.
2. Overcurrent protective devices for the EPSS shall be accessible only to authorized personnel.
3. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with UL 489.
4. Tripping Characteristic: Designed specifically for generator protection.
5. Trip Rating: Matched to generator output rating.
6. Shunt Trip: Connected to trip breaker when engine generator is shut down by other protective devices.
7. Mounting: Adjacent to, or integrated with, control and monitoring panel.
8. Generator Circuit Breaker: Molded case, electronic trip type; 100 percent rated; complying with UL 489.
9. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
10. Trip Settings: Selected to coordinate with generator thermal damage curve.
11. Shunt Trip: Connected to trip breaker when engine generator is shut down by other protective devices.
12. Mounting: Adjacent to or integrated with control and monitoring panel.
13. Generator Protector: Microprocessor-based unit shall continuously monitor current level in each phase of generator output, integrate generator heating effect over time, and predict when thermal damage of alternator will occur. When signaled by generator protector or other engine generator protective devices, a shunt-trip device in the generator disconnect switch shall open the switch to disconnect the generator from load circuits. Protector performs the following functions:

    a. Initiates a generator overload alarm when generator has operated at an overload equivalent to 110 percent of full rated load for 60 seconds. Indication for this alarm is integrated with other engine generator malfunction alarms. Contacts shall be available for load shed functions.

    b. Under single or three phase fault conditions, regulates generator to 300 percent of rated full-load current for up to 10 seconds.

    c. As overcurrent heating effect on the generator approaches the thermal damage point of the unit, protector switches the excitation system off, opens the generator disconnect device, and shuts down the engine generator.

    d. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot.

14. Ground-Fault Indication: Comply with NFPA 70 Article 700, "Emergency System" signals for ground fault.

    a. Indicate ground fault with other engine generator alarm indications.

    b. Trip generator protective device on ground fault.

2.8 Generator, Exciter, and Voltage Regulator

1. Comply with NEMA MG 1.
2. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.
3. Electrical Insulation: Class H or Class F.
4. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required. Provide 12-lead alternator.
5. Range: Provide [limited] [broad] [extended] range of output voltage by adjusting the excitation level.
6. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.
7. Enclosure: Dripproof.
8. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified and as required by NFPA 110.

    a. Adjusting Rheostat on Control and Monitoring Panel: Provide plus or minus 5 percent adjustment of output-voltage operating band.

    b. Maintain voltage within 20 percent on one step, full load.

    c. Provide anti-hunt provision to stabilize voltage.

    d. Maintain frequency within 10 percent and stabilize at rated frequency within 2 seconds.

9. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.
10. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.
11. Subtransient Reactance: 12 percent, maximum.

2.9 Portable Trailer Type Outdoor Engine Generator Enclosure

1. Description: Vandal resistant, sound-attenuating weatherproof aluminum housing, wind resistant up to 100 mph. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.
2. Sound Attenuation Level: Entire package delivers a maximum sound pressure level of 80 dBA at 7 meters at full load.
3. Structural Design and Anchorage: Comply with ASCE/SEI 7 for wind loads up to150 mph.
4. Hinged Doors: With padlocking provisions.
5. Space Heater: Thermostatically controlled and sized to prevent condensation.
6. Thermal Insulation: Manufacturer's standard materials and thickness selected in coordination with space heater to maintain winter interior temperature within operating limits required by engine generator components.
7. Muffler Location: Within enclosure.

8. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for two hours with ambient temperature at top of range specified in system service conditions.
9. Provide trailer type with ball hitch connection.

2.10 Vibration Isolation Devices

1. Elastomeric Isolator Pads: Oil and water resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.
2. Material: Standard neoprene separated by steel shims.
3. Shore A Scale Durometer Rating: 50.
4. Number of Layers: Two.
5. Minimum Deflection: 1 inch.
6. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint.
7. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory drilled baseplate bonded to 1/4-inch-thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment-mounting and -leveling bolt that acts as blocking during installation.
8. Outside Spring Diameter: Not less than 80 percent of compressed height of the spring at rated load.
9. Minimum Additional Travel: 50 percent of required deflection at rated load.
10. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
11. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
12. Minimum Deflection: 1 inch.

    a. Comply with requirements in Section 232116 "Hydronic Piping Specialties" for vibration isolation and flexible connector materials for steel piping.

    b. Comply with requirements in Section 233113 "Metal Ducts" for vibration isolation and flexible connector materials for exhaust shroud and ductwork.

    c. Vibration isolation devices shall not be used to accommodate misalignments or to make bends.

2.11 Finishes

1. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.12 Source Quality Control

1. Prototype Testing: Factory test engine generator using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.
2. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.

PART 3 - EXECUTION

3.1 Examination

1. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine generator performance.
2. Examine roughing-in for piping systems and electrical connections to verify actual locations of connections before packaged engine generator installation.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

1. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:

    a. Notify Owner no fewer than 7 working days in advance of proposed interruption of electrical service.

    b. Do not proceed with interruption of electrical service without Owner's written permission.

3.3 Installation

1. Comply with NECA 1 and NECA 404.
2. Comply with packaged engine generator manufacturers' written installation and alignment instructions and with NFPA 110.
3. Equipment Mounting:

    a. Install packaged engine generators on cast-in-place concrete equipment bases.

    b. Coordinate size and location of concrete bases for packaged engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

    c. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

4. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.4 Connections

1. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
2. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Provide a minimum of one 90-degree bend in flexible conduit routed to the engine generator from a stationary element.
3. Balance single-phase loads to obtain a maximum of 10 percent unbalance between any two phases.

3.5 Identification

1. Identify system components according to Section 260553 "Identification for Electrical Systems."
2. Install a sign indicating the generator neutral is bonded to the main service neutral at the main service location.

3.6 Field Quality Control

1. Perform tests and inspections with the assistance of a factory authorized service representative.

3.7 Tests and Inspections

1. Perform tests recommended by manufacturer and each visual and mechanical inspection and electrical and mechanical test listed in first two subparagraphs below, as specified in NETA ATS. Certify compliance with test parameters.

    a. Visual and Mechanical Inspection:

        1) Compare equipment nameplate data with Drawings and the Specifications.

        2) Inspect physical and mechanical condition.

        3) Inspect anchorage, alignment, and grounding.

        4) Verify that the unit is clean.

2. Electrical and Mechanical Tests

    a. Perform insulation-resistance tests according to IEEE 43.

    b. Machines Larger Than 200 hp Test duration shall be 10 minutes. Calculate polarization index.

    c. Machines 200 hp or Less: Test duration shall be one minute. Calculate the dielectric-absorption ratio.

    d. Test protective relay devices.

    e. Verify phase rotation, phasing, and synchronized operation as required by the application.

    f. Functionally test engine shutdown for low oil pressure, overtemperature, overspeed, and other protection features as applicable.

    g. Perform vibration test for each main bearing cap.

    h. Conduct performance test according to NFPA 110.

    i. Verify correct functioning of the governor and regulator.

3. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single step full load pickup test.
4. Battery Tests:

    a. Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.

    b. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.

    c. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.

    d. Verify acceptance of charge for each element of the battery after discharge.

    e. Verify that measurements are within manufacturer's specifications.

5. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
6. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine generator system before and during system operation. Check for air, exhaust, and fluid leaks.
7. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases and verify that performance is as specified.
8. Leak Test: After installation, charge exhaust, coolant, and fuel systems and test for leaks. Repair leaks and retest until no leaks exist.
9. Operational Test:

    a. After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation for generator and associated equipment.

    b. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

    c. Remove and replace malfunctioning units and retest as specified above.

10. Retest:

    a. Correct deficiencies identified by tests and observations, and retest until specified requirements are met.

    b. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

3.8 Maintenance Service

1. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of manufacturer's authorized service representative. Include quarterly preventive maintenance and exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Parts shall be manufacturer's authorized replacement parts and supplies.

3.9 Demonstration

1. Engage a factory authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators.

END OF SECTION 263213

SECTION 263600 - TRANSFER SWITCHES

PART 1 - GENERAL

1.1 Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary

1. Section includes automatic transfer switches rated 600 V and less, including the following:

1.3 Action Submittals

1. Product Data: For each type of product.
    a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for transfer switches.
    b. Include rated capacities, operating characteristics, electrical characteristics, and accessories.
2. Shop Drawings:
    a. Include plans, elevations, sections, details showing minimum clearances, conductor entry provisions, gutter space, and installed features and devices.
    b. Include material lists for each switch specified.

1.4 Informational Submittals

1. Field quality-control reports.

1.5 Closeout Submittals

1. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.
    a. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
        1) Features and operating sequences, both automatic and manual.
        2) List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

1.6 Field Conditions

1. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service:

a. Notify Owner no fewer than 7 days in advance of proposed interruption of electrical service.

b. Do not proceed with interruption of electrical service without Owner's written permission.

1.7 Warranty

1. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of transfer switch or transfer switch components that fail in materials or workmanship within specified warranty period.

a. Warranty Period: 12 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 Performance Requirements

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with NEMA ICS 1.
3. Comply with UL 1008 unless requirements of these Specifications are stricter.
4. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.
5. Tested Fault-Current Closing and Short-Circuit Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.

a. Short-time withstand capability for 30 cycles.

6. Repetitive Accuracy of Solid-State Controls: All settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.
7. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.62. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
8. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism. Switches for emergency or standby purposes shall be mechanically and electrically interlocked in both directions to prevent simultaneous connection to both power sources unless closed transition.
9. Neutral Terminal: Solid and fully rated unless otherwise indicated.
10. Heater: Equip switches exposed to outdoor temperatures and humidity, and other units indicated, with an internal heater. Provide thermostat within enclosure to control heater.
11. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, by color-code or by numbered or lettered wire and cable shrinkable sleeve markers at terminations. Color-coding and wire and cable markers are specified in Section 260553 "Identification for Electrical Systems."

a. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.

b. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.

c. Control Wiring: Equipped with lugs suitable for connection to terminal strips.

d. Accessible via front access.

12. Enclosures: NEMA type as required for location, unless otherwise indicated.

2.2 Contactor Type Automatic Transfer Switches

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ASCO.

b. Caterpillar, Inc.; Electric Power Division.

c. Cummins Power Generation.

d. Emerson.

e. Generac Power Systems, Inc.

f. General Electric Company.

g. Kohler Power Systems.

h. MTU Onsite Energy Corporation.

i. Russelectric, Inc.

2. Comply with Level 1 equipment according to NFPA 110.
3. Switch Characteristics: Designed for continuous duty repetitive transfer of full rated current between active power sources.
4. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are unacceptable.
5. Switch Action: Double throw; mechanically held in both directions.
6. Contacts: Silver composition or silver alloy for load-current switching. Contactor-style automatic transfer-switch units, rated 600 A and higher, shall have separate arcing contacts.
7. Conductor Connectors: Suitable for use with conductor material and sizes.
8. Material: Hard-drawn copper, 98 percent conductivity.
9. Main and Neutral Lugs: Mechanical type.
10. Ground Lugs and Bus-Configured Terminators:

a. Mechanical type.

b. Ground bar.

c. Connectors shall be marked for conductor size and type according to UL 1008.

11. Automatic Open Transition Transfer Switches:

a. Interlocked to prevent the load from being closed on both sources at the same time.

b. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.

12. Failure of power source serving load initiates automatic break-before-make transfer.
13. Electric Nonautomatic Switch Operation: Electrically actuated by push buttons designated "Normal Source" and "Alternative Source." Switch shall be capable of transferring load in either direction with either or both sources energized.
14. Signal Before Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval shall be adjustable from 1 to 30 seconds.
15. Automatic Transfer-Switch Controller Features: Controller operates through a period of loss of control power.
16. Undervoltage Sensing for Each Phase of Normal and Alternate Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
17. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
18. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
19. Test Switch: Simulate normal-source failure.
20. Switch Position Pilot Lights: Indicate source to which load is connected.
21. Source Available Indicating Lights: Supervise sources via transfer switch normal and emergency-source sensing circuits.

    a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."

    b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."

22. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
23. Transfer Override Switch: Overrides automatic retransfer control so transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
24. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
25. Engine Shutdown Contacts: Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
26. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30

minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:

a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.

b. Push-button programming control with digital display of settings.

c. Integral battery operation of time switch when normal control power is unavailable.

2.3 Source Quality Control

1. Factory Tests:

a. Test and inspect components, assembled switches, and associated equipment according to UL 1008. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

b. Prepare test and inspection reports.

c. For each of the tests required by UL 1008, performed on representative devices, for emergency systems. Include results of test for the following conditions:

1) Overvoltage.

2) Undervoltage.

3) Loss of supply voltage.

4) Reduction of supply voltage.

5) Alternative supply voltage or frequency is at minimum acceptable values.

6) Temperature rise.

7) Dielectric voltage-withstand; before and after short-circuit test.

8) Overload.

9) Contact opening.

10) Endurance.

11) Short circuit.

12) Short-time current capability.

13) Receptacle withstand capability.

14) Insulating base and supports damage.

PART 3 - EXECUTION

3.1 Installation

1. Floor Mounting Switch:

    a. Anchor to floor by bolting.

    b. Install transfer switches on cast-in-place concrete equipment base(s).

    c. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.

    d. Provide workspace and clearances required by NFPA 70.

2. Annunciator and Control Panel Mounting: Flush in wall unless otherwise indicated.
3. Identify components according to Section 260553 "Identification for Electrical Systems."
4. Set field-adjustable intervals and delays, relays, and engine exerciser clock.
5. Comply with NECA 1.

3.2 Connections

1. Wiring to Remote Components: Match type and number of cables and conductors to generator sets, control, and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner, if necessary, to accommodate required wiring.
2. Wiring Method:

    a. Install cables in raceways and cable trays except within electrical enclosures. Conceal raceway and cables except in unfinished spaces.

    b. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

3. Wiring within Enclosures:

    a. Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.

    b. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

    c. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

    d. Connect twisted pair cable according to Section 260523 "Control-Voltage Electrical Power Cables."

    e. Route and brace conductors according to manufacturer's written instructions and Section 260529 "Hangers and Supports for Electrical Systems." Do not obscure manufacturer's markings and labels.

f. Final connections to equipment shall be made with liquid tight, flexible metallic conduit no more than 18 inches in length.

3.3 Field Quality Control

1. Perform the following tests and inspections with the assistance of a factory authorized service representative:

   a. After installing equipment, test for compliance with requirements according to NETA ATS.

2. Visual and Mechanical Inspection:

   a. Compare equipment nameplate data with Drawings and Specifications.

   b. Inspect physical and mechanical condition.

   c. Inspect anchorage, alignment, grounding, and required clearances.

   d. Verify that the unit is clean.

   e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.

   f. Verify that manual transfer warnings are attached and visible.

   g. Verify tightness of all control connections.

   h. Inspect bolted electrical connections for high resistance using one of the following methods, or both:

      1) Use of low-resistance ohmmeter.

      2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data.

   i. Perform manual transfer operation.

   j. Verify positive mechanical interlocking between normal and alternate sources.

   k. Perform visual and mechanical inspection of surge arresters.

   l. Inspect control power transformers.

   m. Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.

   n. Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.

   o. Verify correct functioning of drawout disconnecting contacts, grounding contacts, and interlocks.

3. Electrical Tests:

   a. Perform insulation-resistance tests on all control wiring with respect to ground.

   b. Verify settings and operation of control devices.

   c. Calibrate and set all relays and timers.

   d. Verify phase rotation, phasing, and synchronized operation.

   e. Perform automatic transfer tests.

   f. Verify correct operation and timing of the following functions:

   g. Normal source voltage sensing and frequency-sensing relays.

   h. Engine start sequence.

   i. Time delay on transfer.

   j. Alternative source voltage-sensing and frequency-sensing relays.

   k. Automatic transfer operation.

   l. Interlocks and limit switch function.

   m. Time delay and retransfer on normal power restoration.

   n. Engine cool-down and shutdown feature.

   o. Measure insulation resistance phase-to-phase and phase-to-ground with insulation resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

   p. Check for electrical continuity of circuits and for short circuits.

   q. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.

   r. Verify that manual transfer warnings are properly placed.

   s. Perform manual transfer operation.

   t. After energizing circuits, perform each electrical test for transfer switches stated in NETA ATS and demonstrate interlocking sequence and operational function for each switch at least three times.

   u. Simulate power failures of normal source to automatic transfer switches and retransfer from emergency source with normal source available.

   v. Simulate loss of phase-to-ground voltage for each phase of normal source.

w. Verify time-delay settings.

x. Verify pickup and dropout voltages by data readout or inspection of control settings.

3.4 Demonstration

1. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.
2. Training shall include testing ground-fault protective devices and instructions to determine when the ground-fault system shall be retested. Include instructions on where ground-fault sensors are located and how to avoid negating the ground-fault protection scheme during testing and circuit modifications.
3. Coordinate this training with that for generator equipment.

END OF SECTION 263600

SECTION 269000 - INSTRUMENTATION AND CONTROLS

PART 1 - GENERAL

1.1 Description of Work

1. In general, the work specified in this section of the specifications includes the furnishing of all labor, material, and services necessary to install the instrumentation, control and monitoring systems, including all fees, charges, and permits.
2. The Contractor shall refer to other sections and drawings for locations of pressure-operated control switches, float switches, solenoid-operated valves, limit switches, alarm actuating contacts, and other devices requiring wiring.
3. The Contractor shall make all interconnections required between transmitters, receivers, control panels, and miscellaneous devices, and shall provide for electrical supply to metering and signal systems.
4. All conduit and wiring between electrical and instrumentation panels, all field-mounted devices, and power sources shall be furnished and installed as required for a complete operable system.

1.2 Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to the work of this section.
2. This is a basic Instrumentation and Controls Section. The provisions of this section shall include all sections of Division 26.

1.3 System Responsibility

1. To ensure a coordinated control system, to properly achieve the indicated functions, and to provide a maximum interchangeability of equipment items and parts, the complete instrument and control system shall be furnished by a single Instrumentation System Contractor/Supplier who shall be responsible for the satisfactory operation of the system.
2. The system contractor/supplier shall maintain a permanent in-house system engineering and fabrication facility including a quality assurance organization with the ability to perform complete system checkout and simulation in the shop prior to shipment.
3. The system contractor/supplier shall maintain a permanent field service engineer for maintenance service.
4. The system contractor/supplier shall perform all system engineering, prepare all necessary internal and external wiring and piping drawings, and assume full responsibility with the performance requirements of these specifications, and as required for a complete and operable system.
5. The instrumentation equipment locations and conduit drawings are diagrammatic to show the general scope and route of instrumentation system conduit. The Instrumentation System Contractor/Supplier shall provide all conduit and wiring necessary for his specific requirements, in accordance with these specifications, and without additional cost to the Owner.
6. The Instrumentation System Contractor/Supplier shall be responsible for providing all applications programming and configuration services to accomplish the control and monitoring functions described in the Specifications and Contract Drawings.
7. Provide all programming functions including, but not limited to, any control strategies and communications. The Instrumentation System Contractor/Supplier shall also provide all

application programming and configuration services necessary to produce the HMI graphic displays, reports, trends, historical archive, etc. as described in the Specifications and Contract Drawings.

8. Perform all system engineering, prepare all necessary internal and external wiring and piping drawings, and assume full responsibility with the performance requirements of these specifications, and as required for a complete and operable facility.
9. Coordinate the control systems for proper operation with related equipment and materials furnished by other suppliers under other sections of these specifications and with related existing equipment.
10. Auxiliary and accessory programming structures necessary for system operation or performance shall be included whether or not they are specified or shown on the contract drawings.
11. All equipment shall be controlled in full conformity with the specifications, drawings, engineering data, instructions, and recommendations of the equipment manufacturer.
12. To facilitate the Owner's future operation and maintenance requirements, all programming and operator interface development shall match the form and function of the existing Columbia County standards.
13. The Instrumentation System Contractor/Supplier shall coordinate and schedule all testing procedures.

1.4 Verification of Owner's Data

1. Prior to commencing any work, the Contractor shall satisfy himself as to the accuracy of all data as indicated in these plans and specifications and/or as provided by the Owner. Should the Contractor discover any inaccuracies, errors, or omissions in the data, he shall immediately notify the Architect/Engineer in order that proper adjustments can be anticipated and ordered. Commencement by the Contractor of any work shall be held as an acceptance of the data by him after which time the Contractor has no claim against the Owner resulting from alleged errors, omissions or inaccuracies of the said data.

1.5 Delivery and Storage of Materials

1. Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. All material shall be stored to provide protection from the weather and accidental damage.
2. Extent of work is indicated by the drawings, schedules, and the requirements of the specifications. Singular references shall not be constructed as requiring only one device if multiple devices are shown on the drawings or are required for proper system operation.

1.6 Guarantee

1. All work shall be guaranteed for a minimum 1-year period, effective after Engineer acceptance of system.
2. Owner reserves right to make emergency repairs as required to keep equipment in operation without voiding Contractor's Guarantee Bond nor relieving Contractor of his responsibilities during guarantee period.

1.7 Approval Submittals

1. The Contractor's attention is directed to the requirements of section 260000 Electrical General with regards to submissions for approval. To facilitate review and approval of the

proposed system, shop drawing submittals shall be made in two steps. The first submittal shall include all in-line devices such as flowmeters, control valves, etc., to be supplied or coordinated with the instrumentation system. The second submittal shall include complete details of the instrumentation system.

2. Shop drawing submittals shall include the following:

    a. Field Instrument Submittal

        1) Instrument data sheets indicating all pertinent data including complete model number, and description of each option and accessory.

        2) Each instrument shall be identified by tag number and nomenclature as indicated on the drawings and in these specifications.

    b. System Hardware Submittal

        1) Complete front panel view with component locations, subpanel view with component locations, and electrical schematics.

        2) Functional description of the entire system including individual loop diagram descriptions.

        3) Detail loop diagrams showing both piping and wiring requirements for each analog instrument loop in the system.

        4) Component drawing for each component showing dimensions, mounting, and external connection details.

        5) Detail layout, dimensions, fabrication, piping, and wiring schematic, connection, and interconnection drawings for each instrumentation panel, graphic display, termination cabinet, etc.

    c. System Software Submittal

        1) Preliminary Graphics Submittal

        2) Process Control Strategy, Graphic Screen and Reports Submittal

3. Preliminary Graphics Submittal: The preliminary graphics submittal shall be reviewed at first coordination meeting and shall include the following:

    a. Standard symbols.

    b. Standard color conventions to be used for pumps, valves, filters, pipe colors, equipment on and off, alarm status colors, etc.

    c. Sample HMI graphic displays.

    d. Sample equipment interface popup displays.

    e. Alarm display descriptions.

f. Alarm acknowledge descriptions.

4. Process Control Strategy, Graphic Screen and Reports

a. The Instrumentation System Contractor/Supplier shall hold all necessary meetings at the project site and Owner's office building to solicit the Owner and Engineer's input prior to submitting the process control strategies and operator interface submittals. These meetings shall also be used to establish standards for developing the database, trends, graphics, reports and control strategies

b. The process control strategies shall be developed in a functional block (logic) diagram presentation based on information from the specifications and drawings. Included with each diagram shall be: and in these specifications.

1) A short narrative of the control strategy.

2) Any assumptions made in developing the program.

3) I/O database list showing all field inputs and output signals or data points associated with the control strategy.

4) Cross-reference list of all l/O showing to which I/O modules or software modules they are linked.

5) List of all operator inputs or outputs to and from the control strategy.

6) Specific OIT and HMI graphic displays and reports related to the strategy shall be illustrated, defined and formatted.

7) A narrative of the operation of any panels shall be described as it relates to the strategy.

8) A narrative of the failure contingencies shall be described in detail.

c. This submittal shall cover any associated program (function block diagrams, script language, etc.) developed under this contract required to implement the control strategy specified.

d. The annotated program shall be submitted in 8-1/2 inch by 11-inch format and electronic media for all logic developed. Annotation shall be 3 lines of 6 characters each for every logic contact. In addition, each network or rung shall be annotated so that a non-technical person can read and easily comprehend what control function the rung or network is performing.

e. This submittal shall also include PLC l/O configuration tables, I/O reference usage table, complete cross-reference to specific rung used of all inputs, outputs, internal coils, data registers and special purpose coils. In addition, any special switch settings or hardware configuration requirements such as communications port configurations shall be described in detail and submitted.

f. This submittal shall cover the specific plant control strategies as well as the semifinal details of the plant reports and process graphic displays. This submittal shall also include what appears on each display and what appears on each display and what calculations are required to support them.

g. Each system point shall have the capability of being stored historically for an indefinite period of time and shall be capable of being changed. Each system point's raw value shall be available for trending.

h. A complete list of all signals to be collected for long-term historical information shall be provided. This listing shall include frequency of data sampling and duration for which the data shall immediately accessible.

5. Shop drawings shall include detailed Bill of Materials for each component.
6. Operation and maintenance manuals, in accordance with the provisions of section 260000, shall also be supplied. Operating instructions shall incorporate an updated functional description of the entire system including the system schematics that reflect as-built modifications. Special maintenance requirements particular to the system shall be clearly defined along with special calibration and test procedures.

a. A complete set of "as-built" wiring, fabrication, and interconnection drawings shall be included with the manuals.

b. Electronic copies of the O&M manuals with as-built drawings shall be provided in PDF format.

c. Electronic copies of the as-built drawings shall also be provided on compact disk in AutoCAD format.

1.8 Test Reports and Verification Submittals

1. Submit test reports, certifications and verification letters as called for in other sections. Contractor shall coordinate the required testing and documentation of system performance such that sufficient time exists to prepare the reports, submit the reports, review the reports and take corrective action within the scheduled contract time.

1.9 Quality Assurance

1. The chemical feed equipment shall be the product of manufacturers that have designed and manufactured similar equipment and have a record of ten years or more of successful operation of such equipment in the field. The manufacturer must have ISO 9001 Certification.
2. All equipment provided under this section shall be obtained from a single supplier or manufacturer that shall assume full responsibility for the completeness and proper installation of the system.
3. To ensure quality and unit responsibility, the Contractor must assemble and test the control system logic at its facility. The manufacturer must have a physical plant, technical and design staff and fabricating personnel to complete the work specified.

PART 2 - PRODUCTS

2.1 General Equipment Requirements

1. All materials shall be new as shown on the drawings, the best of their respective kinds, suitable for the conditions and duties imposed on them at the building and shall be of reputable manufacturers. The description, characteristics, and requirements of materials to be used shall be in accordance with qualifying conditions established in the following sections.

2.2 Equipment and Materials

1. Shall be new and the most suitable grade for the purpose intended. Equipment furnished under this section shall be the product of a manufacturer regularly engaged in the manufacturer of such items for a period of three years. Where practical, all of the components shall be products of a single manufacturer in order to provide proper coordination and responsibility. Where required, Contractor shall furnish proof of installation of similar units or equipment.
2. Each item of equipment shall bear a name plate showing the manufacturer's name, trade name, model number, serial number, ratings and other information necessary to fully identify it. This plate shall be permanently mounted in a prominent location and shall not be concealed, insulated or painted.
3. The label of the approving agency, such as UL, by which a standard has been established for the particular item shall be in full view.
4. The equipment shall be essentially the standard product of a manufacturer regularly engaged in the production of such equipment and shall be a product of the manufacturer's latest design.
5. A service organization with personnel and spare parts shall be available within two hours for each type of equipment furnished.
6. Install in accordance with manufacturer's recommendations. Place in service by a factory trained representative where required.
7. Materials and equipment are specified herein by a single or by multiple manufacturers to indicate quality, material and type of construction desired. Manufacturer's products shown on the drawings have been used as basis for design; it shall be the Contractor's responsibility to ascertain that alternate manufacturer's products, or the particular products of named manufacturers, meet the detailed specifications and that size and arrangement of equipment are suitable for installation.

2.3 Model Numbers

1. Catalog numbers and model numbers indicated in the drawings and specifications are used as a guide in the selection of the equipment and are only listed for the contractor's convenience. The contractor shall determine the actual model numbers for ordering materials in accordance with the written description of each item and with the intent of the drawings and specifications.

2.4 Requests for Substitution

1. Where a particular system, product or material is specified by name, consider it as standard basis for bidding, and base proposal on the particular system, product or material specified.

2. Requests by Contractor for substitution will be considered only when reasonable, timely, fully documented, and qualifying under one or more of the following circumstances:

   a. Required product cannot be supplied in time for compliance with Contract time requirements.

   b. Required product is not acceptable to governing authority, or determined to be non-compatible, or cannot be properly coordinated, warranted or insured, or has other recognized disability as certified by Contractor.

   c. Substantial cost advantage is offered Owner after deducting offsetting disadvantages including delays, additional compensation for redesign, investigation, evaluation and other necessary services and similar considerations.

3. All requests for substitution shall contain a "Comparison Schedule" and clearly and specifically indicate any and all differences or omissions between the product specified as the basis of design and the product proposed for substitution. Differences shall include but shall not be limited to data as follows for both the specified and substituted products:

   a. Principal of operation.

   b. Materials of construction or finishes.

   c. Thickness of gauge of materials.

   d. Weight of item.

   e. Deleted features or items.

   f. Added features or items.

   g. Changes in other work caused by the substitution.

   h. Actuators when applicable.

4. If the approved substitution contains differences or omissions not specifically called to the attention of the Architect/Engineer, the Owner reserves the right to require equal or similar features to be added to the substituted products (or to have the substituted products replaced) at the Contractor's expense.

2.5 Cellular Based Monitoring and Control System: Wireless, web-based alarm detection and notification system from RACO designed specifically for water and wastewater applications. System shall be sufficiently robust to permit direct user on demand management of the following functions via the web; administration and configuration of WRTUs (Wireless Remote Terminal Unit), system preferences, adding users, reporting parameters, and report generation. Cellular monitoring and control system shall allow users to see in real-time all local conditions at the WRTU. These conditions include:

1. All I/O states.
2. Incoming power conditions.
3. Battery charging states and voltage levels.

4. A service contract with local cellular carriers shall NOT be required for WRTU operation. The WRTU shall communicate with a dedicated website via wireless cellular communications. RACO shall own and maintain all connection with cellular carriers.
5. The WRTU shall have the following minimum complement of inputs and outputs:

    a. Input Monitoring Function: The basic unit shall continuously monitor the presence of AC power the status of inputs and outputs. AC power failure or violation of the alarm criteria at any input shall cause the unit to go into alarm status. Each input channel shall also be independently programmable, without the need to manipulate circuit board switches or jumpers.

    b. Alarm Trip Delay: All alarm inputs, power failure alarms shall have individually assigned alarm trip delay settings. The range shall be 2 seconds – 1 hour.

    c. Digital Inputs: May be programmed multiple input types.

    d. Relay Contact Outputs: Normally Open Output relays shall be provided as required.

6. LED Indicators shall include, both performance and diagnostic categories
7. AlarmAgent.com WRTUs shall utilize the data services of most national and regional LTE cellular carriers in North America.
8. The basic WRTU configuration items shall be performable via local switch settings on the WRTU, or remotely via the website. With all digital inputs in their non-alarm state, pressing an “accept” pushbutton on the WRTU shall automatically set the open / closed alarm criteria for each input. The WRTU shall at the user's option be configurable from the website without need to visit the WRTU.
9. Future firmware enhancements of the operating features of the WRTU shall be implemented via over-the-air firmware upgrades automatically sent to the WRTU by the manufacturer.
10. All wiring connections shall be via unpluggable screw-clamp terminal blocks, which accommodate 16 to 26 AWG wire.
11. The WRTU shall operate on 12 VDC power input; with 12 VDC input, current shall be 1 ampere peak 200 mA average.
12. The WRTU shall incorporate a sealed lead-acid backup battery contained within the enclosure. The battery shall be automatically charged, providing 24 hours nominal backup time (In real-time operations this nominal back-up time is reduced due to operational demands). All enclosure options shall accommodate the battery internally.
13. Digital inputs shall be optically isolated and rated at 5,000 V. Universal inputs shall be rated at 600 watts. Power input shall be protected to 1,500 watts peak. Surge protection shall be 1,500 watts peak. The fuse shall reset automatically.
14. The WRTU shall transmit both alarms and returns to normal to the website. Website settings shall determine whether actual notifications are delivered to users upon return to normal.
15. The WRTU shall incorporate means to suppress alarm reports arising from any given input going in and out of alarm repeatedly. Such suspensions shall apply only to the input involved. Notification shall be provided when such suspensions occur. Such suspensions will automatically clear upon receipt of template reports or when manually cleared at the WRTU.
16. The Manufacturer shall provide a two year limited warranty on all equipment provided covering parts and labor performed at the factory.

2.6 Supervisory Control System

1. Manufacturer Basis of Design: Scheider Automation
2. General: The supervisory control system (SCS) shall be a complete integrated system furnished and configured by the Instrumentation System Contractor/Supplier who shall be responsible for the satisfactory operation of the entire system. The SCS shall consist of programmable logic controllers, operator interface panels, and fiber optic communications network.

    a. The Instrumentation System Contractor/Supplier shall provide complete system configuration submittal data, including detailed I/O signal listings, proposed ladder logic, etc. for coordination and approval prior to implementation.

    b. The Instrumentation System Contractor/Supplier shall provide all SCS system programming.

    c. System startup and testing shall be provided by the contractor, and shall be witnessed and approved by Columbia County and the Engineer.

    d. Each PLC shall be loaded and tested at the Instrumentation System Contractor/Supplier manufacturing facility, and shall be witnessed and approved by Columbia County and the Engineer.

3. Programmable Logic Controller (PLC): Each PLC shall be fully equipped to monitor all equipment status, alarm, and instrumentation system analog signals; control selected equipment operations; and seamlessly connect to the communications network. Each PLC shall be Allen-Bradley CompactLogix, no exceptions. Configuration shall be based upon the following standardized components:

    a. CPU (2MB Memory)

    b. Digital lnput Modules

    c. Digital Output Modules

    d. Analog Input Modules

    e. Analog Output Modules

    f. Power Supply

    g. Operator Interface Panel (OIT)

4. Programmable Software: The Instrumentation System Contractor/Supplier shall provide one complete copy of the programming software licensed to the Owner. Electronic and hard copies of all final approved PLC programming shall be furnished to the Owner with the O&M manuals.

2.7 Panel LED Lights

1. Manufacturer Basis of Design: Harmony XB4 Pilot Light, metal 24 V AC DC.
2. Shall include multiple color selections.

3. Bezel material: Chromium plated metal.
4. Mounting diameter: 0.9 in (22.5 mm).
5. Shape of signaling unit head shall be round.
6. Lens color: As required by plans.
7. Signaling Type: Steady.
8. Service life: 100,000 h at rated voltage.
9. Ambient air temperature for operation: -40 to 158 F (-40 to 70 C).
10. NEMA degree of protection: NEMA 4X.

2.8 Panel 3-Position Selector Switch

1. Manufacturer Basis of Design: Harmony ZB4 selector switch operating head, 3 position, maintained, black, unmarked
2. Shall include multiple color selections.
3. Bezel material: Chromium plated metal.
4. Mounting diameter: 0.9 in (22.5 mm).
5. Shape of signaling unit head shall be round.
6. Operator position: 3 positions +/- 45 Deg.
7. Signaling Type: Steady.
8. Service life: 100,000 cycles.
9. Ambient air temperature for operation: -40 to 158 F (-40 to 70 C).
10. NEMA degree of protection: NEMA 4X.

2.9 Panel Counter

1. Manufacturer Basis of Design: Red Lion.
2. Display Range: -99999999 to 99999999.
3. Reset: remote dry contact input and local.
4. LED: Yes.
5. Backlight: Yes.
6. Material: Plastic.
7. Function: Counter.
8. Max Operating Temperature: 70 C (158 F).
9. Min Operating Temperature: -35 C (-31 F).
10. Digit Height: .4” to .5”.

2.10 Radar Sensor – Level Measurement

1. Manufacturer Basis of Design: VEGAPULS C 21, Two-wire 4-20 mA.
2. Measurement Range: Up to 15 ft.
3. Beam Angle: 8 Deg.
4. Measurement Frequency: W-Band (80 GHz Technology).
5. Output Signal: 4-20 mA/HART.
6. Ambient Temperature: -40 to 176 F (-40 to 80 C).
7. Bluetooth Range: Bluetooth 5.0
8. Bluetooth Range: 82 ft (25 m).
9. The housing shall be optimized for applications in the water/waste water industry and manufactured of PVDF. Protection rating IP66/IP68 (3 bar) shall be achieved.

2.11 Flow Element:

1. Manufacturer Basis of Design: Yokogawa ADMAG TI Series; AXW Magnetic Flow Meter.
2. Electromagnetic flow meters for permanent installation above ground with integral flow meter and display.
3. Output Signal: 4-20 mA/HART.
4. Ambient Temperature: -10 to 60 C (14 to 140 F).
5. Measurement Range: .33 ft/s to 33 ft/s.
6. Repeatability: +/- 0.1% of rate (Velocity 3.3 ft/s or above).
7. Power: 120 VAC 60 Hz.
8. Fluid Conductivity: 1 µS/cm or larger.
9. Pressure Rating: 250 PSI.
10. Submittals: Furnish complete Product Data, Shop Drawings, Test Reports, Operating Manuals, Record Drawings, Manufacturer's certifications, Manufacturer's Field Reports and the following specific product data:

    a. Dimensional Drawings

    b. Materials of Construction

        1) Sensor

        2) Liner

        3) Electrodes

        4) Flanges

    c. Measurement Accuracy

    d. Range and Range Ability

    e. Enclosure Rating

    f. Classification Rating

    g. Power

        1) Voltage

        2) Wattage

    h. Output Options.

11. Quality Assurance

    a. Manufacture facilities shall be certified to the quality standards of ISO Standard 9001 Quality Systems - Model for Quality Assurance in Design/Development, Production, Installation, and Servicing.

b. Provide instrument suitable for the installed outdoor site conditions including but not limited to material compatibility, site altitude, process and ambient temperature, and humidity conditions.

12. Provide all parts, necessary for maintenance and calibration purposes throughout the warranty period. Deliver all of these supplies before project substantial completion.
13. Manufactured Unit: The flow meter shall be a flanged tube (by application and instrument schedule) which complies with AWWA C751 and transmitter which shall be mounted integral (compact) to the sensor.

    a. The flow metering system shall be microprocessor-based and possess a non-volatile memory to store the sensor calibration and transmitter setup information. The electronics shall be interchangeable for meters sizes 1”- 90”.

    b. The sensor shall be the proper size to measure the design flow rate of the piping and measure bi-directional flow as a standard.

    c. Lining: Fluorocarbon PTFE, various rubbers.

    d. Sensors from 1”-12” shall have fixed (welded) or rotating lap joint flanges.

    e. Sensors from 14”-120” shall have the flanges welded to the sensor body.

14. The sensor liner and electrode material shall be chosen to be compatible with the process fluid. All fluids require a minimum conductivity of 5µS/cm (20µS/cm for deionized water).
15. The sensor tube shall be lined with polyurethane, hard rubber or PTFE in accordance with NSF-61 based upon the size of the flow meter and the process media conditions.
16. The sensor shall house two measuring electrodes, a grounding electrode, and one for physical empty pipe detection. The electrodes shall be bullet-nosed shaped and made of 316L SS or Alloy C22 (listed by the application and instrument schedule).
17. The external sensor housing shall enclose the coil assemblies and internal wiring. The materials shall be designed and constructed to prevent moisture ingress and promote corrosion resistance.
18. The sensor shall be rated for NEMA 4X service as standard.

PART 3 - EXECUTION

3.1 Installation

1. All materials and equipment shall be installed and completed in a first-class workmanlike manner and in accordance with the best modern methods and practice. Any materials installed which do not present an orderly and reasonably neat and/or workmanlike appearance, or do not allow adequate space for maintenance, shall be removed and replaced when so directed by the Architect/Engineer.
2. The equipment shall be installed per the contract documents and the manufacturer’s recommendations.
3. Provide a manufacturer’s certificate showing the equipment has been satisfactorily calibrated and tested.
4. An authorized manufacturer’s representative shall inspect the installation of all work furnished under this section and shall provide a certificate of proper installation.

5. The manufacturer or manufacturer's authorized distributor or representative shall provide the following:

    a. Services of an experienced, authorized representative who shall be present at the job site and/or classroom designated by the Owner for the minimum man-days listed for the services shown below.

    b. One man-day per site for inspection, start-up, functional testing and certificate of proper installation.

    c. One man-day per site for training and commissioning

    d. All services shall be inclusive of travel and associated expenses.

3.2 Coordination

1. The Contractor shall be responsible for full coordination of the ICS and related systems with shop drawings of the related systems so that provisions for piping, ductwork, or other equipment are made.
2. Any additional steel supports required for the installation of any ICS equipment shall be furnished and installed under the section of the specifications requiring the additional supports.
3. It shall be the Contractor's responsibility to see that all equipment such as valves, dampers, sensors and such other apparatus or equipment that may require maintenance and operation are made easily accessible, regardless of the diagrammatic location shown on the drawings.
4. All connections to equipment shown on the drawings shall be considered diagrammatic unless otherwise indicated by detail. The actual connections shall be made to fully suit the requirements of each case and adequately provide for expansion and servicing.
5. The Contractor shall protect equipment, material, and fixtures at all times. He shall replace all equipment, material, and fixtures which are damaged as a result of inadequate protection.
6. Prior to starting and during progress of work, examine work and materials installed by others as they apply to work in this division. Report conditions which will prevent satisfactory installation.
7. Start of work will be construed as acceptance of suitability of work of others.

3.3 Interruption of Service

1. Before any equipment is shut down for disconnecting or tie-ins, arrangements shall be made with the Architect/Engineer and this work shall be done at the time best suited to the Owner. This will typically be on weekends and/or holidays and/or after normal working hours. Services shall be restored the same day unless prior arrangements are made. All overtime or premium costs associated with this work shall be included in the base bid.

3.4 Cutting and Patching

1. Contractor shall provide all cutting and patching of all holes, chases, sleeves, and other openings required for installation of equipment furnished and installed under this section. Utilize experienced trades for cutting and patching. Obtain permission from Architect/Engineer before cutting any structural items.

3.5 Painting

1. Touch-up factory finishes on equipment located inside and outside shall be done under this section. Obtain matched color coatings from the manufacturer and apply as directed. If corrosion is found during inspection on the surface of any equipment, clean, prime, and paint, as required.

3.6 Clean-up

1. Thoroughly clean all exposed parts of apparatus and equipment of cement, plaster, and other materials and remove all oil and grease spots. Repaint or touch up as required to look like new. During progress of work, contractor is to carefully clean up and leave premises and all portions of building free from debris and in a clean and safe condition.

3.7 Start-up and Operational Test

1. Start each item of equipment in strict accordance with the manufacturer's instructions; or where noted under equipment specification, start-up shall be done by a qualified representative of the manufacturer. Alignment, safety, and operating control shall be included in start-up check.

3.8 Climate Control

1. Operate heating and cooling systems as required after initial startup to maintain temperature and humidity conditions to avoid freeze damage and warping or sagging of ceilings and carpet.

3.9 Flow Meter Installation

1. As shown on installation details and mechanical Drawings.
2. As recommended by the manufacturer’s installation and operation manual.
3. Specific attention should be given to the following technical requirements:

    a. Verify ground rings (if required) have been installed according to the manufacturer recommendations.

    b. Reduced inlet installations must either be specified in the device ordering information or accompanied by manufacturer’s documented evidence of third party testing and data collection in comparison to a traceable standard.

4. Field Quality Control

    a. Each instrument shall be tested before commissioning and the Engineer shall witness the interface capability in the PLC control system and associated registers.

        1) Each instrument shall provide direct programming capability through the PLC.

        2) Each instrument shall provide direct control of totalizer reset functions through the PLC.

3) Each instrument shall be supported with a device profile permitting direct integration in the PLC.

5. The Engineer shall witness all instrument verifications in the field.
6. Manufacturers Field Services shall be included for start-up and commissioning by a Factory field service representative or a manufacturer's authorized service provider (ASP) – the warranty against manufacturing defects is three years.

   a. Manufacturer representative shall verify installation of all installed flow tubes and transmitters.

   b. Manufacturer representative shall notify the ENGINEER in writing of any problems or discrepancies and proposed solutions.

   c. Manufacturer representative shall perform field verification at the time of installation for long-term analysis of device linearity, repeatability and electronics health. A comparative report shall be generated for each meter tested.

   d. Manufacturer representative shall generate a configuration report for each meter.

3.10 Record (As Built) Drawings

1. During the progress of the work the Contractor shall record on their field set of drawings the exact location, as installed, of all controls, equipment, and other systems which are not installed exactly as shown on the contract drawings. [Contractor shall review the record (as-built) drawings with the Engineer and the field conditions at every regular job-site meeting. Pay requests will not be processed if record drawings are not accurate and current.]
2. Upon completion of the work, record drawings shall be prepared as described in the General Conditions, Supplementary Conditions, and Division 1.
3. For projects done in Revit, the A/E will update the Revit model for all field orders, ASIs or other Owner directed revisions. The Contractor shall update the Revit model with all shop drawing data, manufacturer model numbers and field adjustments. True Revit files are required. Imported files such as PDF, linked files, print clouds and IFC files are not acceptable.

3.11 Acceptance

1. Punch List: Submit written confirmation that all punch lists have been checked and the required work completed.
2. Instructions: At completion of the work, provide a competent and experienced person who is thoroughly familiar with project, for one day to instruct permanent operating personnel in operation of equipment and control systems. This is in addition to any specific equipment operation and maintenance training.

3.12 Operation and Maintenance Manuals

1. Furnish searchable PDF format with Table of Contents, organized, and tabbed by specification section.
2. Detailed operating instructions and instructions for making minor adjustments.
3. Complete wiring and control diagrams.

4. Routine maintenance operations.
5. Manufacturer's catalog data, service instructions, and parts lists for each piece of operating equipment.
6. Copies of approved submittals.
7. Copies of all manufacturer's warranties.
8. Copies of test reports and verification submittals.

3.13 Record Drawings

1. Submit record drawings.
2. Acceptance will be made on the basis of tests and inspections of job. Contractor shall furnish trained individuals to operate system, make any necessary adjustments and assist with final inspection.

END OF SECTION 269000

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section covers clearing, grubbing and stripping along the construction sites, complete as specified herein.

B. The Contractor shall clear and grub all of the area within the limits of construction or as required, which includes but is not limited to, utility easements. The width of the area to be cleared shall be established by the Owner's Representative prior to the beginning of any clearing.

1.2 MEASUREMENT AND PAYMENT

A. Section 012000 - Price and Payment Procedures.

B. Site Clearing:

1. Basis of Measurement: By lump sum, per the Project Bid Form.
2. Basis of Payment: Work under this section includes demolition indicated on Project Drawings, site clearing, loading waste materials and removing waste materials from Site.

1.3 QUALITY ASSURANCE

A. Conform to applicable Columbia County standards.

B. Perform Work in accordance with the State of Florida Highways standards.

PART 2 - PRODUCTS

2.1 Not Applicable. The use of herbicides in clearing and grubbing is specifically prohibited.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements.

B. Verify existing plant life designated to remain is tagged or identified.

3.2 PREPARATION

A. Call Local Utility Line Information service at 811 not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.
2. In areas so designated, topsoil shall be stockpiled. Topsoil so stockpiled shall be protected until it is placed as specified. Any topsoil remaining after all work is in place shall be disposed of by the Contractor.

3.3 PROTECTION

A. Locate, identify, and protect from damage all utilities indicated to remain.

B. Protect from damage existing plant life where indicated on Project Drawings.

C. Protect benchmarks, survey control points, and existing structures from damage or displacement.

3.4 CLEARING AND GRUBBING

A. Clearing

The surface of the ground, for the area to be cleared and grubbed shall be completely cleared of all timber, brush, stumps, roots, grass, weeds, rubbish and all other objectionable obstructions resting on or protruding through the surface of the ground. However, those trees which are designated by the Owner's Representative shall be preserved as hereinafter specified. Clearing operations shall be conducted so as to prevent damage to existing structures and installations, and to those under construction, and so as to provide for the safety of employees and others. Clearing for structures shall consist of topsoil and vegetation removal.

B. Grubbing

Grubbing shall consist of the complete removal of all stumps, roots larger than 1-1/2 inches in diameter, matted roots, brush, timber, logs and any other organic or metallic debris not suitable for foundation purposes, resting on, under or protruding through the surface of the ground to a depth of 18 inches below the subgrade. All depressions excavated below the original ground surface for or by the removal of such objects, shall be refilled with suitable materials and compacted to a density conforming to the surrounding ground surface.

All organic surface soils and muck shall be removed under all structures, tanks, pipes, slabs and roads, plus a 5-foot margin all around.

3.5 REMOVAL

A. The Contractor shall dispose of all material and debris from the clearing and grubbing operation by hauling such material and debris away to an approved dump. Disposal by burning or burial shall not be permitted. The cost of disposal (including hauling) of cleared and grubbed material and debris shall be considered a subsidiary obligation of the Contractor, the cost of which shall be included in the contract prices.

B. If the landowner desires the timber or small trees, the Contractor shall cut and neatly pile it in 4-foot lengths for removal by landowner; otherwise, the Contractor shall dispose of it by hauling away from the project site.

C. Remove debris, rock, and extracted plant life from Site.

D. Partially remove paving, curbs, and as indicated on Project Drawings. Neatly saw cut edges at right angle to surface.

E. Remove abandoned utilities. Indicate removal termination point for underground utilities on Record Documents.

F. Continuously clean-up and remove waste materials from Site. Do not allow materials to accumulate on Site and leave the Site in clean condition.

3.6 PRESERVATION OF TREES

A. Those trees which are designated on Project Drawings for preservation shall be carefully protected from damage. The Contractor shall erect such barricades, guards, and enclosures as may be considered necessary by him for the protection of the trees during all construction operations.

3.7 PRESERVATION OF DEVELOPED PRIVATE PROPERTY

A. The Contractor shall exercise extreme care to avoid unnecessary disturbance of developed private property as applicable. Trees, shrubbery, gardens, lawn and other landscaping, which in the opinion of the Owner's Representative must be removed, shall be replaced and replanted to restore the construction easement to the condition existing prior to construction.

B. All soil preparation procedures and replanting operations shall be under the supervision of a nurseryman experienced in such operations.

END OF SECTION 311000

SECTION 312213 - ROUGH GRADING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes, except as elsewhere provided, excavation, filling, compacting and grading to attain the subgrades and grades indicated on Project Drawings.

B. Supplemental foundation and site preparation notes are indicated on Project Drawings.

C. Related Requirements:

1. Section 312316.13 - Trenching.
2. Section 333213 - Packaged Wastewater Pumping Stations.

1.2 MEASUREMENT AND PAYMENT

A. Section 012000 - Price and Payment Procedures.

B. Rough Grading:

1. Basis of Measurement: By lump sum, per the Project Bid Form.
2. Basis of Payment: Work under this section includes excavation, removing excess materials from Site, importing borrow material from offsite, and site grading as indicated on Project Drawings. Additional payment is not made for over-excavation work nor for replacement materials.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO M145 - Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes.
2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-inch Drop.

B. ASTM International:

1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
3. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.4 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements.

B. Project Record Documents: Accurately record final ground elevations within the Project Area, as well as actual locations of any existing utilities remaining.

1.5 QUALITY ASSURANCE

A. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.

B. Protect structures, utilities, sidewalks, pavements, and other facilities from possible damage which may result from settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

C. The Contractor shall examine the Site taking into consideration all conditions that may affect his work. The Owner and Engineer will not assume responsibility for variations of sub-soil quality or conditions. A Soils Report has been prepared and is attached as an Appendix to this Report.

D. Existing Utilities: Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

E. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the Engineer and the Owner of such piping or utility immediately for directions.

F. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

G. Demolish and completely remove from Site existing underground utilities indicated to be removed.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory soil materials are those defined in AASHTO M145 Groups A-1, A-2-4, A-2-5, and A-3.

B. Unsatisfactory soil materials are those defined in AASHTO M145 Groups A-2-6, A-2-7, A-4, A-5, A-6, and A- 7, as well as peat and other highly organic soils.

C. Sub-base Material: Naturally or artificially graded mixture of sand clay, natural, or crushed sand, as acceptable to Owner’s Representative.

D. Backfill and Fill Materials: Satisfactory soil materials free of clay, rock or gravel larger than 2-inches in any dimension, debris, waste, vegetable and other deleterious matter.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements.

B. Examine the areas and conditions under which excavating, filling, and grading are to be performed. Notify Owner’s Representative of any unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected.

C. Examine and accept existing grade of walks, pavements and steps prior to commencement of work and report to Owner's Representative if elevations of existing subgrade varies from elevations shown on Project Drawings.

D. Verify survey benchmark and intended elevations for the Work are as indicated on Project Drawings.

3.2 PREPARATION

A. Call Local Utility Line Information service at 811 not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum.

C. Protect utilities indicated to remain from damage.

D. Protect from damage existing plant life where indicated on Project Drawings.

E. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 TOPSOIL EXCAVATION

A. Excavate topsoil from areas to be further excavated, relandscaped, or regraded, without mixing with foreign materials for use in finish grading.

B. Do not excavate wet topsoil.

C. Stockpile in area designated on site to depth not exceeding 8 feet and protect from erosion. Stockpile material on impervious material and cover over with same material, until disposal.

D. Remove excess topsoil not intended for reuse, from Site.

3.4 SUBSOIL EXCAVATION

A. Excavate subsoil from areas to be further excavated, relandscaped, or regraded.

B. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.

C. When excavating through roots, perform Work by hand and cut roots with sharp axe.

D. Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.

1. Locate and retain soil materials away from edge of excavations.
2. Dispose of excess soil material and waste materials from Site.

E. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key placed fill material to slope to provide firm bearing.

F. Stability: Replace damaged or displaced subsoil as specified for fill.

G. Excavation for Structures:

1. Conform to elevations and dimensions shown on Project Drawings within a tolerance of plus or minus 0.10 feet.
2. Extend excavation a sufficient distance from structures to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection, or as shown on Project Drawings.
3. Do not disturb bottom of excavation. Excavate by hand to final grade and trim bottoms to required lines and grades to leave solid base to receive structure (for precast concrete) or reinforcement (for poured concrete).

H. Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

3.5 BACKFILLING AND FILLING

A. General: Place material in layers to required contours and subgrade elevations as shown on Project Drawings.

B. Maintain optimum moisture content of fill materials to attain required compaction density.

C. Placement:

1. Place backfill and fill materials in continuous layers not more than 12-inches loose depth for material compacted by heavy compaction equipment, and not more than 6-inches loose depth for material compacted by hand-operated tampers.
2. Do not place backfill or fill material on surfaces that are muddy or that contain frost or ice.

D. Repair or replace items indicated to remain damaged by excavation or filling.

3.6 COMPACTION

A. General:

1. Control soil compaction during construction providing minimum percentage of density specified on Project Drawings for each area classification.

B. Moisture Control:

1. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content.
2. Compact each layer to the required percentage of maximum dry density or relative dry density for each classification.

C. Percentage of Maximum Density Requirements:

1. Compact soil to not less than the following percentages of maximum dry density in accordance with AASHTO T180.

    a. Pavements and Drives: Compact top 6-inches of subgrade uniformly to minimum 98 percent of maximum dry density.
    b. Lawn or Unpaved Areas: Compact each layer of backfill or fill uniformly to 95 percent of maximum dry density, including top 6 inches of subgrade.
    c. Topsoil: Compact final 4 inches of topsoil uniformly to minimum 90 percent of maximum density.

3.7 FINISH GRADING

A. General: Uniformly grade areas within limits of grading as indicated on Project Drawings, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

B. Finish grade surfaces to be free from irregular surface changes, and as follows:

1. Grassed or Unpaved Areas: Finish areas to not more than 0.10 feet above or below the required elevation.
2. Walks and Drives: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10 feet above or below the required subgrade.
3. Make grade changes gradual, blending slope into level areas.

C. Compaction: After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

3.8 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements.

B. Quality Control Testing During Construction: Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.

C. If, in the opinion of Owner’s Representative, based on testing service reports and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense.

3.9 MAINTENANCE

A. Protection of Graded Areas:

1. Protect newly graded areas from traffic and erosion. Keep areas free of trash and debris.
2. Repair and re-establish grades in settled, eroded and rutted areas to specified tolerances.

B. Reconditioning Compacted Areas:

1. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

END OF SECTION 312213

SECTION 312316.13 - TRENCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating trenches for utilities.
2. Compacted fill from top of utility bedding to subgrade elevations.
3. Backfilling and compaction.

B. Related Requirements:

1. Section 333123 -Sanitary Sewerage Force Main Piping.

1.2 MEASUREMENT AND PAYMENT

A. Section 012000 - Price and Payment Procedures.

B. Trenching:

1. Measurement and payment for Work under this section are included in the unit pricing for materials installation under related sections of these Specifications.
2. Basis of Payment: Work under this section includes trenching, removing unsuitable or excess materials from Site, importing suitable material from offsite, backfilling, compaction and testing. Additional payment is not made for over-excavation work nor for replacement materials.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO M145 - Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes.
2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-inch Drop.

B. ASTM International:

1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
3. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.4 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

1.5 SUBMITTALS

A. Section 013300 - Submittal Procedures.

B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.

C. Product Data: Submit data for geotextile fabric indicating fabric and construction.

D. Materials Source: Submit name of imported fill materials suppliers.

E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with the Florida Department of Transportation (FDOT) standards.

1.7 QUALIFICATIONS

A. Prepare excavation protection plan under direct supervision of Professional Engineer experienced in design of this Work and licensed in the State of Florida.

1.8 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.9 COORDINATION

A. Section 013000 - Administrative Requirements.

B. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

A. Bedding Rock:

1. 3/16-inch to 3/4-inch washed and graded stone.
2. Free of stones larger than one inch in any dimension.
3. Coarse aggregate conforming to FDOT Standard Specification 901 (#57 stone)

B. Common, Subsoil:

1. Fill: Excavated and re-used material, graded.
2. Borrow: Imported borrow, graded.
3. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
4. Granular material conforming to AASHTO M145 Groups A-1 or A-3.

C. Topsoil:

1. Fill: Excavated and reused material, graded.
2. Borrow: Imported borrow, friable loam.
3. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.

    a. Screening: Single screened.

4. Prepared soil material conforming to FDOT Standard Specification 987.

D. Structural Fill:

1. Granular material conforming to AASHTO M145 Group A3.

E. Concrete:

1. Excavatable flowable fill (compressive strength less than 150 psi).

PART 3 - EXECUTION

3.1 LINES AND GRADES

A. Lay pipes to lines and grades indicated on Project Drawings.

1. Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.

B. Use laser-beam instrument with qualified operator to establish lines and grades.

3.2 PREPARATION

A. Call Local Utility Line Information service at 811 not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum locations.

C. Protect plant life, lawns, rock outcropping and other features remaining as portion of final landscaping.

D. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

E. Maintain and protect above and below grade utilities indicated to remain.

F. Establish temporary traffic control and detours when trenching is performed in public right-of-way. Relocate controls and reroute traffic as required during progress of Work.

3.3 TRENCHING

A. Excavate subsoil required for utilities as shown on Project Drawings.

B. Remove subsoil lumps larger than 3 inches, boulders, and rocks larger than 2 inches.

C. Perform excavation within 24 inches of existing utility service in accordance with utility's requirements.

D. Do not advance open trench more than 200 feet ahead of installed pipe.

E. Cut trenches to width indicated on Project Drawings. Remove water or materials that interfere with Work.

F. Excavate bottom of trenches as indicated on Project Drawings.

G. Excavate trenches to depth indicated on Project Drawings. Provide uniform and continuous bearing and support for bedding material and pipe.

H. Do not interfere with 45 degree bearing splay of foundations.

I. When Project conditions permit, slope side walls of excavation starting 12 inches above top of pipe. When side walls cannot be sloped safely, provide sheeting and shoring to protect excavation as specified in this section.

J. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Engineer until suitable material is encountered.

K. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type A3 and compact to density equal to or greater than requirements for subsequent backfill material.

L. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

M. Correct areas over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Engineer.

N. Remove excess subsoil not intended for reuse, from Site.

3.4 SHEETING AND SHORING

A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.

B. Support trenches and other excavations more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.

C. Design sheeting and shoring to be left in place as part of the completed Work, cut off minimum 18 inches below finished grade.

3.5 BACKFILLING

A. Backfill trenches to contours and elevations with specified fill materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

C. Place geotextile fabric, where required, prior to placing subsequent fill materials.

D. Place fill material in continuous layers and compact in accordance with schedule at end of this section.

E. Employ placement method that does not disturb or damage foundation perimeter drainage, or utilities in trench.

F. Maintain optimum moisture content of fill materials to attain required compaction density.

G. Do not leave more than 50 feet of trench open at end of working day.

H. Protect open trench to prevent danger to the public.

3.6 TOLERANCES

A. Section 014000 - Quality Requirements.

B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

C. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.7 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements.

B. Field inspecting, testing, adjusting, and balancing.

C. Perform laboratory material tests in accordance with AASHTO T180.

D. Perform in place compaction tests in accordance with the following:

1. Density Tests: ASTM D2922.
2. Moisture Tests: ASTM D3017.

E. When tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest.

F. Testing Frequency: Every 500 feet or as dictated by Owner’s Representative based on field conditions.

3.8 PROTECTION OF FINISHED WORK

A. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.9 SCHEDULE

A. Storm and Sanitary Non-Pressure Piping:

1. Provide bedding rock from 4 inches (minimum) below pipe bottom to pipe spring line, compacted uniformly to minimum 95 percent of maximum density.
2. Provide pipe embedment with common fill to subgrade elevation.

3. Compact uniformly to minimum 95 percent of maximum density for unimproved areas.
4. Compact uniformly to minimum 98 percent of maximum density for areas to be improved.

B. Potable and Sanitary Pressure Piping:

1. Install pipe on undisturbed soil or suitable soil compacted uniformly to 100 percent of maximum density.
2. Provide pipe embedment with common fill to subgrade elevation.
3. Compact uniformly to minimum 95 percent of maximum density for unimproved areas.
4. Compact uniformly to minimum 98 percent of maximum density for areas to be improved.

C. Topsoil Fill:

1. Provide prepared soil material for final 4 inches of fill in areas to be grassed.
2. Compact uniformly to minimum 90 percent of maximum density.

END OF SECTION 312316.13

SECTION 330505.31 - HYDROSTATIC TESTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Flushing and leakage testing of pressure piping by hydrostatic methods.

B. Related Requirements:

1. Section 330110.58 - Disinfection of Water Utility Piping Systems.
2. Section 333123 - Sanitary Sewerage Force Main Piping.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Section 012000 - Price and Payment Procedures.

B. Hydrostatic Testing:

1. Measurement and payment for Work under this section are included in the unit pricing for materials installation under related sections of these Specifications.
2. Basis of Payment: Includes preparing, flushing, testing and reporting.

1.3 REFERENCE STANDARDS

A. American Water Works Association:

1. AWWA C600 - Installation of Ductile-Iron Mains and Their Appurtenances.
2. AWWA C605 - Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings.
3. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 inch Through 12 inch for Water Transmission and Distribution.
4. AWWA M55 Chapter 9

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures.

B. Submit following items prior to start of testing:

1. Testing procedures.
2. Testing sequence schedule.
3. Provisions for disposal of flushing and test water.

C. Test and Evaluation Reports: Indicate results of piping tests.

1.5 QUALITY ASSURANCE

A. Perform Work according to AWWA C600, AWWA C605 and ASTM F2164 standards.

PART 2 - PRODUCTS

2.1 HYDROSTATIC LEAKAGE TESTING

A. Equipment:

1. Pressure pump.
2. Pressure hose.
3. Water meter.
4. Test connections.
5. Pressure relief valve.
6. Pressure Gage: Calibrated to 0.1 psi.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall conduct all hydrostatic testing in a safe manner, including protection of personnel, equipment, and the public in the event of a testing failure. The Contractor shall restrain pipe, and components as required. All pumps, valves, temporary connections, meters, gauges and other measuring devices shall be furnished, installed and operated by the Contractor and all such equipment and devices and their installation shall be approved by the Owner's representative.

B. All testing of pressure piping shall be by the hydrostatic methods described herein. Pneumatic (compressed air) leakage testing of pressure piping is strictly prohibited for safety reasons.

3.2 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements.

B. Verify that piping has undergone preliminary flushing and is ready for testing.

C. Verify that all piping trenches are backfilled.

D. Verify that all pressure piping thrust restraints have been installed.

3.3 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements.

B. Leakage Testing of Pressure Piping (DIP and PVC):

1. Hydrostatically test system according to AWWA C600, AWWA C605 and the following:

a. Hydrostatically test each portion of pressure piping, including valved sections, at 1.5 times the working pressure of piping, based on elevation of lowest point in the test section.
b. The test pressure for both potable water and sanitary force main piping is 120 psi, based on a design working pressure of 80 psi.
c. Conduct hydrostatic testing for at least two hours.

d. Slowly fill the section of pipe to be tested with potable water approved by the Owner/Engineer. While the system is being filled with water, air shall be carefully and completely exhausted.
e. Install corporation cocks at high points.
f. Close air vents and corporation cocks after air is expelled.
g. Raise pressure to specified test pressure.
h. Observe joints, fittings, and valves undergoing testing.
i. Remove and renew cracked pipes, joints, fittings, and valves that show visible leakage, and correct all other visible deficiencies.
j. Repressurize the piping segment to be tested and continue testing at the same test pressure for an additional two hours to determine leakage rate.
k. Maintain pressure within plus or minus 5.0 psi of test pressure.
l. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of testing.
m. Compute maximum allowable leakage using following formula:

1) $L = [S \times D \times \sqrt{P}] / C$
2) L = testing allowance, gph.
3) S = length of pipe tested, feet.
4) D = nominal diameter of pipe, inches.
5) P = average test pressure during hydrostatic testing, psig.
6) C = 148,000.
7) If the pipe segment undergoing testing contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each pipe size.

2. If testing of piping indicates leakage greater than that allowed, locate source of leakage, make corrections, and retest until leakage is within acceptable limits.
3. Correct visible leaks regardless of quantity of leakage.

C. Leakage Testing of Pressure Piping (HDPE):

1. Hydrostatically test system according to ASTM F2164, PPI TN46 and the following:

a. Hydrostatically test each portion of pressure piping, including valved sections, at 1.5 times the working pressure of piping, based on elevation of lowest point in the test section.
b. The test pressure for both potable water and sanitary force main piping is 120 psi, based on a design working pressure of 80 psi.
c. Adjust test pressures as necessary for thermal conditions, in accordance with the appendix of Chapter 3 (Material Properties) of the PPI Handbook of Polyethylene Pipe.
d. Slowly fill the section of pipe to be tested with potable water approved by the Owner/Engineer. While the system is being filled with water, air shall be carefully and completely exhausted.
e. If Contractor elects to perform hydrostatic testing against valves in an existing distribution system, he does so at his own risk and will bear the cost of any damage to the existing valves, piping system, private or public property, or the new pipeline under test.
f. The test procedure for HDPE pipe consists of two steps: 1) the initial (or expansion) phase and 2) the test phase.

1) During the initial/expansion phase, sufficient make-up water shall be added hourly for 3 hours to return to the test pressure.
2) During the test phase, the expansion phase pressure is reduced by 10 psi to test phase pressure and monitored for at least one hour (3 hours maximum).

g. Under no circumstances shall the total time under testing exceed eight (8) hours. If the test is not completed due to leakage, equipment failure or any other reason, depressurize the test section and permit the system to "relax" for eight (8) hours prior to the next testing sequence.
h. In accordance with section 9.8 of ASTM F2164, the pipe shall pass if the final pressure is within 5% of the test phase pressure for the testing period (3 hours maximum).

2. If testing of piping indicates leakage greater than that allowed, locate source of leakage, make corrections, and retest until leakage is within acceptable limits.
3. Correct visible leaks regardless of quantity of leakage.

END OF SECTION 330505.31

SECTION 330505.33 - INFILTRATION AND EXFILTRATION TESTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Testing of Gravity Sewer Piping:

a. Visual inspection.
b. Infiltration testing.
c. Exfiltration testing.

2. Testing of Manholes and Wetwells: Exfiltration testing.

B. Related Requirements:

1. Section 333213 - Packaged Wastewater Pumping Stations.

1.2 SUBMITTALS

A. Section 013300 - Submittal Procedures.

B. Submit following items prior to start of testing:

1. Testing procedures.
2. Testing sequence schedule.
3. Provisions for disposal of flushing and test water.

C. Test and Evaluation Reports: Indicate results of wet well and piping tests.

1.3 QUALITY ASSURANCE

A. Perform Work according to ASTM standards.

PART 2 - PRODUCTS

2.1 EXFILTRATION TESTING

A. Equipment:

1. Plugs.
2. Pump.
3. Measuring device.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements.

B. Verify that piping, and wetwells are ready for testing.

C. Verify that trenches are backfilled.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements.

B. Thoroughly clean and flush each test section of gravity pipe prior to visual inspection and testing.

C. Plugs:

1. Plug outlets, wye branches, and laterals.
2. Brace plugs to resist test pressures.

3.3 FIELD QUALITY CONTROL

A. Manhole and Wetwell Testing:

1. In this specification section, use of the term “manhole” equally applies to the term “wetwell”.
2. Repair both outside and inside of joints to ensure permanent seal.
3. Test manholes with manhole frame set in place.
4. Plug pipes in manhole.
5. Remove water from manhole.
6. Observe plugs over period of not less than two hours to ensure that there is no leakage into manhole (i.e., infiltration).
7. Repair areas of visible infiltration regardless of quantity of leakage.
8. Determine ground water level outside manhole.
9. Fill manhole with water within 4 inches of top of cover frame.
10. Prior to testing, allow manhole to soak from minimum of four hours to maximum of 72 hours.
11. After soak period, adjust water level inside manhole to within 4 inches of top of cover frame.
12. Measure water level from top of manhole frame.
13. At end of four-hour testing period, again measure water level from top of manhole frame; compute drop in water level during testing period.
14. Manhole exfiltration test is considered satisfactory when drop in water level is less than following:

a. Manhole Depth of 4 Feet:

1) Diameter of 4 feet: 0.11 inch.
2) Diameter of 5 feet: 0.14 inch.

b. Manhole Depth of 6 Feet:

1) Diameter of 4 feet: 0.17 inch.
2) Diameter of 5 feet: 0.21 inch.

c. Manhole Depth of 8 Feet:

1) Diameter of 4 feet: 0.23 inch.
2) Diameter of 5 feet: 0.29 inch.

d. Manhole Depth of 10 Feet:

1) Diameter of 4 feet: 0.28 inch.
2) Diameter of 5 feet: 0.35 inch.

e. Manhole Depth of 12 Feet:

1) Diameter of 4 feet: 0.34 inch.
2) Diameter of 5 feet: 0.43 inch.

f. Manhole Depth of 14 Feet:

1) Diameter of 4 feet: 0.40 inch.
2) Diameter of 5 feet: 0.50 inch.

g. Manhole Depth of 16 Feet:

1) Diameter of 4 feet: 0.45 inch.
2) Diameter of 5 feet: 0.56 inch.

h. Manhole Depth of 18 Feet:

1) Diameter of 4 feet: 0.51 inch.
2) Diameter of 5 feet: 0.64 inch.

i. Manhole Depth of 20 Feet:

1) Diameter of 4 feet: 0.57 inch.
2) Diameter of 5 feet: 0.71 inch.

15. If unsatisfactory testing results are achieved, repair manhole and retest until result meets criteria.
16. Repair visible leaks regardless of quantity of leakage.

END OF SECTION 330505.33

SECTION 330553 - IDENTIFICATION FOR UTILITIES PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe Warning Tape
2. Tracer Wire

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Section 012000 - Price and Payment Procedures.

B. Piping Identification:

1. Measurement and payment for Work under this section are included in the unit pricing for materials installation under related sections of these Specifications.
2. Basis of Payment: Includes installation, continuity testing and reporting.

1.3 REFERENCE STANDARDS

A. American Society of Mechanical Engineers:

1. ASME A13.1 - Scheme for the Identification of Piping Systems.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures.

B. Product Data: Submit manufacturer's catalog literature for each product required.

1.5 QUALITY ASSURANCE

A. Section 013300 - Submittal Procedures.

B. Conform to ASME A13.1 for color scheme for identification of piping systems and accessories.

PART 2 - PRODUCTS

2.1 Buried Warning and Identification Tape:

A. Polyethylene plastic and metallic core or metallic-faced, acid and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines.

B. Provide tape on rolls, 3-inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length.

C. Warning Color Codes: Blue (Water Mains), Green (Sanitary Force Mains).

D. Warning Identification: “CAUTION, BURIED (intended service) LINE BELOW” or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.

2.2 Buried Locate (Tracer) Wire:

A. Material: 10-gauge, single strand, UF-rated (direct burial), copper wire. Locate wiring must have the ability to conduct an electrical current; therefore, the wiring must be continuous with any breaks in the line spliced.

B. Fasteners and Connectors: Plastic zipper-type ties shall be used to fasten locate wire to water and sewer mains. Ground clamps shall be bronze serrated head with brass-bronze screws. Locate wire shall be spliced with Engineer-approved wire connectors. Wire connectors shall be PinPoint wire connectors by Duraline or approved equal.

2.3 INSTALLATION

A. Install underground plastic pipe warning tape 6 to 8 inches below finished grade, directly above buried pipe. This requirement applies to pipe installed by trenching, as well as to shallow pipe installed by directional drilling if not beneath a delineated wetland.

B. Install underground locate (tracer) wire attached directly to buried pipe, extending the wire into buried meter boxes and valve boxes, as shown on Project Drawings.

END OF SECTION 330553

SECTION 331419 - VALVES AND HYDRANTS FOR WATER UTILITY SERVICE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Valves.
2. Valve boxes.
3. Fire hydrants.

B. Related Requirements:

1. Section 312316.13 - Trenching.
2. Section 330553 - Identification for Utilities Piping and Equipment.
3. Section 333123 - Sanitary Sewerage Force Main Piping.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Section 012000 - Price and Payment Procedures.

B. Valves:

1. Basis of Measurement: By each.
2. Basis of Payment: Includes excavation, valve, valve box, accessories, bedding, and backfill.

C. Fire Hydrants:

1. Basis of Measurement: By each.
2. Basis of Payment: Includes excavation, hydrant, isolation valve and box, accessories, foundation bedding, and backfill.

1.3 REFERENCE STANDARDS

A. American Water Works Association:

1. AWWA C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
2. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.
3. AWWA C512 - Air Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
4. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

B. NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.
2. NSF 372 - Drinking Water System Components - Lead Content.

1.4 COORDINATION

A. Section 013000 - Administrative Requirements.

B. Coordinate Work of this Section with installation of water mains.

1.5 SUBMITTALS

A. Section 013300 - Submittal Procedures.

B. Product Data: Submit manufacturer information regarding component materials, fittings, assembly and parts diagram, and accessories.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.

E. Source Quality-Control Submittals: Indicate results of factory tests and inspections.

F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

G. Qualifications Statements:

1. When requested by Engineer, submit qualifications data for manufacturer and installer.
2. When requested by Engineer, submit manufacturer's approval of installer.

1.6 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements.

B. Project Record Documents: Record actual locations of valves and hydrants.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements.

B. Tools: Furnish one tee wrench of required length to Owner.

1.8 QUALITY ASSURANCE

A. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372.

B. Cast manufacturer's name, pressure rating, and year of fabrication into valve body.

C. Perform Work according to AWWA & ASTM standards and Columbia County standards.

1.9 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements.

B. Delivery:

1. Seal valve and hydrant ends to prevent entry of foreign matter.
2. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
3. Store materials according to manufacturer instructions.
4. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.

C. Protection:

1. Protect materials from moisture and dust by storing in clean, dry locations remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

PART 2 - PRODUCTS

2.1 VALVES

A. Performance and Design Criteria:

1. Pressure Rating:

a. 12-inch Diameter and Smaller: 200 psig.
b. 14-inch Diameter and Larger: 150 psig.

2. End Connections: Mechanical joint
3. Coatings:

a. Comply with AWWA C550.
b. Application: Interior and exterior.

B. Resilient-Wedge Gate Valves (for below ground force main isolation valves):

1. Materials:

a. Furnish materials according to AWWA & ASTM standards and Columbia County standards for sewer force mains.

2. Description:

a. Comply with AWWA C509.
b. Body: Ductile iron
c. Seats: Resilient.
d. Stem Type:

1) Non-rising (buried service).
2) OS&Y rising (aboveground service).
3) Material: Bronze.

e. Operation:

1) Square operating nut (buried service).
2) Cast iron handwheel (aboveground service).
3) Opening Direction: Counterclockwise.

C. Combination Air Valves for Water Service:

1. Materials:

a. Furnish materials according to AWWA & ASTM standards and Columbia County standards.

2. Description:

a. Type:

1) Heavy duty, combination air release and vacuum type.
2) Suitable for potable or raw water service.
3) Fully automatic, float operated.
4) Body: Single.

b. Comply with AWWA C512.
c. Pressure Rating: 150 psi (tested to 300 psi).
d. Materials: Ductile iron body, cover and baffle. Valve interior shall be coated with a rust inhibitor.
e. Float and Internal Parts: Type 316 stainless steel.
f. Seats: Resilient.

2.2 VALVE BOXES

A. Materials:

1. Furnish materials according to AWWA & ASTM standards and Columbia County standards.

B. Description:

1. Valves 12-inch Diameter and Smaller:

a. Material: Cast iron.
b. Type: Two-piece; adjustable screw.

2. Valves Larger than 12-inch Diameter:

a. Material: Cast iron.
b. Type: Three piece; adjustable screw.
c. Base: Round.

3. Lid Inscription: WATER.

2.3 ACCESSORIES

A. Thrust Restraints: As specified on Project Drawings.

B. Valve Box Aligner: High-strength plastic device designed to automatically center valve box base and to prevent it from shifting off center during backfilling.

C. Fire Hydrant Drainage Gravel: As specified in Project Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements.

B. Determine exact location and size of valves from Project Drawings.

C. Identify required lines, levels, contours, and datum locations.

D. Verify that elevations of existing facilities prior to excavation and installation of valves and hydrants are as indicated on Project Drawings.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements.

B. Locate, identify, and protect from damage utilities to remain.

C. Do not interrupt existing utilities without permission and without arrangements to provide temporary utility services.

1. Notify Owner’s Representative not less than seven days in advance of proposed utility interruption.
2. Do not proceed without written permission from Owner’s Representative.

3.3 INSTALLATION

A. Perform trench excavation, backfilling, and compaction as specified on Project Drawings and as specified in Section 312316.13 - Trenching.

B. PE Encasement: Provide polyethylene encasement for buried valves having ductile iron bodies, in compliance with AWWA C105.

C. Install valves and hydrants in conjunction with pipe laying.

D. Provide buried valves with valve boxes installed flush with finished grade.

E. Install air release valves in precast concrete vaults, as shown on Project Drawings.

F. Provide support blocking and drainage gravel while installing fire hydrants; do not block drain hole.

G. Orientation:

1. Set valves and hydrants plumb.
2. Set fire hydrants with pumper nozzle facing roadway.
3. Set fire hydrants with centerline of pumper nozzle 18 inches above finished grade and with safety flange not more than 6 inches nor less than 2 inches above grade.

H. After main-line pressure testing, flush fire hydrants and check for proper drainage.

I. Installation Standards: Install Work according to AWWA & ASTM standards and Columbia County standards.

J. Disinfection of Water Piping System: Flush and disinfect valves and hydrants with water mains as specified in Section 330110.58 - Disinfection of Water Utility Piping Systems.

3.4 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements.

B. Section 017000 - Execution and Closeout Requirements.

C. Testing: Pressure test valves and hydrants with water mains as specified in Section 331413 - Public Water Utility Distribution Piping

END OF SECTION 331419

SECTION 333123 - SANITARY SEWERAGE FORCE MAIN PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sanitary Force mains.
2. Tapping sleeves and valves.
3. Valves.
4. Bedding and cover materials.

B. Related Requirements:

1. Section 312316.13 - Trenching.
2. Section 330505.31 - Hydrostatic Testing.
3. Section 330553 - Identification for Utilities Piping and Equipment.
4. Section 331419 - Valves and Hydrants for Water Utility Service.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Section 012000 - Price and Payment Procedures.

B. Pipe and Fittings:

1. Basis of Measurement:

a. Trench Installation: By linear foot.
b. Directional Bore Installation: Measurement is included in the unit pricing for materials installation under related sections of these Specifications.

2. Basis of Payment:

a. Trench Installation: Includes pipe and fittings, cutting and joining, joint restraints, trenching, bedding, backfill, connections to existing piping and manholes, testing and reporting.

C. Valves:

1. Basis of Measurement: By each.
2. Basis of Payment: Includes excavation, bedding, and backfill; valve, fittings, and accessories; and joint restraints.

D. Taps:

1. Basis of Measurement: By each.
2. Basis of Payment: Includes tapping sleeve, tapping valve, and accessories.

1.3 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:

1. AASHTO T180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-inch Drop.

B. ASTM International:

1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
2. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
3. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cf).
4. ASTM D1785 - Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120.
5. ASTM D2241 - Standard Specification for Polyvinyl Chloride (PVC) Pressure-Rated Pipe (SDR Series).
6. ASTM D2466 - Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40.
7. ASTM D2467 - Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80.
8. ASTM D3035 - Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
9. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
10. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
11. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

C. American Water Works Association:

1. AWWA C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
2. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
3. AWWA C115 - Flanged Ductile Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
4. AWWA C116 - Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings.
5. AWWA C150 - Thickness Design of Ductile-Iron Pipe.
6. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast.
7. AWWA C153 - Ductile-Iron Compact Fittings.
8. AWWA C512 - Air Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
9. AWWA C605 - Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings.
10. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 inches Through 12 inches, for Water Transmission and Distribution.
11. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 3/4 inches Through 3 inches, for Water Service.

1.4 COORDINATION

A. Section 013000 - Administrative Requirements.

B. Coordinate Work of this Section with Owner and with connection to existing municipal sewer utility service.

C. Notify affected utility companies at least 72 hours prior to construction.

1.5 SUBMITTALS

A. Section 013300 - Submittal Procedures.

B. Product Data: Submit manufacturer information indicating pipe materials, pipe fittings, valves, restrained joint details and accessories.

C. Shop Drawings:

1. Indicate piping piece numbers and locations.
2. Indicate restrained joint locations.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer Instructions: Submit special procedures required to install specified products.

F. Preconstruction Photographs: Submit digital files of **color** photographs of Work areas and material storage areas.

G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.6 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements.

B. Project Record Documents: Record actual installed locations and elevations of piping mains, valves and connections.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.7 QUALITY ASSURANCE

A. Perform Work according to applicable AWWA and ASTM standards.

B. Valves: Mark valve body with manufacturer's name and pressure rating.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Storage:

1. Store materials according to manufacturer instructions.
2. Block individual and stockpiled pipe lengths to prevent moving.
3. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Store PVC materials out of sunlight.
3. Store gaskets for mechanical and push-on joints in cool and dry location, out of direct sunlight, and not in contact with petroleum products.
4. Provide additional protection according to manufacturer instructions.

1.9 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

1.10 WARRANTY

A. Section 017000 - Execution and Closeout Requirements.

PART 2 - PRODUCTS

2.1 FORCE MAIN PIPING

A. Ductile-Iron:

1. Pipe:

a. Thickness Class: Class 50, complying with AWWA C151.
b. Pressure Class: 350 psig.
c. Outside Coating: Bituminous coating conforming to AWWA C151.
d. Inside Lining: Fusion-bonded epoxy conforming to AWWA C116.
e. PE Encasement: Comply with AWWA C105.

2. Fittings:

a. Material: Ductile Iron Compact Fittings, complying with AWWA C153.
b. Pressure Rating: 250 psig.
c. Outside Coating: Bituminous, complying with AWWA C151.
d. Inside Lining: Fusion-bonded epoxy conforming to AWWA C116.
e. PE Encasement: Comply with AWWA C105.

3. Joints:

a. Mechanical Joints: Comply with AWWA C111.

b. Flanged Joints: Comply with AWWA C115
c. Restrained Joints: Joint restraint independent of joint seal.
d. Rubber Gaskets, Lubricants, Glands, Bolts, and Nuts: Comply with AWWA C111.

B. PVC:

1. Pipe: Comply with AWWA C900 and C905, DR 18.
2. Fittings:

a. Material: Ductile Iron Compact Fittings, complying with AWWA C153.
b. Pressure Rating: 250 psig.
c. PE Encasement: Comply with AWWA C105.

3. Joints:

a. Comply with ASTM D3139 and F477.
b. Seals: PVC flexible elastomeric.
c. Solvent cement couplings are not permitted.

2.2 TAPPING SLEEVES AND VALVES

A. Tapping Sleeves:

1. Description:

a. Material: Fabricated, Type 304 SS.
b. Type: Dual compression.
c. Outlet Flange Dimensions and Drilling: Comply with ASME B16.1, Class 125 and MSS SP-60.
d. Coating: Fusion-bonded epoxy.

B. Tapping Valves:

1. Description:

a. Comply with AWWA C509.
b. Type: Resilient wedge with non-rising stem.
c. Inlet: Flanged, complying with ASME B16.1, Class 125 and MSS SP-60.
d. Outlet: Mechanical Joint, complying with AWWA C111.
e. PE Encasement: Comply with AWWA C105.

C. Combination Air Valves for Wastewater Service:

1. Materials:

a. Furnish materials according to AWWA & ASTM standards and Columbia County standards.

2. Description:

a. Type:

1) Heavy duty, combination air release and vacuum type.
2) Suitable for sewage service.
3) Fully automatic, float operated, with upper and lower floats separated by a float guide to prevent fouling.
4) Body: Single.

b. Comply with AWWA C512.
c. Pressure Rating: 150 psi (tested to 300 psi).
d. Materials: Ductile iron body, cover and baffle. Valve interior shall be coated with an epoxy lining.
e. Float and Internal Parts: Type 316 stainless steel.
f. Seats: Resilient, Buna-N.

2.3 ACCESSORIES

A. Pipe Markers: As specified in Section 330553 - Identification for Utilities Piping and Equipment.

2.4 MATERIALS

A. Bedding and Cover:

1. Subsoil: No rocks greater than 3/4 inches in diameter, frozen earth, or foreign matter.
2. Pipe Embedment: Common Fill Group A1 or A3, as indicated on Project Drawings and as specified in Section 312316.13 - Trenching.
3. Soil Backfill to Finish Grade: Common Fill as indicated on Project Drawings and as specified in Section 312316.13 - Trenching.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements.

B. Verify that trench cut is ready to receive Work.

C. Verify that excavations, dimensions, and elevations are as indicated on Project Drawings.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements.

B. Preconstruction Site Photos:

1. Take photographs along centerline of proposed pipe trench; minimum one photograph for each 50 feet of pipe trench.
2. Show mailboxes, curbing, lawns, driveways, signs, culverts, and other existing Site features.
3. Include Project description, date taken, and sequential number on back of each photograph.

C. Correct over-excavation with fine aggregate.

D. Remove large stones or other hard matter capable of damaging pipe or of impeding consistent backfilling or compaction.

E. Pipe Cutting:

1. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, and remove burrs.
2. Use only equipment specifically designed for pipe cutting; use of chisels or hand saws is not permitted.
3. Grind edges smooth with beveled end for push-on connections.

F. Remove scale and dirt on inside and outside before assembly.

G. Prepare pipe connections to equipment with flanges or unions.

3.3 INSTALLATION

A. Installation Standards: Install Work according to AWWA and ASTM standards, as indicated on Project Drawings, and as specified in Section 312316.13 - Trenching.

B. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil. See Section 312316.13 - Trenching.

C. Excavation:

1. Hand trim for accurate placement of pipe to elevations as indicated on Project Drawings.
2. Dewater excavations to maintain dry conditions and to preserve final grades at bottom of excavation.

D. Bedding:

1. Excavate pipe trench as specified in Section 312316.13 - Trenching.
2. Place bedding material at trench bottom, if required to replace unsuitable bedding material.
3. Level materials in continuous layers not exceeding 6 inches in depth.
4. Maintain optimum moisture content of bedding material to attain required compaction density.

E. Piping:

1. Comply with AWWA C600 and C605.
2. Handle and assemble pipe according to manufacturer instructions and as indicated on Project Drawings.
3. Steel Rods, Bolts, Lugs, and Brackets: Coat buried steel before backfilling.
4. Maintain 10 feet of horizontal separation between water main and sewer piping according to FDEP requirements.
5. Ductile-Iron Piping and Fittings: Comply with AWWA C600.
6. Flanged Joints: Do not use in underground installations except within structures.
7. Route pipe in straight line and re-lay pipe that is out of alignment or grade.
8. High Points:

a. Install air release valves at high points where indicated on Project Drawings.

b. Install remainder of pipe with no high points, wherever possible.
c. If unforeseen field conditions necessitate high points, install air release valves.

9. Bearing:

a. Maintain bearing along entire length of pipe.
b. Excavate bell holes to permit proper joint installation.
c. Do not lay pipe in wet or frozen trench.

10. Prevent foreign material from entering pipe during placement.
11. Allow for expansion and contraction without stressing pipe or joints.
12. Close pipe openings with watertight plugs during Work stoppages.
13. Install access fittings to permit disinfection of water system performed under Section 330110.58 - Disinfection of Water Utility Piping Systems.
14. Cover:

a. Establish elevations of buried piping with not less than 36 inches of cover.
b. Measure depth of cover from final surface grade to top of pipe barrel.

15. Pipe Markers: As specified in Section 330553 - Identification for Utilities Piping and Equipment.

F. Valves: As located on Project Drawings and as specified in this Section and in Section 331419 - Valves and Hydrants for Water Utility Service, for sewer force main service.

G. Tapping Sleeves and Valves: As indicated on Shop Drawings and according to manufacturer instructions.

H. Install air release valves in precast concrete vaults, as shown on Project Drawings.

I. Thrust Restraints: As specified on Project Drawings.

J. PE Encasement:

1. Encase ductile iron piping in PE as indicated on Project Drawings to prevent contact with surrounding backfill material.
2. Comply with AWWA C105.
3. Terminate encasement 3 to 6 inches above ground where pipe is exposed.

K. Backfilling:

1. As shown on Project Drawings and as specified in Section 312316.13 - Trenching.
2. Backfill around sides and to top of pipe with cover fill in 6-inch (minimum) to 12-inch (maximum) lifts, tamp in place and compact to 95 percent of maximum density.
3. Place and compact material immediately adjacent to pipes to avoid damage to pipe and prevent pipe misalignment.
4. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 TOLERANCES

A. Section 014000 - Quality Requirements.

B. Install pipe to indicated elevations within tolerance of 5/8 inch.

3.5 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements.

B. Section 017000 - Execution and Closeout Requirements.

C. Inspections: Request inspection by Engineer prior to placing bedding.

D. Leakage Testing: As specified in Section 330505 31- Hydrostatic Testing.

E. Compaction Testing:

1. Comply with AASHTO T180.
2. Testing Frequency: Every 500 feet or as dictated by Owner's Representative based on field conditions.

3.6 PROTECTION

A. Section 017000 - Execution and Closeout Requirements.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION 333123

SECTION 333213 - PACKAGED WASTEWATER PUMPING STATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Packaged wastewater pumping stations, which include wetwell, pumps, piping, controls and other accessories.

B. Related Requirements:

1. Section 099000 - Painting and Coating.
2. Section 312316.13 - Trenching.
3. Section 330505.33 - Infiltration and Exfiltration Testing.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Section 012000 - Price and Payment Procedures.

B. Package Pumping Station:

1. Basis of Measurement: By each.
2. Basis of Payment: Includes excavation and backfill; wetwell with accessories; pumps; all mounting components; discharge piping and valves; valve vault; all pump and level controls, panels, and instrumentation; all wiring and junction boxes; and startup testing.

1.3 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:

1. AASHTO T180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-inch Drop.

B. ASTM International:

1. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
2. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cf).
3. ASTM D1785 - Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120.
4. ASTM D2466 - Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40.
5. ASTM D2467 - Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80.
6. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

C. National Electrical Manufacturers Association:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

D. Underwriters Laboratories:

1. UL 83 - Thermoplastic-Insulated Wires and Cables.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures.

B. Product Data:

1. Manufacturer information for wetwell, valve vault, covers, hinged door, slide rail assembly, mounting components, hardware, piping, valves, and level instruments.
2. Manufacturer information for pumps, including performance curve, breakaway fittings data, and access frame data.
3. Control panel data and panel wiring schematic.

C. Shop Drawings:

1. Indicate station layout as designed by station manufacturer.
2. Indicate size, materials, and components of system.
3. Indicate wetwell size, inlet and discharge locations, cover dimensions, vent location, lifting cable location, pump locations, discharge piping and valve locations, wiring diagrams, junction box locations, guide rail assembly location, level control locations, and ballast support flange dimensions (where applicable).

D. Manufacturer's Certificate: Certify that products meet or exceed specified design requirements.

E. Source Quality-Control Submittals: Submit written reports that Manufacturer-furnished factory and field pump inspections, tests, and startup have been successfully performed.

F. Manufacturer Instructions: Submit manufacturer's installation instructions and instructions for wetwell, pump, and panel systems procedures.

G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

H. Manufacturer Reports:

1. Submit report of each visit of manufacturer's representative to provide technical assistance during installation.
2. Submit Manufacturer’s Certificate of Proper Installation.
3. Submit startup report before final acceptance of pumps to document that pumping station operation meets performance requirements.

I. Qualifications Statements:

1. Submit qualifications for manufacturer and installer.

1.5 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements.

B. Project Record Documents: Record actual locations of packaged pumping stations, including wetwells and control panel.

C. Submit certification of pumping stations after performance testing.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements.

B. Spare Parts:

1. Furnish for each pumping station:

a. One check valve
b. One spare plug valve.

C. Operation and Maintenance Manual.

1.7 QUALITY ASSURANCE

A. Perform Work according to manufacturer’s standards.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years’ documented experience.

B. Installer: Company specializing in performing Work of this Section with minimum three years’ documented experience and approved by manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Handling: Support wetwell with nylon slings connected to structural lift points when moving.

D. Storage:

1. Store materials according to manufacturer instructions.
2. Do not place equipment, materials or structures on private property or in areas obstructing pedestrian or vehicle traffic.

E. Protection:

1. Protect materials from moisture and dust by storing in clean, dry locations remote from construction operations areas.
2. Store FRP and PVC materials out of sunlight.
3. Provide additional protection according to manufacturer instructions.

1.10 AMBIENT CONDITIONS

A. Section 015000 - Temporary Facilities and Controls.

B. Conditions: Do not install wetwell and concrete wetwell base if bedding is wet or frozen.

1.11 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

1.12 WARRANTY

A. Section 017000 - Execution and Closeout Requirements.

B. Furnish five-year prorated manufacturer's warranty for pump seals.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Pumping Station:

1. Wetwell Configuration: In-ground.
2. Wetwell Material: Fiberglass (FRP)
3. Pump Configuration: Duplex.
4. Pump Type: Submersible, non-clog.
5. Assembly: Shop.
6. Controls:

a. Multiple float switches.
b. Operation: Automatic.

2.2 PERFORMANCE AND DESIGN REQUIREMENTS

A. Wetwells:

1. Submersible duplex basin system, including cover with vent and hatch, rail assemblies, discharge and fittings, union ball valves, junction boxes, and level controls.
2. Geometry: Circular with integral, extended base, as specified on Project Drawings.
3. Material: Fiberglass (FRP)
4. Wall Thickness: Sufficient to withstand water-saturated sand load of 120 pcf.
5. Live Load: 150 psf (minimum).

B. Pumps:

1. Type: Submersible, non-clog (solids-handling) centrifugal pumps with horizontal discharge, fittings, piping, check valves and pump brackets.
2. Manufacturer: Make and model as indicated on Project Drawings.

3. Service Conditions: Continuous submerged operation in municipal wastewater service, without loss of watertight integrity to depth of 65 feet.
4. Hydraulic Operating Conditions: As indicated on Project Drawings.
5. Discharge Connection Elbow: Permanently installed in wetwell with discharge piping.
6. Connection: Automatic to discharge connection elbows when lowered into place and easily removed for inspection or service.
7. Guide Bracket:

    a. Integral part of pump unit.
    b. Entire weight of pump unit shall be guided by not less than two guide bars and pressed tightly against discharge connection elbow with metal-to-metal contact.

8. Discharge Interface Seal: Diaphragm.
9. Do not permit any portion of pump to bear directly on floor of sump.

C. Valves:

1. Check Valves: 4" Crispin, or equal, AWWA C-508 L&W Swing Check with DI body with 316 SST seats, bronze and stainless steel trim, and buna-N-rubber faced discs made for wastewater service.

2. Plug Valves: 4" Crispin, or equal, AWWA 517 K-Flo 800 Series Plug made for wastewater service.

3. Gate Valves: 4" Rotating double disk gate with ASTM A536 Ductile Iron Body, Bonnet, and Disk, bronze or 316 SST Stem Nut, and 316 SST hardware. Approved plug valves can substitute for gate valves at the above ground pump station discharge.

D. Operation:

1. Duplex Alternation: Set pumps per the control configuration denoted in Project Drawings.
2. Level float switches for pump control and alarms, as indicated in Project Drawings.

E. Sound, Vibration, and Thermal Control:

1. Dampen or suppress noise and absorb vibration.
2. Accommodate thermal expansion and stresses.
3. Adjust or correct for misalignment in piping systems.

F. Level Controls:

1. Description: Mechanical float-type or mercury-type, pilot-duty liquid-level controls.
2. Quantity: As specified on Project Drawings.
3. Electrical Cable:

    a. Description: AWG 18-2 SJOW-A in polypropylene housing.
    b. Mounting: To float pole.

G. Float Pole:

1. Comply with ASTM D1785.

2. Material: 1//2-inch PVC, Schedule 40.

H. Control Panel:

1. As specified on Project Drawings.

I. Accessories:

1. Sealant: Industrial silicon sealant for pipe penetrations in wetwell.
2. Anchor Bolts, Nuts, and Washers:

a. Bent Anchor Bolts: Comply with ASTM A709, Grade 36.
b. Nuts: Comply with ASTM A307, Grade A.
c. Washers: Comply with ASTM A126.
d. Galvanize bolts, nuts, and washers according to ASTM A153.

2.3 MATERIALS

A. Bedding: As indicated on Project Drawings and as specified in Section 312316.13 - Trenching.

B. Backfill: Common Fill Type A3, as specified in Section 312316.13 - Trenching.

2.4 ACCESSORIES

A. Sealant: Industrial silicon sealant for pipe penetrations in wetwell.

B. Anchor Bolts, Nuts, and Washers:

1. Bent Anchor Bolts: Comply with ASTM A709, Grade 36.
2. Nuts: Comply with ASTM A307, Grade A.
3. Washers: Comply with ASTM A126.
4. Galvanize bolts, nuts, and washers according to ASTM A153.

2.5 SOURCE QUALITY CONTROL

A. Section 014000 - Quality Requirements.

B. Provide shop inspection and testing of completed assembly.

C. Inspection:

1. Verify that motor voltage and frequency is as shown on nameplate.
2. Verify that motor and cable insulation test for moisture content or insulation defects comply with UL 83.

D. Testing:

1. Submerged Pump Run: Test to determine that pump meets hydraulic performance requirements.
2. Document and certify testing results in written report.

E. Certificate of Compliance:

1. If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements.

B. Verify that inlet and discharge piping connections are correct size, location, and elevation as indicated on Project Drawings.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements.

B. Establish elevations of package pumping station and valve vault as shown on Project Drawings.

C. Protect piping system pieces from entry of foreign materials and water by using temporary covers, by completing sections of Work, and by isolating parts of completed system.

3.3 INSTALLATION

A. Install all components of package pumping station according to manufacturer’s recommendation and as shown on Project Drawings.

B. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil. See Section 312316.13 - Trenching.

C. Wetwell:

1. Provide compacted bedding per manufacturer’s recommendations and as indicated on Project Drawings.

D. Pumps:

1. Install pumps, including wetwell rail assembly, lifting device, discharge piping, fittings, and valves.
2. Wire pump to junction box.

E. Control Panel: Mount and wire control panel as shown in Project Drawings, including duplex motor controls, circuit breaker, starter, control transformer, fuse box, terminal block, alternator, alarm, and running lights.

F. Backfilling:

1. As shown on Project Drawings and as specified in Section 312316.13 - Trenching.
2. Maintain optimum moisture content of fill material to attain required compaction density.

3. After hydraulic testing, evenly backfill around entire periphery of wetwell by hand, placing backfill material and hand tamping in 6-inch compacted layers to finish grade, and compact to 95 percent maximum density.
4. Do not use wheeled or tracked vehicles for tamping.

3.4 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements.

B. Compaction Testing:

1. Comply with AASHTO T180.
2. If tests indicate Work does not meet specified requirements, remove Work, replace, and retest.
3. Testing Frequency: One for each lift.

C. Leakage Testing: Test wetwell for leakage as specified in Section 330505.33 – Infiltration and Exfiltration Testing.

D. Preoperational Inspection:

1. Check pump and motor alignment.
2. Check for proper motor rotation.
3. Check pump and drive units for proper lubrication.

E. Operational Inspection:

1. Check pump and motor for high bearing temperature and excessive vibration.
2. Check for motor overload by taking ampere readings.

F. Startup and Performance Testing:

1. Notify Owner and Engineer at least three days prior to startup and performance testing.
2. Operate pump using clean water at design point for continuous period of two hours, under supervision of manufacturer's representative and in presence of Owner’s Representative.
3. Verify pump performance by performing time/draw-down test or time/fill test.
4. Coordinate and operate pumps in conjunction with other Work.

G. Equipment Acceptance:

1. Adjust, repair, modify, or replace system components failing to perform as specified and rerun tests.
2. Make final adjustments to equipment under direction of manufacturer's representative.
3. Document field adjustments, repairs, and replacements in manufacturer's certification.

H. Manufacturer Services: Furnish services of manufacturer's representative experienced in installation of products furnished under this Section for installation, inspection, startup, field testing, and instructing Owner's personnel in maintenance of equipment.

I. Furnish installation certificate from equipment manufacturer's representative attesting equipment has been properly installed and is ready for startup and testing.

3.5 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements.

B. Adjust wetwell, pump, and control panel systems such that station operates to performance requirements indicated on Project Drawings and according to Specifications.

3.6 DEMONSTRATION

A. Section 017000 - Execution and Closeout Requirements.

B. Demonstrate equipment startup, shutdown, routine maintenance, and emergency repair procedures to Owner's personnel.

END OF SECTION 333213

VENDOR INFORMATION AND SIGNATURE FORM

Vendor Name	
Trade License (If applicable)	
Contact Person(s)	
Street Address with City, State and Zip Code	
Mailing Address (If different from Above)	
Phone Number	
Fax Number	
E-Mail	
Proposer will do the work as	____Individual ____Joint Venture ____Partnership ____Corporation
Date and State of Incorporation	DATE:_____ STATE: _____
Name of partnership or joint venture	

By signing below, the submission shall be deemed a representation and certification by the Proposing Firm that you have investigated all aspects of the solicitation, have read and understand the solicitation, and acknowledge all addenda.

Authorized Signature:
Printed Name of Signer:
Date Signed:
Title of Signatory:

Claiming Local Vendor Preference in accordance with Columbia County Purchasing Policies section 304.6.3 as found on https://www.columbiacounty.com/Purchasing.asp

YES_____ NO_____

EQUAL OPPORTUNITY/AFFIRMATIVE ACTION STATEMENT

1. The Contractors and subcontractors hereby agree to a commitment to the principles and practices of equal opportunity in employment and to comply with the letter and spirit of federal, state, and local laws and regulations prohibiting discrimination based on race, color, religion, national region, sex, age, handicap, marital status, and political affiliation or belief.

2. The Contractor agrees to comply with Executive Order 11246, as amended, and to comply with specific affirmative action obligations contained therein.

Signed:_____

Title:_____

Firm: _____

Address:_____

City, State, Zip: _____

Non-Collusion Affidavit

STATE OF .....

COUNTY OF _____

I state that I_____(Name and Title) of_____(Name of Firm),
am authorized to make this affidavit on behalf of my firm and its owner, directors and officers. I am the person responsible in my firm for the price(s) and amount(s) of this Response, and the preparation of the Response. I state that:

1. The price(s) and amount(s) of this Response have been arrived at independently and without consultation, communication or agreement with any other Provider, potential provider, Proposal, or potential Proposal.

2. Neither the price(s) nor the amount(s) of this Response, and neither the approximate price(s) nor approximate amount(s) of this Response, have been disclosed to any other firm or person who is a Provider, potential Provider; Proposal, or potential Proposal, and they will not be disclosed before Proposal opening.

3. No attempt has been made or will be made to induce any firm or persons to refrain from submitting a Response for this contract, or to submit a price(s) higher that the prices in this Response, or to submit any intentionally high or noncompetitive price(s) or other form of complementary Response.

4. The Response of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive Response.

5. _____(Name of Firm), its affiliates, subsidiaries, officers, director, and employees are not currently under investigation, by any governmental agency and have not in the last three years been convicted or found liable for any act prohibited by State or Federal law in any jurisdiction, involving conspiracy or collusion with respect to Proposal, on any public contract, except as follows:

I state that I and the named firm understand and acknowledge that the above representations are material and important, and will be relied on by the Board of County Commissioners of Columbia County, Florida for which this Response is submitted. I understand and my firm understands that any misstatement in this affidavit is, and shall be treated as, fraudulent concealment from the State of Florida of the true facts relating to the submission of responses for this contract.

Dated this_____day of_____

Name of Organization:_____

Signed by:_____

Print Name: _____

Being duly sworn deposes and says that the information herein is true and sufficiently complete so as not to be misleading.

The foregoing instrument was executed before me this day____ of_____ 20__ by _____as _____ of _____, who personally swore or affirmed that he/she is authorized to execute this document and thereby bind the Corporation, and who is personally known to me **OR** has produced _____as identification.

(stamp)

_____
NOTARY PUBLIC, State of_____

Public Entity Crimes Statement

SWORN STATEMENT UNDER SECTION 287.133(3) (a), FLORIDA STATUTES: THIS FORM MUST BE SIGNED IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICER AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement is submitted with Proposal, ITN, or Contract Number

2. This sworn statement is submitted by_____
[Name of entity submitting sworn statement)
whose business address is_____and (if applicable) itsFederal Employer Identification Number (FEIN) is_____
(If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement:_____

3. My name is_____and my relationship to the above is
[Please print name of individual signing)
_____

4. I understand that a "public entity crime" as defined in section 287. l 33(l)(g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity in Florida or with an agency or political subdivision of any other state or with the United States, including, but not limited to, any proposal or contract for goods or services to be provided to any public entity or an agency or political subdivision and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.

5. I understand that "convicted" or "conviction" as defined in section 287.133(1) (b), Florida Statutes, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July l, 1989, as a result of a jury verdict, non-jury trial, or entry of a plea of guilty or nolo contenders.

6. I understand that "affiliate" as defined in section 287.133(1) (a), Florida Statutes, means:

   a. A predecessor or successor of a person convicted of a public entity crime; or

   b. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding thirty-six (36) months shall be considered an affiliate.

7. I understand that a "person" as defined in section 287.133(1) (e), Florida Statutes, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids/proposals or applies to bids/proposals on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

8. 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 is active in the management of the entity, nor any affiliate of the entity have been convicted of a public entity crime subsequent to July 1, 1989.

___ 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 the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989, AND **[Please indicate which additional statement applies].**

___ There has been a proceeding concerning the conviction before a judge or hearing officer of the State of Florida, Division of Administrative Hearings, or a court of law having proper jurisdiction. The final order entered by the hearing officer or judge did not place the person or affiliate on the convicted Contractor list. **[Please attach a copy of the final order.]**

___ The person or affiliate was placed on the convicted Contractor list. There has been a subsequent proceeding before a court of law having proper jurisdiction or a judge or hearing officer of the State of Florida, Division of Administrative Hearings. The final order entered by the judge or hearing officer determined that is was in the public interest to remove the person or affiliate from the convicted Contractor list. **[Please attach a copy of the final order.]**

___ The person or affiliate has not been placed on any convicted vendor list. [Please describe any action taken by or pending with the State of Florida, Department of Management Services.]

By the signature(s) below, I/we, the undersigned, as authorized signatory to commit the firm, certify that the information as provided in Attachment "C", Public Entity Crimes, is truthful and

correct at the time of submission.

_____
AFFIANT

_____
Typed Name of AFFIANT

_____
Title

STATE OF_____

County OF_____

The foregoing instrument was executed before me this day____ of_____
20__ by _____as _____of
_____, who personally swore or affirmed that he/she is authorized to execute this document and thereby bind the Corporation, and who is personally known to me **OR** has produced_____as identi fication.

(stamp) NOTARY PUBLIC, State of _ _ _ _ _

Drug-Free Workplace Certification

The drug-free certification form below must be signed and returned with the solicitation response.

In order to have a drug-free workplace program, a business shall:

1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.

2. Inform employees about the dangers of drug abuse in the workplace, the business' policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.

3. Give each employee engaged in providing the commodities or contractual services that are under bid/proposal a copy of the statement specified in the first paragraph .

4. In the statement specified in the first paragraph, notify the employees that, as a condition of working on the commodities or contractual services that are under bid/proposal, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or nolo contendere to, any violation of chapter 893, Florida Statutes, or of any controlled substance law of the United States or any state, for a violation occurring in the workplace no later than five (5) Days after such conviction.

5. Impose a sanction on, or require the satisfactory participation in, a drug abuse assistance or rehabilitation program if such is available in the employee's community, by any employee who is so convicted.

6. Make a good faith effort to continue to maintain a drug-free workplace through implementation of the foregoing provisions.

By the signature(s) below, I/we, the undersigned, as authorized signatory to commit the firm, certify that the information as provided in this Drug-Free Workplace Certification, is truthful and correct at the time of submission.

_____
AFFIANT

_____
Typed Name of AFFIANT

_____
Title

STATE OF .....

County OF _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

The foregoing instrument was executed before me this day ____ of_____ 20___, by_____as_____of _____, who personally swore or affirmed that he/she is authorized to execute this document and thereby bind the Corporation, and who is personally known to me **OR** has produced _____ as identi fication .

(stamp) NOTARY PUBLIC, State of_____

Conflict of Interest Statement

STATE OF_____

County OF_____

Before me, the undersigned authority, personally appeared_____ who was duly sworn, deposes, and states:

I am the_____ of_____ with a local office
(Insert Title) (Insert Company Name)
in_____ and principal office in_____. Said entity is submitting this proposal/offer to

1. The AFFIANT has made diligent inquiry and provided the information in this statement affidavit based upon its full knowledge.

2. The AFFIANT states that only one submittal for this solicitation has been submitted and tendered by the. appropriate date and time and that said above stated entity has no financial interest in other entities submitting a proposal for the work contemplated hereby.

3. Neither the AFFIANT nor the above named entity has directly or indirectly entered into any agreement, participated in any collusion or collusive activity, or otherwise taken any action which in any way restricts or restraints the competitive nature of this solicitation, including but not limited to the prior discussion of terms, conditions, pricing, or other offer parameters required by this solicitation.

4. Neither the entity nor its affiliates, nor anyone associated with them, is presently suspended or otherwise prohibited from participation in this solicitation or any contract to follow thereafter by any government entity.

5. Neither the entity nor its affiliates, nor anyone associated with them, have any potential conflict of interest because and due to any other clients, contracts, or property interests in this solicitation or the resulting project.

6. I hereby also certify that no member of the entity's ownership or management or staff has a vested interest in any County Office or Department.

7. I certify that no member of the entity's ownership or management is presently applying, actively seeking, or has been selected for an elected position within Columbia County government.

8. In the event that a conflict of interest is identified in the provision of services, I, the undersigned will immediately notify the County in writing.

_____

AFFIANT

_____

Typed Name of AFFIANT

_____

Title

STATE OF_____

County OF_____

The foregoing instrument was executed before me this day____ of_____
20___, by_____as _____ of
_ , who personally swore or affirmed that he/she is authorized to execute this document and thereby bind the Corporation, and who is personally known to me OR has produced _____ as identification.

(stamp) . NOTARY PUBLIC, State of_____

Form **W-9**
(Rev. October 2018)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

► **Go to *www.irs.gov/FormW9* for instructions and the latest information.**

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

Print or type. See **Specific Instructions** on page 3.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.

2 Business name/disregarded entity name, if different from above

3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only **one** of the following seven boxes.

☐ Individual/sole proprietor or single-member LLC ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ► _____

Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is **not** disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.

☐ Other (see instructions) ►

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any) _____

Exemption from FATCA reporting code (if any) _____

(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.) See instructions.

Requester's name and address (optional)

6 City, state, and ZIP code

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

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

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number

			–			–				

or

Employer identification number

		–							

Part II Certification

Under penalties of perjury, I certify that:

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

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

Sign Here	**Signature of U.S. person** ►	**Date** ►

General Instructions

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

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to *www.irs.gov/FormW9.*

Purpose of Form

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

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, *later.*

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),

2. Certify that you are not subject to backup withholding, or

3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and

4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting,* later, for further information.

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

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

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

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

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

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

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

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

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

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.

2. The treaty article addressing the income.

3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.

4. The type and amount of income that qualifies for the exemption from tax.

5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

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

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

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 24% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

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

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,

2. You do not certify your TIN when required (see the instructions for Part II for details),

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

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

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

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

Also see *Special rules for partnerships,* earlier.

What is FATCA Reporting?

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

Updating Your Information

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

Penalties

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

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

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

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

Specific Instructions

Line 1

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

If this Form W-9 is for a joint account (other than an account maintained by a foreign financial institution (FFI)), list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9. If you are providing Form W-9 to an FFI to document a joint account, each holder of the account that is a U.S. person must provide a Form W-9.

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

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

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

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

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

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

Line 2

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

Line 3

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

IF the entity/person on line 1 is a(n) . . .	THEN check the box for . . .
• Corporation	Corporation
• Individual • Sole proprietorship, or • Single-member limited liability company (LLC) owned by an individual and disregarded for U.S. federal tax purposes.	Individual/sole proprietor or single-member LLC
• LLC treated as a partnership for U.S. federal tax purposes, • LLC that has filed Form 8832 or 2553 to be taxed as a corporation, or • LLC that is disregarded as an entity separate from its owner but the owner is another LLC that is not disregarded for U.S. federal tax purposes.	Limited liability company and enter the appropriate tax classification. (P= Partnership; C= C corporation; or S= S corporation)
• Partnership	Partnership
• Trust/estate	Trust/estate

Line 4, Exemptions

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

Exempt payee code.

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

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

1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)

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

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

4—A foreign government or any of its political subdivisions, agencies, or instrumentalities

5—A corporation

6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession

7—A futures commission merchant registered with the Commodity Futures Trading Commission

8—A real estate investment trust

9—An entity registered at all times during the tax year under the Investment Company Act of 1940

10—A common trust fund operated by a bank under section 584(a)

11—A financial institution

12—A middleman known in the investment community as a nominee or custodian

13—A trust exempt from tax under section 664 or described in section 4947

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

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

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

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

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

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

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

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

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

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

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

G—A real estate investment trust

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

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

J—A bank as defined in section 581

K—A broker

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

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

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

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns. If this address differs from the one the requester already has on file, write NEW at the top. If a new address is provided, there is still a chance the old address will be used until the payor changes your address in their records.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

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

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN.

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

Note: See *What Name and Number To Give the Requester,* later, for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at *www.SSA.gov*. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/Businesses* and clicking on Employer Identification Number (EIN) under Starting a Business. Go to *www.irs.gov/Forms* to view, download, or print Form W-7 and/or Form SS-4. Or, you can go to *www.irs.gov/OrderForms* to place an order and have Form W-7 and/or SS-4 mailed to you within 10 business days.

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

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

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

Part II. Certification

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

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

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

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), ABLE accounts (under section 529A), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

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

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

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

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

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

***Note:** The grantor also must provide a Form W-9 to trustee of trust.

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

Secure Your Tax Records From Identity Theft

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

To reduce your risk:

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

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

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

For more information, see Pub. 5027, Identity Theft Information for Taxpayers.

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

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

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

If you receive an unsolicited email claiming to be from the IRS, forward this message to *phishing@irs.gov.* You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at *spam@uce.gov* or report them at *www.ftc.gov/complaint.* You can contact the FTC at *www.ftc.gov/idtheft* or 877-IDTHEFT (877-438-4338). If you have been the victim of identity theft, see *www.IdentityTheft.gov* and Pub. 5027.

Visit *www.irs.gov/IdentityTheft* to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

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

HUMAN TRAFFICKING AFFIDAVIT

Affiant swears under pain and penalty of perjury that the company or entity does not use coercion for labor or services as defined by Florida Statute § 787.06 which is hereby incorporated by reference.

_____

(Company or Entity Name)

Affiant who is an Officer/Authorized Representative of Company or Entity:

_____

(Signature)

_____ _____

(Printed Name) **(Date)**

STATE OF _____)

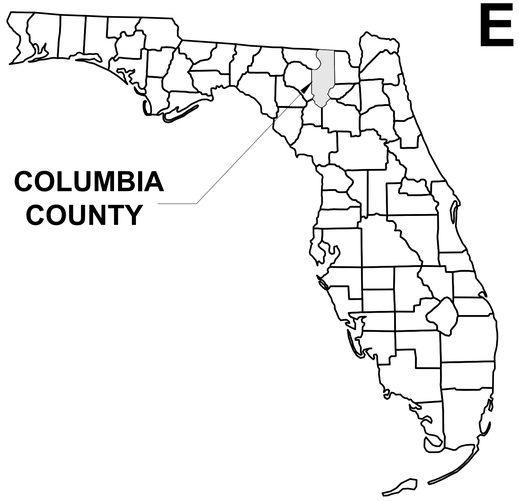
COUNTY OF _____)

Sworn to and subscribed before me this_____day of_____, 202__ by _____, by means of physical presence and _____who is personally known to me or _____ has produced _____ as identification.

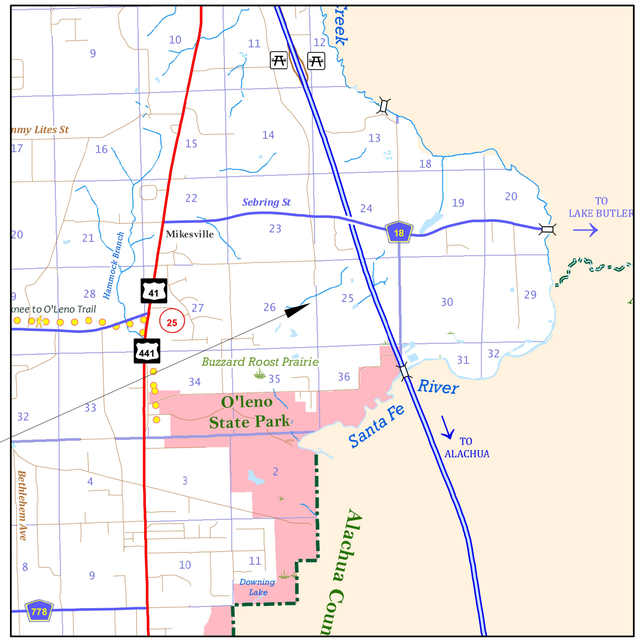
_____

(NOTARY STAMP) Notary Public

ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL



PROJECT LOCATION



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PLANS PREPARED FOR:

COLUMBIA COUNTY BOCC
135 HERNANDO AVE. SUITE 203
LAKE CITY, FL 32055
(386) 785-1005

09/2025
ISSUED FOR BID
NOT FOR CONSTRUCTION

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY RICKY L HENDRIX, ON THE DATE ADJACENT TO THE SEAL.
PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

REVISIONS	
DATE	DESCRIPTION

NORTH FLORIDA PROFESSIONAL SERVICES, INC.
P.O. BOX 3823 LAKE CITY, FL 32056 PH. 386-752-4675 LIC NO. LB8356
BLAIRSTONE PINES DR. TALLAHASSEE, FL 32301 CA# 29011
4168 SOUTHPOINT PKWY. JACKSONVILLE, FL 32216 www.nfps.net/firstcoast/

JOB NUMBER: L231019CCB
EOR: RICKY L. HENDRIX P.E.
P.E. NO.: 45239

COVER SHEET

SHEET NO. C-1

RICKY LANE HENDRIX
LICENSE
No.45239
STATE OF FLORIDA
PROFESSIONAL ENGINEER

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY RICKY LANE HENDRIX ON THE DATE ADJACENT TO THE SEAL.

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

NORTH FLORIDA PROFESSIONAL SERVICES INC.
P.O. BOX 3823
LAKE CITY, FL 32056
CERTIFICATE OF AUTHORIZATION: 29011
RICKY L. HENDRIX, P.E. NO. 45239

THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE WITH RULE 61G15-23.004, F.A.C.

SHEET INDEX

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FORCEMAIN DETAILS	C-16 THRU C-17

MARK RAYMOND AKIN
LICENSE
No.59242
STATE OF FLORIDA
PROFESSIONAL ENGINEER

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY MARK R AKIN, PE ON __/__/__.

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AKIN BROOKS ENGINEERING INC.
14260 NEWBERRY RD. #115
NEWBERRY, FL 32669
MARK R. AKINS, P.E. NO. 59242

THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE WITH RULE 61G15-23.004, F.A.C.

LEGEND, SPECIFICATIONS, CODES AND STANDARDS	E1
PLAN, DETAILS, SCHEDULE & SINGLE LINE DIAGRAM	E2

DAVID LEE BROOKS
LICENSE
No.56766
STATE OF FLORIDA
PROFESSIONAL ENGINEER

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14260 NEWBERRY RD. #115
NEWBERRY, FL 32669
DAVID L. BROOKS, P.E. NO. 56766

THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE WITH RULE 61G15-23.004, F.A.C.

LEGENDS & DIAGRAMS	IC1
DIAGRAMS AND PLANS	IC2

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Akin Brooks Engineering
Akin Brooks Engineering, Inc.
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akinbrooks.com

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TALLAHASSEE, FL 32301
CA# 29011
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JACKSONVILLE, FL 32216
www.nfps.net/firstcoast/

JOB NUMBER: L231019CCB
EOR: RICKY L. HENDRIX P.E.
P.E. NO.: 45239

SIGNATURE SHEET
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO. C-2

Grace Pearson 9/18/2025 4:25:00 PM X:\2023\L231019CCB\H.CADD\Ellisville WWTP\Details\Legend.dwg

GENERAL NOTES

1. ALL SITE CONSTRUCTION SHALL COMPLY WITH THE COLUMBIA COUNTY & FDOT UTILITY REGULATIONS.

2. THE CONTRACTOR SHALL COMPLY WITH ALL CONDITIONS AS SET FORTH BY THE ISSUED FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP) DOMESTIC WASTEWATER COLLECTION/TRANSMISSION SYSTEM PERMIT.

3. ALL MAINTENANCE OF TRAFFIC SHALL CONFORM TO FDOT STANDARD PLANS, LATEST EDITION. COORDINATE WITH COLUMBIA COUNTY PUBLIC WORKS DEPARTMENT FOR ALL PARTIAL OR FULL ROAD CLOSURES AND/OR DETOURS REQUIRED DURING CONSTRUCTION.

4. CONTRACTOR SHALL COORDINATE ALL WORK WITH OTHER CONTRACTORS WITHIN PROJECT AREA.

5. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AT THE JOB SITE TO ENSURE THAT ALL NEW WORK WILL FIT IN THE MANNER INTENDED ON THE PLANS. SHOULD ANY CONDITIONS EXIST THAT ARE CONTRARY TO THOSE SHOWN ON THE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND THE OWNER OF SUCH DIFFERENCES IMMEDIATELY AND PRIOR TO PROCEEDING WITH THE WORK.

6. THE SITE IS LOCATED IN SECTION 11, TOWNSHIP 06 SOUTH, RANGE 17 EAST, COLUMBIA COUNTY, FLORIDA.

7. ANY PUBLIC LAND CORNER WITHIN THE LIMITS OF CONSTRUCTION SHALL BE PROTECTED. IF A CORNER MONUMENT IS IN DANGER OF BEING DESTROYED AND HAS NOT BEEN PROPERLY REFERENCED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

8. THE CONTRACTOR SHALL MAINTAIN THE CONSTRUCTION SITE IN A SECURE MANNER. ALL OPEN TRENCHES AND EXCAVATED AREAS SHALL BE PROTECTED FROM ACCESS BY THE GENERAL PUBLIC.

9. THE CONTRACTOR SHALL SUBMIT A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM NOTICE OF INTENT ALONG WITH SUPPORTING DOCUMENTATION TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION AT LEAST 48 HOURS PRIOR TO BEGINNING OF CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMIT FEES.

10. THE CONTRACTOR SHALL IMPLEMENT ALL COMPONENTS OF THE EROSION AND SEDIMENTATION CONTROL PLAN PRIOR TO ANY EARTH DISTURBING ACTIVITIES. ALL COMPONENTS SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL ALL VEGETATION IS ESTABLISHED, THE ENTIRE PROJECT AREA IS STABILIZED AND THE OWNER HAS ACCEPTED OPERATION AND MAINTENANCE. REFER TO THE EROSION CONTROL NOTES IN THIS DRAWING.

11. ALL DISTURBED AREAS NOT SODDED SHALL BE SEEDED WITH A MIXTURE OF LONG-TERM VEGETATION AND QUICK GROWING SHORT-TERM VEGETATION FOR THE FOLLOWING CONDITIONS. FOR THE MONTHS FROM SEPTEMBER THROUGH MARCH, THE MIX SHALL CONSIST OF 70 POUNDS PER ACRE OF LONG-TERM SEED AND 20 POUNDS PER ACRE OF WINTER RYE. FOR THE MONTHS OF APRIL THROUGH AUGUST, THE MIX SHALL CONSIST OF 70 POUNDS PER ACRE OF LONG-TERM SEED AND 20 POUNDS PER ACRE OF MILLET.

12. PROJECT DESIGN IS BASED ON STATE PLAIN COORDINATES AND NAVD88 DATUM FROM FDOT (EPIC) PUBLISHED CONTROL ALONG THE PROJECT ROADWAYS. CONSTRUCTION LAYOUT AND AS-BUILT SURVEY SHALL BE BASED ON THE SAME CONTROL. FDOT PUBLISHED CONTROL IS AVAILABLE AT: HTTPS://FDOTEWP.1.DOT.STATE.FL.US/ENTERPRISEPNCINFORMATIONCOLLECTION/

13. THE LOCATION OF THE UTILITIES SHOWN IN THE PLANS ARE APPROXIMATE ONLY. THE EXACT LOCATION SHALL BE DETERMINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. ALL CONFLICTS OR DISCREPANCIES BETWEEN THESE PLANS AND EXISTING FIELD CONDITIONS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF ENGINEER. CONTRACTOR SHALL PROTECT ALL UTILITIES WITHIN THE PROJECT AREAS. CONTRACTOR SHALL CONTACT SUNSHINE 811 OR (800) 432-4770 FOR UTILITY CONSTRUCTION LOCATES AT LEAST TWO (2) BUSINESS DAYS PRIOR TO CONSTRUCTION. UTILITY CONTACT INFORMATION AS FOLLOWS:

NAME	CONTACT	PHONE	EMAIL
CLAY ELECTRIC	CRAIG W. WACHA	O:(386) 961-0106 C: (386) 867-1978	cwacha@clayelectric.com

14. ALL UTILITY CONSTRUCTION SHALL COMPLY WITH THE COLUMBIA COUNTY & FDOT UTILITY STANDARDS.

15. CONTRACTOR SHALL FOLLOW ALL TRENCH SAFETY PRACTICES PER OSHA GUIDELINES AND THE FLORIDA TRENCH SAFETY ACT, CHAPTER 553 F.S.

16. CONTRACTOR SHALL REVIEW AND BECOME FAMILIAR WITH ALL REQUIRED UTILITY CONNECTIONS PRIOR TO BIDDING. CONTRACTOR SHALL PROVIDE ALL WORK AND MATERIALS REQUIRED TO COMPLETE CONNECTION TO THE EXISTING UTILITIES. THIS INCLUDES BUT IS NOT LIMITED TO MANHOLE CORING, WET TAPS, PAVEMENT REPAIRS AND DIRECTIONAL BORING.

17. THE CONTRACTOR SHALL NOTIFY COLUMBIA COUNTY, FDOT AND ALL APPLICABLE PERMITTING AGENCIES OF CONSTRUCTION COMMENCEMENT AT LEAST 48 HOURS PRIOR TO BEGINNING OF CONSTRUCTION.

18. A PRE-CONSTRUCTION MEETING WITH COLUMBIA COUNTY UTILITY DIRECTOR & FDOT INSPECTOR MAY BE REQUIRED PRIOR TO BEGINNING CONSTRUCTION.

19. THE CONTRACTOR SHALL NOTIFY THE OWNER AT LEAST 48 HOURS IN ADVANCE OF PRESSURE AND LEAKAGE TESTING. NO FINAL PRESSURE OR LEAKAGE TESTING WILL BE ACCEPTED UNLESS WITNESSED BY THE OWNER'S REPRESENTATIVE.

20. NO WORK SHALL BE PERFORMED ON SATURDAY OR SUNDAY WITHOUT OWNER'S APPROVAL BASED ON PRIOR WRITTEN NOTIFICATION TO THE OWNER AND ENGINEER.

21. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS WITH INVERT ELEVATIONS FOR PUMP STATION FOR APPROVAL PRIOR TO PROCUREMENT.

EROSION CONTROL NOTES

1. THIS EROSION AND SEDIMENTATION CONTROL PLAN COMPLIES WITH THE REQUIREMENTS OF THE "FLORIDA DEVELOPMENT MANUAL" AND THE "FLORIDA EROSION AND SEDIMENT CONTROL INSPECTOR'S MANUAL".

2. THE CONTRACTOR SHALL ADHERE TO COLUMBIA COUNTY, SRWMD, AND OTHER GOVERNING AUTHORITIES FOR EROSION AND SEDIMENT CONTROL REGULATIONS. IF THE CONTRACTOR NEEDS TO CHANGE THIS PLAN TO MORE EFFECTIVELY CONTROL EROSION AND SEDIMENTATION, THE CONTRACTOR SHALL USE BMP's FROM THE "FLORIDA EROSION AND SEDIMENT CONTROL INSPECTOR'S MANUAL".

3. THE CONTRACTOR SHALL ADJUST AND REVISE THIS PLAN TO MEET ACTUAL FIELD CONDITIONS. ANY REVISIONS SHALL BE APPROVED BY THE REVIEWING AGENCIES.

4. SEDIMENT AND EROSION CONTROL FACILITIES, STORM DRAINAGE FACILITIES AND DETENTION BASINS SHALL BE INSTALLED PRIOR TO ANY OTHER CONSTRUCTION.

5. EROSION CONTROL MEASURES SHALL BE INSPECTED WEEKLY AND AFTER EACH RAINFALL OF 0.5 INCHES OR GREATER, AND REPAIRED OR REPLACED AS NECESSARY.

6. SEDIMENT AND EROSION CONTROL MEASURES SHALL NOT BE REMOVED UNTIL ALL CONSTRUCTION IS COMPLETE AND UNTIL A PERMANENT GROUND COVER HAS BEEN ESTABLISHED.

7. ALL OPEN DRAINAGE SWALES SHALL BE GRASSED AND RIPRAP SHALL BE PLACED AS REQUIRED TO CONTROL EROSION.

8. SILT FENCES SHALL BE LOCATED ON SITE TO PREVENT SEDIMENT AND EROSION FROM LEAVING PROJECT LIMITS.

9. CONTRACTOR SHALL PLACE A DOUBLE ROW OF SILT FENCE IN AREAS WHERE RUNOFF FROM DISTURBED AREAS MAY ENTER WETLANDS.

10. DURING CONSTRUCTION AND AFTER CONSTRUCTION IS COMPLETE, ALL STRUCTURES SHALL BE CLEANED OF ALL DEBRIS AND EXCESS SEDIMENT.

11. ALL GRADED AREAS SHALL BE STABILIZED IMMEDIATELY WITH A TEMPORARY FAST-GROWING COVER AND/OR MULCH.

12. A PAD OF RUBBLE RIP RAP SHALL BE PLACED AT THE BOTTOM OF ALL COLLECTION FLUMES AND COLLECTION PIPE OUTLETS. GRANITE OR LIMESTONE RIPRAP IS REQUIRED, NO BROKEN CONCRETE WILL BE ACCEPTED.

13. ALL SIDE SLOPES STEEPER THAN 3:1 SHALL BE ADEQUATELY PROTECTED FROM EROSION THROUGH THE USE OF SYNTHETIC BALES OR SODDING.

14. ALL STABILIZATION PRACTICES SHALL BE INITIATED AS SOON AS PRACTICABLE IN AREAS OF THE JOB WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY STOPPED, BUT IN NO CASE SHALL THE DISTURBED AREA BE LEFT UNPROTECTED FOR MORE THAN SEVEN DAYS.

15. ALL WASTE GENERATED ON THE PROJECT SHALL BE DISPOSED OF BY THE CONTRACTOR IN AREAS PROVIDED BY CONTRACTOR.

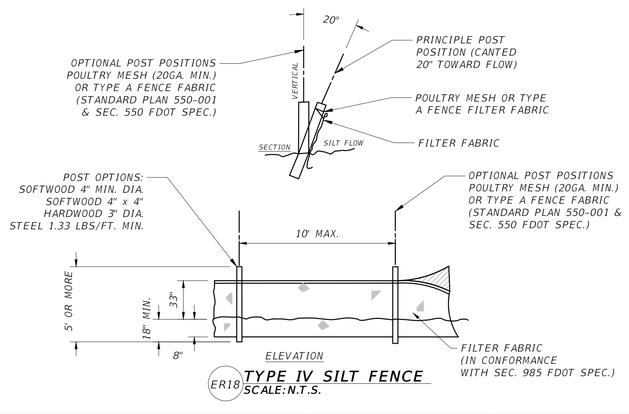
16. LOADED HAUL TRUCKS SHALL BE COVERED WITH TARPS.

17. EXCESS DIRT SHALL BE REMOVED DAILY.

18. THIS PROJECT SHALL COMPLY WITH ALL WATER QUALITY STANDARDS.

19. QUALIFIED PERSONNEL SHALL INSPECT THE AREA USED FOR STORAGE OF STOCKPILES, THE SILT FENCE AND STRAW BALES, THE LOCATION WHERE VEHICLES ENTER OR EXIT THE SITE, AND THE DISTURBED AREAS THAT HAVE NOT BEEN FINALLY STABILIZED, AT LEAST ONCE EVERY SEVEN CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM OF 0.5 INCHES OR GREATER.

20. CONTRACTOR SHALL INSPECT AND ADEQUATELY WATER GRASS SEEDING AFTER FINAL STABILIZATION ONCE A WEEK FOR A ONE MONTH PERIOD.



ER18 TYPE IV SILT FENCE
SCALE:N.T.S.

SEWER NOTES

1. ALL UTILITY CONSTRUCTION SHALL COMPLY WITH THE COLUMBIA COUNTY & FDOT UTILITY STANDARDS.

2. PLASTIC WARNING TAPE SHALL BE PROVIDED FOR ALL BURIED SANITARY FORCE MAINS.

3. COPPER TRACER WIRE SHALL BE PLACED ON ALL BURIED SANITARY FORCE MAINS. TRACER WIRE SHALL BE CONTINUOUS WITH NO INTERRUPTIONS.

4. LOCATOR BALLS SHALL BE PROVIDED AT END OF ALL SANITARY SEWER FORCE MAIN STUB-OUTS. THE LOCATOR BALLS SHALL BE SECURED TO THE STUB-OUTS WITH A PLASTIC TIE STRAP.

5. ALL PIPE SIZES AND MATERIALS (INCLUDING PRESSURE CLASS, SCHEDULE AND/OR DIMENSION RATIO) SHALL BE AS INDICATED IN THESE DRAWINGS.

6. POLYVINYL CHLORIDE (PVC) PRESSURE PIPE SHALL CONFORM TO STANDARDS AWWA C900 (SIZE 4-INCH THROUGH 12-INCH). PIPE SHALL HAVE PUSH-ON GASKETED JOINTS AND DUCTILE IRON MECHANICAL JOINT FITTINGS WITH POLYETHYLENE (PE) ENCASEMENT PER PROJECT SPECIFICATIONS.

7. DUCTILE IRON PIPE (DIP) SHALL CONFORM TO STANDARDS AWWA C150 AND C151 (SIZE 4-INCH OR GREATER). PIPE SHALL HAVE GASKETED MECHANICAL JOINTS FOR BURIED SERVICE AND FLANGED GASKETED JOINTS FOR NON-BURIED SERVICE. ALL BURIED DIP PIPE AND FITTINGS SHALL BE WITH POLYETHYLENE (PE) ENCASEMENT PER PROJECT SPECIFICATIONS.

8. ALL BURIED PRESSURE PIPING INSTALLED UNDER THIS PROJECT SHALL USE RESTRAINED JOINTS WHERE REQUIRED TO PREVENT PIPE MOVEMENT DUE TO THRUST. ALL BURIED PRESSURE FITTINGS, PLUGS AND VALVES SHALL BE RESTRAINED WITH MECHANICAL JOINT RETAINER GLANDS (MEGALUG OR EQUIVALENT), WITH VALVES BEING RESTRAINED AS DEAD ENDS IN BOTH DIRECTIONS. REFER TO THE PVC PIPE RESTRAINED JOINT SCHEDULE DETAIL IN THESE DRAWINGS. NO CONCRETE THRUST BLOCKS SHALL BE ALLOWED.

9. MEGALUG MECHANICAL JOINT RESTRAINTS OR SERIES 1390 UNI-FLANGE BLOCK BUSTER RESTRAINT DEVICES SHALL COMPLY WITH THE MANUFACTURER'S RECOMMENDATIONS. ALL RESTRAINED JOINTING MUST BE LEFT OPEN UNTIL VIEWED BY THE OWNER'S INSPECTOR.

10. ALL PIPE, PIPE FITTINGS, PIPE JOINT PACKING AND JOINTING MATERIALS, VALVES, AND METERS INSTALLED UNDER THIS PROJECT SHALL CONFORM TO APPLICABLE AMERICAN WATER WORKS ASSOCIATION (AWWA) STANDARDS. ALL INSTALLATION SHALL CONFORM WITH THE MANUFACTURER'S RECOMMENDED PROCEDURES.

11. ALL PIPE AND PIPE FITTINGS INSTALLED UNDER THIS PROJECT SHALL CONTAIN NO MORE THAN 8.0% LEAD, AND ANY SOLDER OR FLUX USED IN THIS PROJECT SHALL CONTAIN NO MORE THAN 0.2% LEAD.

12. A CONTINUOUS AND UNIFORM BEDDING SHALL BE PROVIDED IN TRENCHES FOR UNDERGROUND PIPE INSTALLED UNDER THIS PROJECT; BACKFILL MATERIAL SHALL BE TAMPED IN LAYERS AROUND UNDERGROUND PIPE INSTALLED UNDER THIS PROJECT AND TO A SUFFICIENT HEIGHT ABOVE THE PIPE TO ADEQUATELY SUPPORT AND PROTECT THE PIPE; AND UNSUITABLY SIZED STONES (AS DESCRIBED IN APPLICABLE AWWA STANDARDS OR MANUFACTURERS' RECOMMENDED INSTALLATION PROCEDURES) FOUND IN TRENCHES SHALL BE REMOVED FOR A DEPTH OF AT LEAST SIX INCHES BELOW THE BOTTOM OF UNDERGROUND PIPE INSTALLED UNDER THIS PROJECT.

13. NEW OR ALTERED SANITARY PRESSURE MAINS INCLUDED IN THIS PROJECT AND CONSTRUCTED OF PVC PIPE SHALL BE PRESSURE AND LEAKAGE TESTED IN ACCORDANCE WITH AWWA STANDARD C605 AS INCORPORATED INTO RULE 62-555.330, F.A.C.

14. ALL NEW OR ALTERED SANITARY PRESSURE MAINS INCLUDED IN THIS PROJECT AND CONSTRUCTED OF HDPE PIPE SHALL BE PRESSURE AND LEAKAGE TESTED IN ACCORDANCE WITH ASTM STANDARD F2164.

15. NEW OR RELOCATED, UNDERGROUND SANITARY FORCE MAINS SHALL COMPLY WITH UTILITY SEPARATION REQUIREMENTS AS REFERENCED AND DETAILED IN THESE DRAWINGS.

16. CONTRACTOR SHALL PROVIDE AN AS-BUILT SURVEY, MEETING THE REQUIREMENTS OF CHAPTER 61G17 F.A.C. FOR THE PROJECT IMPROVEMENTS. INCLUDE HORIZONTAL AND VERTICAL DIMENSIONAL DATA SO THAT IMPROVEMENTS ARE LOCATED AND DELINEATED RELATIVE TO THE BOUNDARY. PROVIDE SUFFICIENT DETAILED DATA TO DETERMINE WHETHER THE IMPROVEMENTS WERE CONSTRUCTED IN ACCORDANCE WITH THE PLANS. COPIES OF THE AS-BUILT SURVEY (IN PAPER AND DIGITAL AUTOCAD FORMAT) MUST BE SUBMITTED TO OWNER AND THE ENGINEER

17. AS-BUILT INFORMATION FOR BURIED UTILITIES SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:
   a. CERTIFICATION THAT ALL BURIED UTILITIES MEET THE MINIMUM COVER AND SEPARATION REQUIREMENTS.
   b. HORIZONTAL AND VERTICAL LOCATION OF ALL JOINT DEFLECTIONS, FITTINGS AND VALVES.
   c. HORIZONTAL AND VERTICAL LOCATION OF ALL PIPING AT 50-FOOT INTERVALS.
   d. HORIZONTAL AND VERTICAL LOCATION DATA FOR ALL CONSTRUCTION THAT DEVIATES FROM THE APPROVED ENGINEERING PLANS.

18. WHERE THE DISTANCE BETWEEN AN EXISTING POWER POLE AND THE TOP OF UTILITY TRENCH IS LESS THAN THE TRENCH DEPTH, CONTRACTOR EITHER SHALL USE A TRENCH BOX OR SHALL COORDINATE WITH THE APPLICABLE ELECTRIC UTILITY PROVIDER TO SECURE THE POWER POLE DURING TRENCHING AND UTILITY CONSTRUCTION.

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4168 SOUTHPOINT PKWY., JACKSONVILLE, FL 32216, www.nfps.net/firstcoast/

JOB NUMBER: L231019CCB
EOR: RICKY L. HENDRIX P.E.
P.E. NO.: 45239

NOTES
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO. C-3

ABBREVIATIONS

APPROX	APPROXIMATE
ASSY	ASSEMBLY
BLDG	BUILDING
DIA	DIAMETER
ELEV	ELEVATION
FM	FORCE MAIN
MAX	MAXIMUM
MIN	MINIMUM
NOM	NOMINAL
RIB	RAPID INFILTRATION BASIN
WM	WATER MAIN

LEGEND

FM FM FM	PROPOSED SANITARY FORCE MAIN
W(A) W(A)	EXISTING WATER LINE
	EXISTING FENCE
	WOODS LINE (EXISTING)
OE OE OE	EXISTING OVERHEAD ELECTRICAL LINES
BE(A) BE(A)	EXISTING BURIED ELECTRICAL LINES
FM FM FM	PROPOSED SANITARY FORCE MAIN
BE BE BE	PROPOSED ELECTRICAL (BURIED)
	PROPOSED GATE VALVE
	PROPOSED CHECK VALVE
	PROPOSED PLUG VALVE
	PROPOSED AIR RELEASE VALVE (ARV)
	PROPOSED FLOW METER
	PROPOSED TEE
	PROPOSED 90° BEND
	PROPOSED 45° BEND

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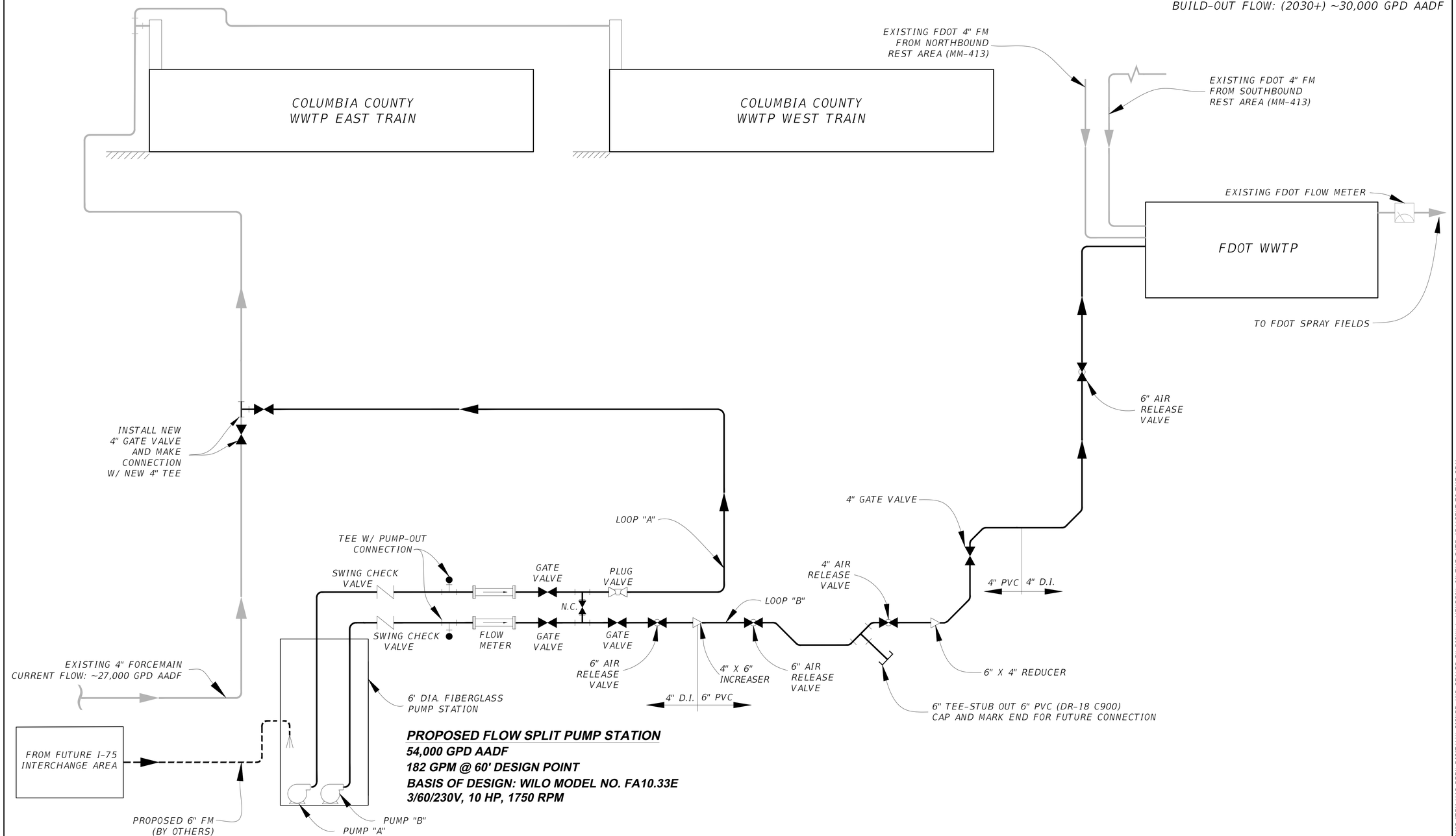
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P.E. NO.: 45239

ABBREVIATIONS AND LEGEND
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO.
C-4

EXISTING COUNTY ELLISVILLE WWTP
WITH RAPID INFILTRATION BASINS (RIBS)
PERMIT: 50,000 GPD AADF
CURRENT FLOW: ~28,000 GPD AADF

EXISTING FDOT WWTP
WITH SPRAY FIELDS
PERMIT 49,000 GPD AADF
CURRENT FLOW: ~17,000 GPD AADF
BUILD-OUT FLOW: (2030+) ~30,000 GPD AADF



PROPOSED FLOW SPLIT PUMP STATION
54,000 GPD AADF
182 GPM @ 60' DESIGN POINT
BASIS OF DESIGN: WILO MODEL NO. FA10.33E
3/60/230V, 10 HP, 1750 RPM

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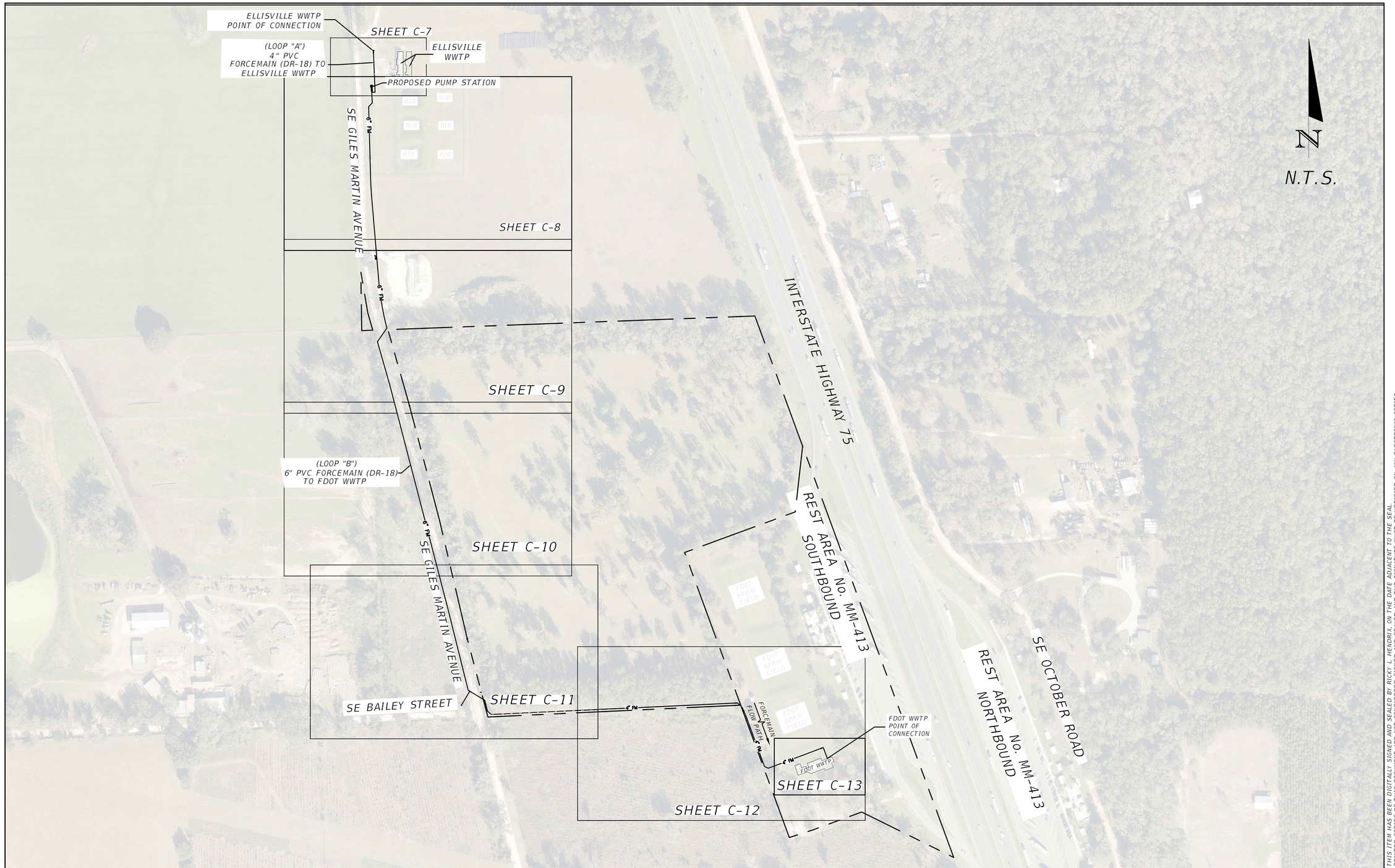
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PROCESS FLOW DIAGRAM
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO. C-5



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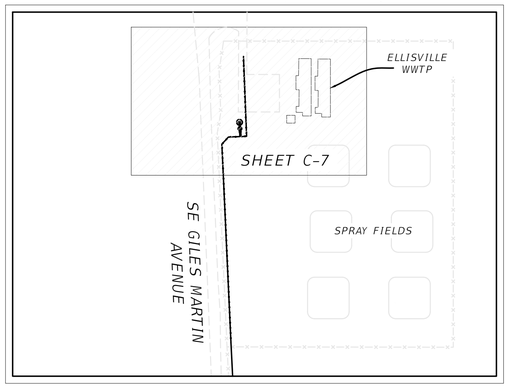
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P.E. NO.: 45239

OVERALL UTILITY MAP & KEY SHEET
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO. C-6

K:\2023+\L231019\CIVIL\CADD\Ellisville WWTP\Utilities\Master Utility Plan01.dwg 6



KEY MAP

MAKE CONNECTION TO EXISTING 4" FORCEMAIN
W/ 4" TAPPING SADDLE @
N: 363119.4147
E: 2574878.9562
CONTRACTOR TO CONFIRM LOCATION AND ELEVATION
PRIOR TO START OF CONSTRUCTION AND NOTIFY
ENGINEER OF ANY DISCREPANCIES

TBM
SET
74.89

3' WIRE FENCE
/MAINTAINED R/W

SE GILES MARTIN AVENUE

TOP EL.=69.90

4" FM (EXIST.)

VLVS

VLVS

BACKFLOW PREVENTER

MW

1 - 4" GATE VALVE ASSY.
N: 363114.4148
E: 2574879.0000

COLUMBIA COUNTY WWTP

COLUMBIA COUNTY WWTP

ELEC PANEL

4" FM

4" FORCEMAIN (D.I.)
36" MIN. COVER (TYP)

CONC PAD
W/ GENERATOR

ELEC PANEL

ELEC PANEL

N

GRAPHIC SCALE
10 0 5 10

SEE SHEET E2 FOR
CONTROL PANEL DETAILS

24' O.C.

6" PIPE BOLLARDS (TYP)
(SEE SHEET C-16 FOR DETAIL)

ELLISVILLE PUMP STATION @
N: 363011.5613
E: 2574867.9105 O.C.
(SEE SHEET C-15 FOR DETAILS)

4" FM

UNDERGROUND ELEC
CASING
SIZE:4" PVC

CONTRACTOR TO MAINTAIN
10' MIN. FROM 4" BURIED
ELECTRICAL CONDUIT

EXISTING RIB

(SEE SHEET C-8 FOR
CONTINUATION)

74 75 76 77

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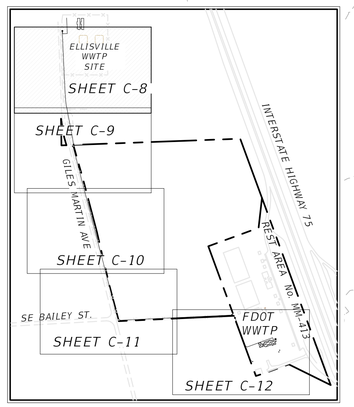
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LAKE CITY, FL 32056
PH. 386-752-4675
LIC NO. LB8356
BLAIRSTONE PINES DR.
TALLAHASSEE, FL 32301
CA# 29011
4168 SOUTHPOINT PKWY.
JACKSONVILLE, FL 32216
www.nfps.net/firstcoast/

JOB NUMBER:
L231019CCB
EOR:
RICKY L. HENDRIX P.E.
P.E. NO.: 45239

ELLISVILLE WWTP CONNECTION SITE PLAN
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO.
C-7

K:\2023\L231019CCB\PLANS\Ellisville WWTP PLANS01.dwg 7



KEY MAP

ELLISVILLE PUMP STATION @
N: 363011.5613
E: 2574867.9105 O.C.
(SEE SHEET C-7 &
SHEET C-15 FOR DETAILS)

6" PIPE BOLLARDS (TYP) SN9

8.5'

TOP OF PIPE
EL.=73.10 (12"PVC)

4" DIP FORCEMAIN
36" MIN. COVER (TYP)

1-4" 45° BENDS M.J.
N:362946.0219
E:2574871.3159

45'

1-4" X 6" INCREASER
TRANSITION FROM
4" D.I. TO 6" PVC (DR-18) @
N: 362925.8589
E: 2574856.8987

SN3
SN5
SN6

10.5'

FM

SE GILES MARTIN AVENUE

VCW

BROWN LAND
TRUST

TOP OF PIPE
EL.=74.73 (12"PVC)

COLUMBIA
COUNTY
PROPERTY

EXISTING 12" WATERMAIN
(CONTRACTOR TO MAINTAIN
10' MINIMUM SEPARATION)

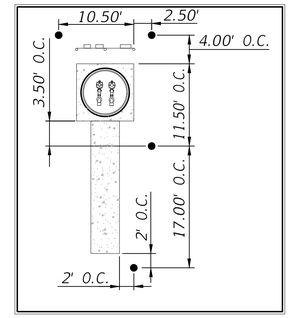
10.5'

6" PVC (DR-18)
FORCEMAIN
36" MIN. COVER (TYP)

EXISTING RIB

GRAPHIC SCALE

30 15 0 30



BOLLARD SPACING DETAIL
1" = 10'

MATCH LINE
SEE SHEET C-9

MATCH LINE
SEE SHEET C-9

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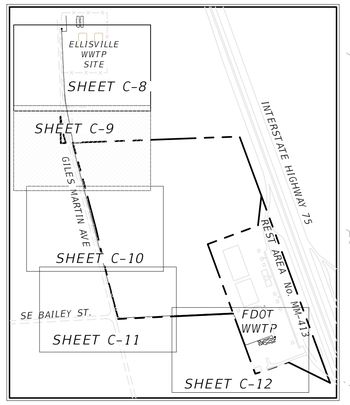
FORCEMAIN PLAN
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO.
C-8

K:\2023\L231019CB\CIVIL\CADD\Ellisville WWTP Utilities\FM Plan02.dwg 9

SEE SHEET C-8
MATCH LINE

SEE SHEET C-8
MATCH LINE



KEY MAP

N

30 15 0 30

GATE

6" PVC (DR-18)
FORCEMAIN
36" MIN. COVER (TYP)

COLUMBIA
COUNTY
PROPERTY

TOP OF PIPE
EL.=80.30 (12"PVC)

FH

TOP OF PIPE
EL.=80.48 (12"PVC)

BROWN LAND
TRUST

EXISTING 12" WATERMAIN
(CONTRACTOR TO MAINTAIN
10' MINIMUM SEPARATION)

10.5'

1 - 6" 45° BEND
TRANSITION
FROM 6" D.I. TO
6" PVC (DR-18)
N: 362179.1828
E: 2574917.8195

1 - 6" 45° BEND
TRANSITION FROM
6" PVC TO 6" D.I.
N:362142.9362
E:2574892.5385

6" DIP FORCEMAIN
36" MIN. COVER (TYP)

1 - AIR RELEASE VALVE
ASSY. W/ OFFSET MANHOLE
N:362136.1723
E:2574894.3569
SEE DETAIL SN11

32.5'

FLORIDA
DEPARTMENT OF
TRANSPORTATION
PROPERTY

1 - 6" GATE VALVE ASSY.
N: 362126.3254
E: 2574896.9772

4.0'

SE GILES MARTIN AVENUE

6" PVC (DR-18)
FORCEMAIN
36" MIN. COVER (TYP)

EXISTING
12" WATERMAIN

4.0'

34.0'

MATCH LINE
SEE SHEET C-10

MATCH LINE
SEE SHEET C-10

REVISIONS	
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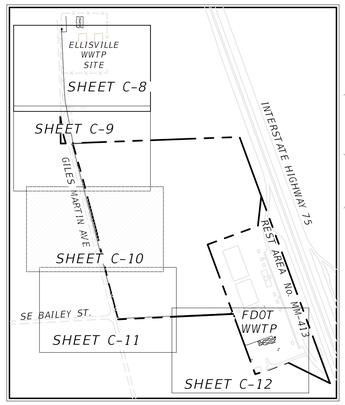
FORCEMAIN PLAN
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO.
C-9

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SEE SHEET C-9
MATCH LINE

SEE SHEET C-9
MATCH LINE



KEY MAP

FM
4.0'
34.0'
34.0'
4.0'
4.0'
4.0'
FM
FM
SE GILES MARTIN AVENUE
GATE
EXISTING 12" WATERMAIN
TOP OF PIPE EL.=72.22 (12"PVC)
6" PVC (DR-18) FORCEMAIN 36" MIN. COVER (TYP)
ROGERS ARKY LAND TRUST
CASON LAND TRUST
FLORIDA DEPARTMENT OF TRANSPORTATION PROPERTY

N

GRAPHIC SCALE
30 15 0 30

MATCH LINE
SEE SHEET C-11

MATCH LINE
SEE SHEET C-11

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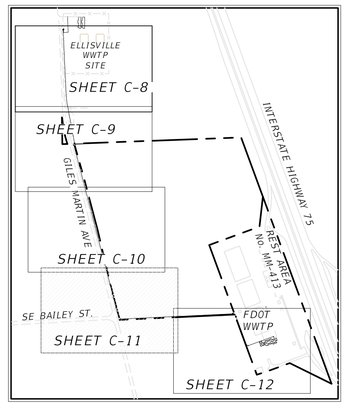
FORCEMAIN PLAN
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO.
C-10

K:\2023\L231019CCB\CADD\Ellisville WWTP Columbia\PW Plans01.dwg 10

SEE SHEET C-10
MATCH LINE

SEE SHEET C-10
MATCH LINE



KEY MAP

FM

4.0'

32.5'

SE GILES MARTIN AVENUE

TOP OF PIPE
EL.=72.68 (12"PVC)

6" PVC (DR-18)
FORCEMAIN
36" MIN. COVER (TYP)

CASON
LAND TRUST

ROGERS ARKY
LAND TRUST

FLORIDA
DEPARTMENT OF
TRANSPORTATION
PROPERTY

1 - 6" X 6" TEE
N: 360950.9863
E: 2575206.7559
1 - 6" GATE
VALVE ASSY.

1 - 6" 45° BEND
START TRANSITION
TO INV. EL. 71.00
N: 360962.9962
E: 2575201.3227

1 - 6" 45° BEND
INV. EL. 71.00 @
N:360958.5975
E:2575202.2958

1 - 6" 45° BEND
TRANSITION FROM 6"
D.I. TO 6" PVC (DR-18)
N: 360952.8375
E: 2575203.5699

1-6" PLUG M.J.
RESTRAINED
MARK END FOR
FUTURE CONNECTION

CONTRACTOR TO FIELD VERIFY
EXISTING 12" WATERMAIN LOCATION
AND INVERT EL. PRIOR TO START OF
CONSTRUCTION AND NOTIFY ENGINEER OF
ANY DISCREPANCIES. CONTRACTOR TO HOLD
12" MIN. VERTICAL SEPARATION FROM
EXISTING 12" WATERMAIN
& PROPOSED 6" FORCEMAIN
SEE DETAIL SN-4, SHEET C-16

TOP OF
EXIST. 12" WM
EL.=73.64

"CAUTION BURIED
WATERMAIN" SIGN

SE GILES MARTIN
AVENUE

1 - 6" 45° BEND
START TRANSITION
TO INV. EL. 73.50
(36" MIN. COVER) @
N: 360931.7012
E: 2575238.7207

1 - 6" 45° BEND
INV. EL. 73.50
TRANSITION
FROM 6" PVC TO
6" D.I. @
N: 360929.3816
E: 2575242.5772

1 - 6" 45° BEND
N: 360926.8916
E: 2575246.7181

DETAIL A
N.T.S.

GRAPHIC SCALE
30 15 0 30

4.0'

FM

30.0'

SEE DETAIL A
THIS SHEET

TOP OF PIPE
EL.=73.59 (12"PVC)

6" DIP FORCEMAIN
36" MIN. COVER (TYP)

1 - AIR RELEASE VALVE ASSY.
W/ MANHOLE OVER MAIN @
N: 360916.0861
E: 2575249.4636
SEE DETAIL SN12

TOP OF PIPE EL.=74.01 (12"PVC)

VALVE TOP OF COVER = 78.20
TOP OF VALVE = 73.54

VALVE TOP OF COVER = 77.78
TOP OF VALVE = 72.59

FH

1 - 4" 45° BEND
N: 360884.1701
E: 2575257.4096

1 - 4" 45° BEND
N: 360872.0217
E: 2575270.4946

4" PVC FORCEMAIN (DR-18)
36" MIN. COVER (TYP)

FM

FM

FM

8'

SE BAILEY STREET

29.97'

CASON
LAND TRUST

1 - 6" X 4" REDUCER
TRANSITION FROM 6" PVC
TO 4" PVC @
N: 360911.1450
E: 2575250.7073
1 - 4" GATE VALVE ASSY.

CONTRACTOR TO MAINTAIN FENCE CLOSURE AT ALL
TIMES AND REPAIR TO OWNER SPECIFICATIONS
IF DAMAGED

CASON
LAND TRUST

MATCH LINE
SEE SHEET 12

MATCH LINE
SEE SHEET 12

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www.nfps.net/firstcoast/

JOB NUMBER:
L231019CCB
EOR:
RICKY L. HENDRIX P.E.
P.E. NO.: 45239

FORCEMAIN PLAN
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO.
C-11

K:\2023\L231019CCB\VCADD\Ellisville WWTP Utilities\VH Plans01.dwg 11

SEE SHEET C-11
MATCH LINE

FLORIDA DEPARTMENT OF TRANSPORTATION PROPERTY

CASON LAND TRUST

4" PVC FORCEMAIN (DR-18)
36" MIN. COVER (TYP)

FM

8'

CONTRACTOR TO MAINTAIN FENCE CLOSURE AT ALL TIMES AND REPAIR TO OWNER SPECIFICATIONS IF DAMAGED

1 - 4" 45° BEND
N: 360903.2884
E: 2576112.9090

1 - 4" 22.5° BEND
N: 360895.1250
E: 2576121.7018

4" PVC FORCEMAIN (DR-18)
36" MIN. COVER (TYP)

5'

END TYPE "B" CROSSING
1 - 4" 45° BEND
N: 360739.9518
E: 2576350.6942

1 - 4" 45° BEND
N: 360735.3911
E: 2576338.5701

1 - 4" 45° BEND
N: 360712.9079
E: 2576278.7406

1 - 4" 45° BEND
N: 360691.6241
E: 2576198.5257

2 - 4" 45° BEND
TRANSITION FROM 4" PVC (DR-18) TO 4" D.I. @
N: 360686.7091
E: 2576209.0937

START TYPE "B" CROSSING
1 - 4" 45° BEND
N: 360708.3275
E: 2576266.6242
MAINTAIN 18" VERTICAL CLEARANCE FROM EXIST. 8" GRAVITY SEWER & (3) 4" FORCEMAINS

4" DIP FORCEMAIN (DR-18)
36" MIN. COVER (TYP)

1 - AIR RELEASE VALVE ASSY.
W/ MANHOLE OVER MAIN
N:360742.2518
E:2576356.7486
SEE DETAIL SN12

1- 4" 90° BEND
N: 360756.9067
E: 2576395.7069

EXISTING FORCEMAIN FROM NORTH REST AREA

SEE SHEETS C-13 & C-14
FOR 4" FORCEMAIN DISCHARGE &
BAR SCREEN PLANS AND DETAILS

EXISTING LIFT STATION FROM SOUTH REST AREA

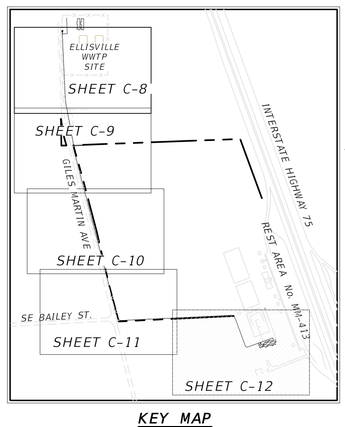
EXISTING FORCEMAIN FROM SOUTH REST AREA

FDOT EFFLUENT OVERFLOW CONTAINMENT

FDOT WWTP

N

GRAPHIC SCALE
30 15 0 30



KEY MAP

SEE SHEET C-11
MATCH LINE

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4168 SOUTHPOINT PKWY. JACKSONVILLE, FL 32216 www.nfps.net/firstcoast/

JOB NUMBER: L231019CCB
EOR: RICKY L. HENDRIX P.E.
P.E. NO.: 45239

FORCEMAIN PLAN
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO.
C-12

K:\2023\L231019CCB\VECADD\Ellisville WWTP\Utilities\FM Plan01.dwg 12

END TYPE "B" CROSSING
1 - 4" 45° BEND
N: 360739.9518
E: 2576350.6942

1 - 4" 45° BEND
N: 360735.3911
E: 2576338.5701

4" D.I. FORCE MAIN
36" MIN. COVER

1 - 4" 45° BEND
N: 360712.9079
E: 2576278.7406

START TYPE "B" CROSSING
1 - 4" 45° BEND
N: 360708.3275
E: 2576266.6242

MAINTAIN 18" VERTICAL CLEARANCE FROM EXIST. 8" GRAVITY SEWER & (3) 4" FORCEMAINS
SEE DETAIL SN4, SHEET C-16

1 - 4" AIR RELEASE VALVE ASSY. W/ MANHOLE OVER MAIN @
N:360742.2518
E:2576356.7486
SEE DETAIL SHEET C-17 FOR DETAIL

1- 4" 90° BEND
N: 360756.9067
E: 2576395.7069

EXISTING FORCEMAIN FROM SOUTH REST AREA

SEE SHEETS C-14 FOR 4" FORCEMAIN DISCHARGE & PROPOSED BAR SCREEN PLANS AND DETAILS

EXISTING FDOT DISCHARGE AND BAR SCREEN

EXISTING FORCEMAIN FROM NORTH REST AREA

FDOT EFFLUENT OVERFLOW CONTAINMENT

FDOT WWTP

N

GRAPHIC SCALE
10 0 5 10

*NOTE:
BAR SCREEN SHALL BE FABRICATED TO FIT EXISTING OPENING. REPLICATE EXISTING ADJACENT BAR SCREEN & OPENING DIMENSIONS. MODIFY EXISTING OPENING W/ 1-½" 304 S.S. "L" CHANNEL AS NEEDED TO SUPPORT NEW BAR SCREEN. SEE DETAIL SHEET C-14 FOR DETAIL.

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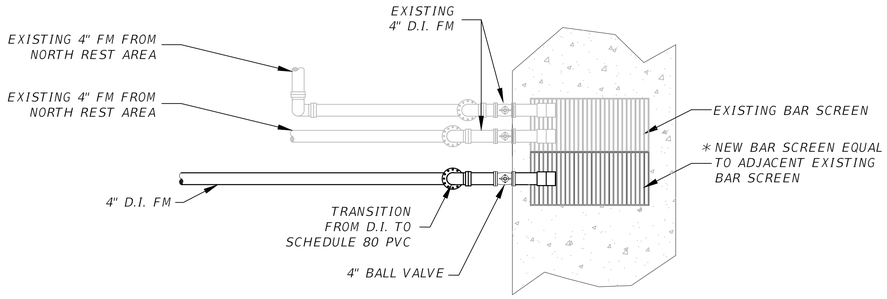
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RICKY L. HENDRIX P.E.
P.E. NO.: 45239

FDOT WWTP CONNECTION SITE PLAN
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO.
C-13

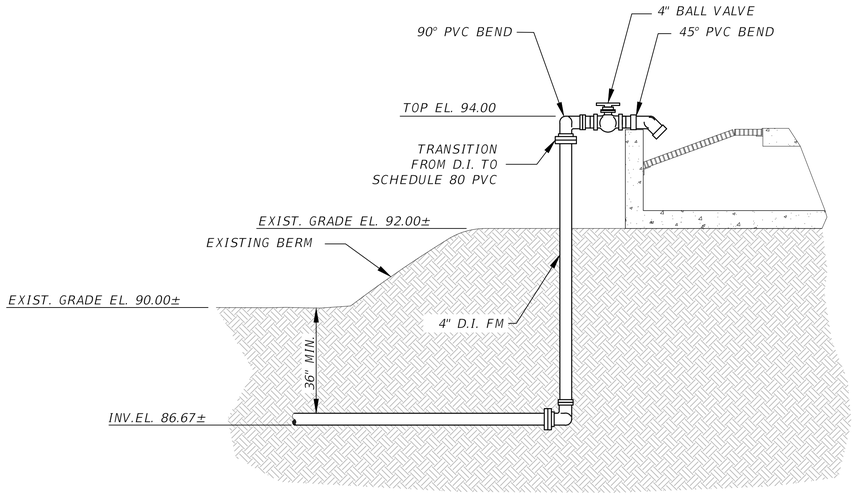


*NOTE

BAR SCREEN SHALL BE FABRICATED TO FIT EXISTING OPENING. REPLICATE EXISTING ADJACENT BAR SCREEN & OPENING DIMENSIONS. MODIFY EXISTING OPENING W/ 1-½" 304 S.S. "L" CHANNEL AS NEEDED TO SUPPORT NEW BAR SCREEN. SEE DETAIL SHEET C-14 FOR DETAIL.

PLAN VIEW

1" = 2'



SECTION VIEW

1" = 2'



EXISTING FDOT WWTP DISCHARGE

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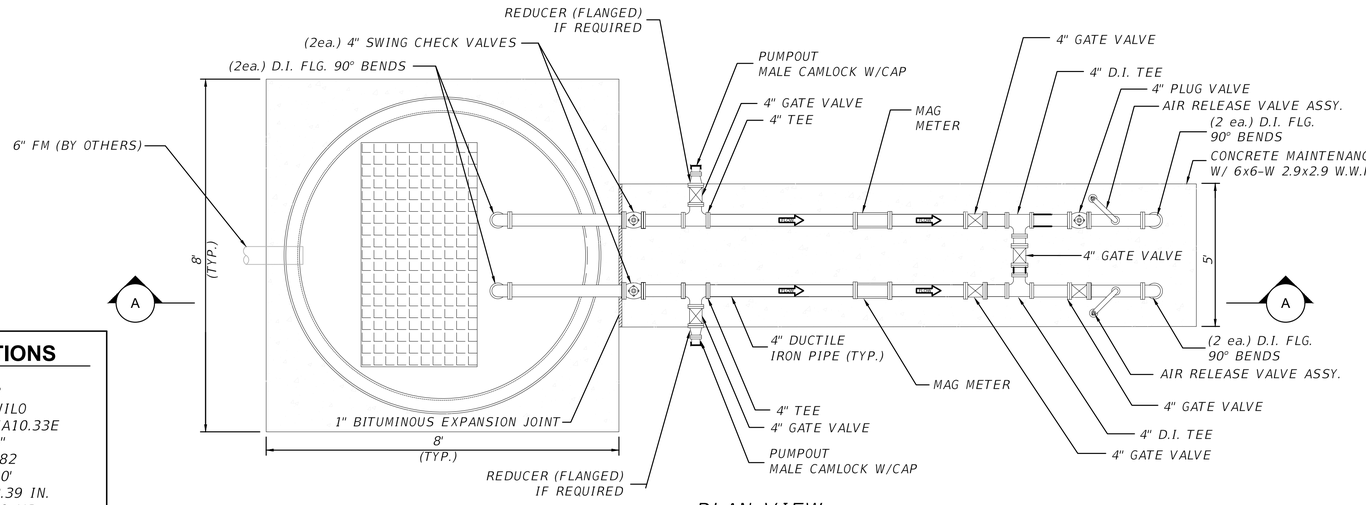
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FDOT WWTP CONNECTION DETAIL

ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO. C-14

K:\2023\231019CCB\HCLADD\Ellisville WWTP Details\FDOT WWTP Connect.dwg C-14



PLAN VIEW

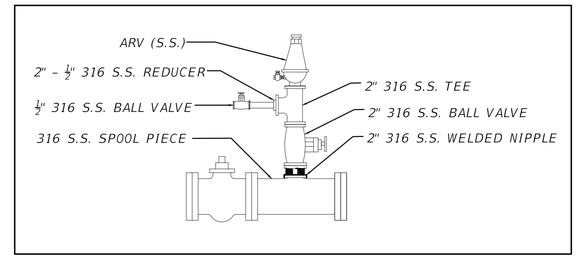
N.T.S.

PUMP SPECIFICATIONS

PUMPS REQ'D	2
MANUFACTURER	WILO
MODEL NUMBER	FA10.33E
PUMP SIZE	4"
CAPACITY EACH (GPM)	182
TOTAL HEAD (FEET)	60'
IMPELLER DIA.	8.39 IN.
MOTOR HP REQ'D	10 HP
SPEED (RPM)	1750
ELECTRICAL	3/60/230V

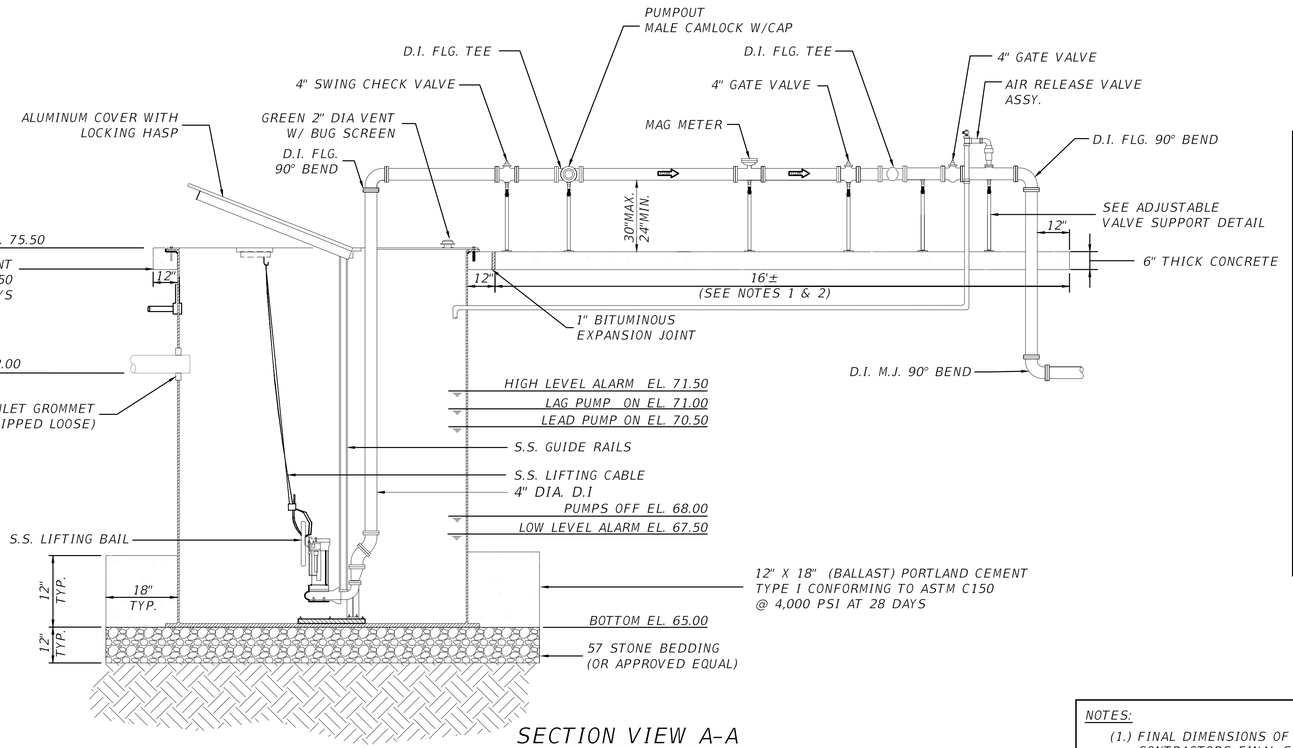
WETWELL

DIAMETER	HEIGHT
6.00'	10.50'



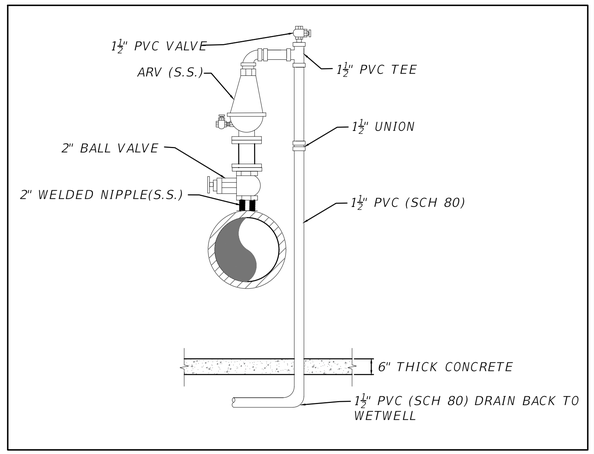
DISCHARGE ARV DETAIL

NTS



SECTION VIEW A-A

N.T.S.



ARV DRAIN DETAIL

NTS

NOTES:

(1.) FINAL DIMENSIONS OF VALVES, FLANGED SPOOL PIECES AND APPURTENANCES TO BE DETERMINED UPON CONTRACTORS FINAL SUBMITTAL. DIMENSIONS SHOWN ARE APPROXIMATE.

(2.) CONCRETE EQUIPMENT PAD FINAL DIMENSIONS TO BE DETERMINED UPON CONTRACTORS FINAL SUBMITTAL OF VALVES AND APPURTENANCES. CONCRETE PAD DIMENSIONS SHOWN ARE APPROXIMATE.

PUMP STATION & EQUIPMENT

REVISIONS

DATE	DESCRIPTION

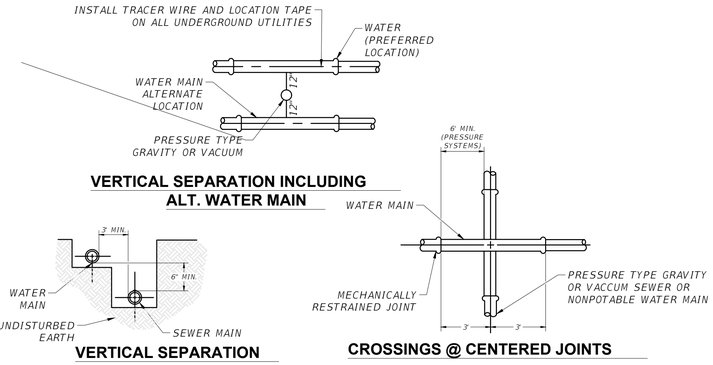
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BLAIRSTONE PINES DR., TALLAHASSEE, FL 32301, CA# 29011
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JOB NUMBER: L231019CCB
EOR: RICKY L. HENDRIX P.E.
P.E. NO.: 45239

PUMP STATION DETAILS
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO. C-15

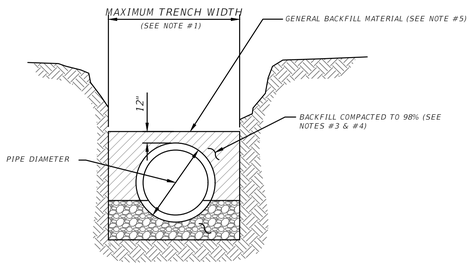
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NOTES:

1. THE MINIMUM HORIZONTAL DISTANCE BETWEEN THE OUTSIDE OF A WATER MAIN AND SEWER MAIN SHALL BE 6' WITH A PREFERRED 10' SEPARATION.
2. WHERE A 10 FOOT PARALLEL SEPARATION CANNOT BE MAINTAINED BETWEEN A WATERMAIN AND A SEWER MAIN OR NON-POTABLE WATER MAIN, THEN THE WATER MAIN SHALL BE LAID IN A SEPARATE TRENCH OR ON AN UNDISTURBED EARTH SHELF AT LEAST 6 INCHES ABOVE THE TOP OF THE SEWER MAIN OR NON-POTABLE WATER MAIN. THE HORIZONTAL SEPARATION SHALL BE NO LESS THAN 3', WHEN A SEWER MAIN AND A WATER MAIN CROSS, THE WATERMAIN SHOULD BE A MINIMUM OF 3' ABOVE OR BELOW THE SEWER.
3. FOR ALL PIPE CROSSINGS, THE PIPE JOINTS SHALL BE ARRANGED SO THAT ALL PIPE JOINTS ARE EQUIDISTANT FROM THE POINT OF CROSSING WITH NO LESS THAN SIX FEET BETWEEN ANY TWO JOINTS.
4. IF THE HORIZONTAL OR VERTICAL CLEARANCE LISTED HEREIN CANNOT BE ACHIEVED THE WATERMAIN CAN BE ENCASED IN 4" OF CONCRETE.

SN1 — WATER/SEWER SEPARATION

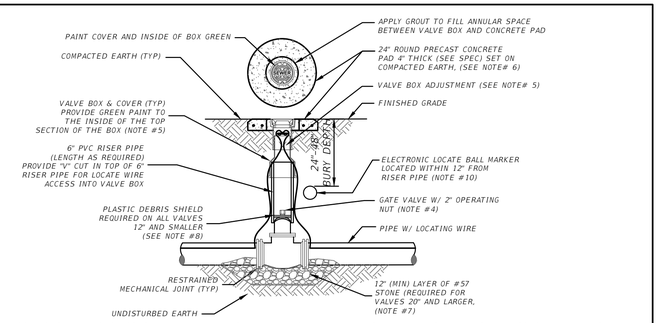


TYPICAL TRENCH

NOTES:

1. TRENCH SIDES SHALL BE APPROXIMATELY VERTICAL BETWEEN AN ELEVATION OF 1 FOOT ABOVE THE TOP OF THE PIPE AND THE CENTER LINE OF THE PIPE; OTHERWISE, TRENCH SIDES SHALL BE AS VERTICAL AS POSSIBLE OR AS REQUIRED BY OSHA STANDARDS. REFER TO THE MEASUREMENT AND PAYMENT SECTION (SECTION #801, PARAGRAPH #4)) TO DETERMINE MAXIMUM PAYLINE WIDTHS.
2. BELL HOLE SHALL BE DUG TO PERMIT THE ENTIRE STRAIGHT BARREL OF THE PIPE TO REST ON THE UNDISTURBED TRENCH BOTTOM. BOULDERS OR LOOSE ROCKS LARGER THAN 3/4 INCH IN SIZE WILL NOT BE PERMITTED IN BACKFILL UP TO 1 FOOT ABOVE THE TOP OF THE PIPE.
3. BACK FILL MATERIAL UP TO A LEVEL OF 1 FOOT OVER THE PIPE SHALL CONSIST OF AASHTO CLASS A-3 SOIL (SUITABLE SOIL) AND SHALL EXCLUDE CLAY MATERIALS AND LOOSE ROCKS LARGER THAN 3/4 INCH SIZE.
4. BACKFILL MATERIAL UP TO A LEVEL 1 FOOT OVER THE TOP OF PIPE OR BOTTOM OF STRUCTURES SHALL BE PLACED IN 6 INCH COMPACTED THICKNESS LAYERS AND SHALL BE COMPACTED TO 98% OF IT'S MAXIMUM DENSITY AS DETERMINED BY THE LABORATORY MODIFIED PROCTOR TEST, ASTM D1557.
5. SEE " EXCAVATION AND EARTHWORK", SECTION 408 FOR ADDITIONAL REQUIREMENTS INCLUDING REMOVAL AND REPLACEMENT OF UNSUITABLE SOILS, DEWATERING, COMPACTION REQUIREMENTS AND DENSITY TESTING OF COMPACTED SOILS.

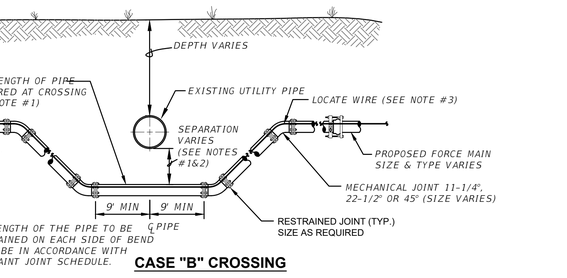
SN2 — OPEN CUT TRENCH FOR PRESSURE PIPE
N.T.S.



NOTES:

1. FOR UNPAVED LOCATIONS, A PRECAST CONCRETE VALVE PAD SHALL BE PROVIDED AND INSTALLED FLUSH WITH GRADE. CONCRETE PAD IS NOT REQUIRED FOR VALVE LOCATED IN THE ROADWAY, UNLESS SHOWN OR NOTED OTHERWISE. LOCATING WIRE IS REQUIRED ON ALL PRESSURE PIPING.
2. A "V" CUT SHALL BE CARVED IN THE CURB CLOSEST/(ASPHALT IF NO CURB) ADJACENT TO ALL BELOW GRADE VALVES. THE "V" CUT IS TO BE PAINTED GREEN.
3. IN PAVED AREAS, INSTALL VALVE AT A DEPTH TO ALLOW A 12" MIN. DISTANCE BETWEEN THE VALVE COVER PLATE AND THE TOP OF THE VALVE OPERATING NUT. OUTSIDE OF PAVED AREAS (GRASS), INSTALL VALVE AT A DEPTH TO ALLOW A 6" MINIMUM DISTANCE BETWEEN THE VALVE COVER AND THE TOP OF THE VALVE OPERATING NUT. OPERATING NUT/STEM EXTENSION SHALL BE PROVIDED (WHERE APPLICABLE) SO THAT THE OPERATING NUT WILL BE NO MORE THAN 30 INCHES BELOW FINISHED GRADE.
4. FOR NEW CONSTRUCTION, THE VALVE BOX SHALL BE ADJUSTED TO MIDRANGE TO ALLOW FOR FUTURE BOX ADJUSTMENTS. ROUTE LOCATE WIRES THRU A "V" CUT IN THE TOP OF THE 6" PVC RISER PIPE FOR LOCATE WIRE ACCESS INTO VALVE BOX. THE LOCATE WIRES WITH A 24" LONG PIG-TAIL AT THE TOP SHALL BE CONNECTED TOGETHER WITH A WIRE NUT.
5. BRASS IDENTIFICATION TAG INDICATING "SEWER", VALVE SIZE, DIRECTION AND TURNS TO OPEN & VALVE TYPE. PROVIDE A ½" HOLE IN BRASS TAG AND ATTACH TAG (TWIST WIRE AROUND TAG) TO THE END OF THE LOCATE WIRE. TAGS ARE NOT REQUIRED ON VALVES INSTALLED ON FIRE HYDRANT BRANCH LINES.
6. IN LIEU OF PRECAST CONCRETE PAD, A 6" THICK X 24" (ROUND OR SQUARE) POURED CONCRETE PAD W/2 - #4 REBAR AROUND PERIMETER, MAY BE USED.
7. GRAVEL SHALL BE PROVIDED UNDER ALL VALVES 20" AND LARGER. THE MINIMUM VERTICAL LIMIT OF GRAVEL IS 12" UNDER THE VALVE UP TO ½ THE OVERALL HEIGHT OF THE VALVE.
8. FOR VALVES 12 INCH AND SMALLER, PROVIDE A WHITE OR BLACK PLASTIC DEBRIS SHIELD WHICH INSTALLS BELOW THE OPERATING NUT. THIS SHIELD SHALL CENTER THE RISER PIPE BOX OVER THE OPERATING NUT AND MINIMIZE INFILTRATION. SHIELD SHALL BE BY AFC, BOXLOK OR APPROVED EQUAL.
9. ALL VALVES SHALL BE INSTALLED WITH AN ELECTRIC LOCATE MARKER. MARKER SHALL BE 4" DIA. COLOR CODED BALL MARKER (3M-1404XR FOR SEWER).

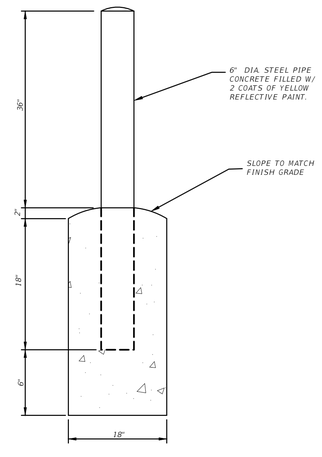
SN3 — SEWER VALVE
N.T.S.



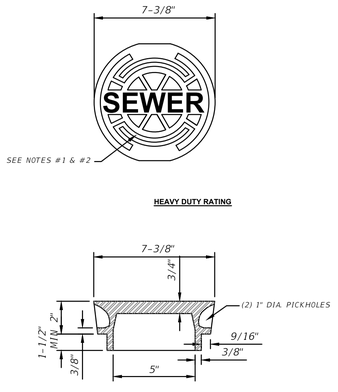
NOTES:

1. IF EXISTING CONFLICT PIPE IS A WATER OR RECLAIMED WATER MAIN, 12-INCHES OF SEPARATION IS REQUIRED.A FULL LENGTH OF PIPE SHALL BE CENTERED OVER EXISTING UTILITY MAIN TO PROVIDE MAXIMUM JOINT SPACING FOR ALL CROSSINGS.
2. LOCATING WIRE REQUIRED.
3. THE COVER FOR PIPING LESS THAN 24" SIZE SHALL BE 30" (MIN) IN UNPAVED AREAS, 36" (MIN) IN PAVED AREAS AND A MAXIMUM COVER OF 60", UNLESS PRE-APPROVED BY FDOT.
4. THE SOILS BETWEEN THE MAIN AND THE CONFLICT PIPE SHALL BE COMPACTED TO 98% OF THE MAXIMUM DENSITY AS DETERMINED BY THE LABORATORY MODIFIED PROCTOR TEST ASTM D 1557.

SN4 — ADJUSTMENT UNDER EXISTING UTILITIES MECHANICAL RESTRAINTS



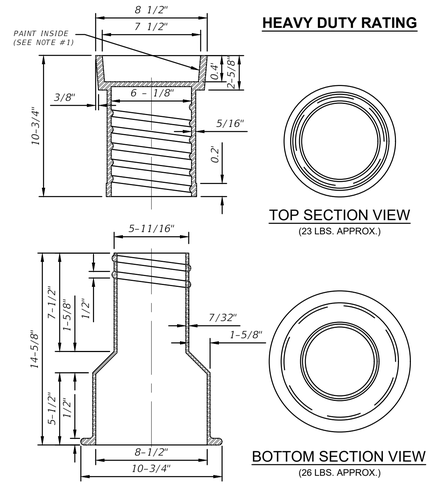
SN9 — PIPE BOLLARD
N.T.S.



NOTES:

1. PAINT TOP OF THE COVER WITH ENAMEL PAINT (GREEN COLOR).
2. LID WEIGHT: APPROX. 12 LBS.

SN5 — SEWER SYSTEM VALVE BOX COVER
N.T.S.



NOTES:

1. PAINT THE INSIDE OF THE TOP SECTION OF THE BOX WITH GREEN COLOR.
2. HEAVY DUTY RATING (TOTAL WEIGHT APPROX. 50 LBS.).
3. REFERENCE SECTION 430, PARAGRAPH V1.2.

SN6 — SEWER SYSTEM VALVE BOX

REVISIONS	
DATE	DESCRIPTION

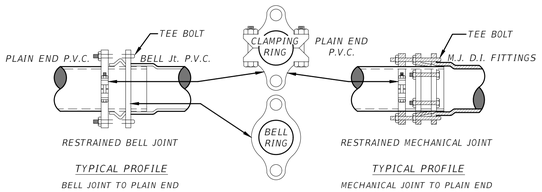
NORTH FLORIDA PROFESSIONAL SERVICES, INC.
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FORCEMAIN DETAILS
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO. C-16

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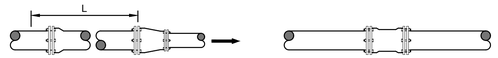
TYPICAL PROFILE

BELL JOINT TO PLAIN END W/MECHANICAL RESTRAINERS

SECTION

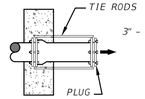
TYPICAL PROFILE

MECHANICAL JOINT TO PLAIN END W/MECHANICAL RESTRAINERS



REDUCER

MECHANICAL JOINT SLEEVES



NO. OF TIE RODS REQUIRED

DIAMETER MAIN - 2 TIE RODS REQUIRED PER JOINT (3/4" ROD)

DEAD - END THRUST COLLAR ANCHOR

TO BE USED INSTEAD OF TOTAL RESTRAINED LENGTH (OPTIONAL) SIZE AS PER THRUST BLOCK DETAIL

GENERAL NOTE:

1. ⟶ INDICATES DIRECTION OF THRUST FORCE.

SN7 MECHANICAL RESTRAINT DETAILS - I

N.T.S.

LENGTH (L) TO BE RESTRAINED

NOMINAL PIPE SIZE (IN.)	HORIZONTAL BENDS				VERTICAL OFFSETS 45° BENDS (SEE NOTE 4)		VALVES OR DEAD ENDS
	90° BENDS L (FT.)	45° BENDS L (FT.)	22.5° BENDS L (FT.)	11.25° BENDS L (FT.)	UPPER L (FT.)	LOWER L (FT.)	L (FT.)
4	21	9	5	3	17	3	47
6	30	13	6	3	23	4	66
8	38	16	8	4	30	6	86
10	45	19	9	5	36	7	103
12	53	22	11	6	43	8	121
14	61	26	13	6	50	9	140
16	66	28	14	7	55	10	154
18	73	30	15	8	60	11	170
20	79	33	16	8	66	12	186
24	79	33	16	8	77	15	185
30	93	39	19	10	97	17	222
36	106	39	21	11	107	20	257
42	117	49	24	12	120	24	289
48	144	53	26	13	133	26	321

REDUCERS

SIZE (IN.)	L (FT.)
6x4	34
8x6	36
8x4	62
10x8	35
10x6	63
12x10	36
12x8	64
16x12	66
16x10	92
20x18	35
20x16	66
20x12	117
24x20	56
24x18	80
24x16	101
30x24	78
30x20	121
36x30	78
36x24	141
42x36	75
42x30	140
48x42	75
48x36	139

TEES SEE NOTE 5

RUN SIZE (IN.)	BRANCH SIZE (IN.)	L (FT.)
4	4	F.O.
4	6	10
	4 < LESS	F.O.
8	8	29
	6 < LESS	F.O.
10	10	45
	8	13
	6 < LESS	F.O.
12	12	62
	10	32
	8 < LESS	F.O.
16	16	94
	12	39
	10	5
	10 < LESS	F.O.
20	20	125
	16	76
	12	14
	10 < LESS	F.O.
24	24	124
	20	84
	16	36
	12 < LESS	F.O.
30	30	159
	24	104
	20	60
	16	5
	16 < LESS	F.O.
36	36	192
	30	142
	24	83
	20	33
	16 < LESS	F.O.
42	42	223
	36	178
	30	124
	24	59
	20	5
	16 < LESS	F.O.
48	48	253
	42	209
	36	162
	30	104
	24	34
	20 < LESS	F.O.

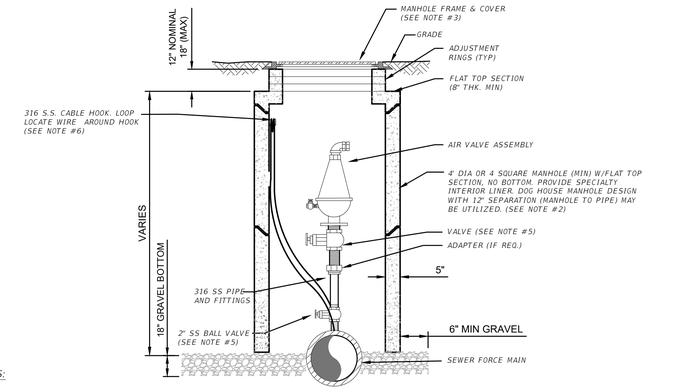
F.O. = FITTING ONLY

PVC PIPE RESTRAINT NOTES:

1. THIS SCHEDULE SHALL BE UTILIZED ON ALL WATER, SEWER FORCE MAIN OR RECLAIMED WATER SYSTEMS. ALL FITTINGS SHALL BE RESTRAINED TO LENGTHS INDICATED ON THE ABOVE SCHEDULE, AT A MINIMUM.
2. ASSUMPTIONS: PVC PIPE, SAFETY FACTOR=1.5, TEST PRESSURE=150PSI, SOIL=GM OR SM, TRENCH TYPE 3, DEPTH OF COVER=30 INCHES FOR 20" AND SMALLER PIPE SIZE OR 36 INCHES FOR 24" AND LARGER PIPE SIZE.
3. BENDS AND VALVES: SHALL BE RESTRAINED ON EACH SIDE OF FITTING.
4. VERTICAL OFFSETS: ARE APPROX. 3 FEET COVER ON TOP AND APPROX. 8 FEET COVER ON BOTTOM. PER THE DETAILS, Lu IS THE RESTRAINED LENGTH FOR THE UPPER (TOP) LEVEL. Li IS THE RESTRAINED LENGTH FOR THE LOWER (DEEPER) LEVEL. ASSUME 45 DEGREE BENDS.
5. TEES: TOTAL LENGTH BETWEEN FIRST JOINTS OR RESTRAINED LENGTH ON EITHER SIDE OF TEE (RUN) SHALL BE A TOTAL DISTANCE OF 30 FEET (MIN). SEE SCHEDULE ABOVE FOR RESTRAINT LENGTH ON TEE "BRANCH" LINE.
6. HDPE TO PVC TRANSITIONS: THE PVC PIPE SIDE SHALL BE RESTRAINED 35 FT (MIN).
7. THE INSTALLATION OF BELL HARNESS RESTRAINTS AT PVC JOINTS (DR-18 & 25 PIPE) SHALL BE COMPLETED PER THE MANUFACTURERS RECOMMENDATION, WHICH INCLUDES NOT OVER TIGHTENING THE PARALLEL RODS/NUTS. THESE NUTS SHOULD ONLY BE SNUG TIGHT. THE HOME MARKS ON THE PIPE SHOULD ALWAYS BE VISIBLE AFTER THE RESTRAINT IS INSTALLED. OVERHOMING THE JOINT MAY CAUSE A FAILURE AT THE BELL RESULTING IN A SERVICE OUTAGE.

SN9 PVC PIPE RESTRAINT JOINT SCHEDULE

N.T.S.

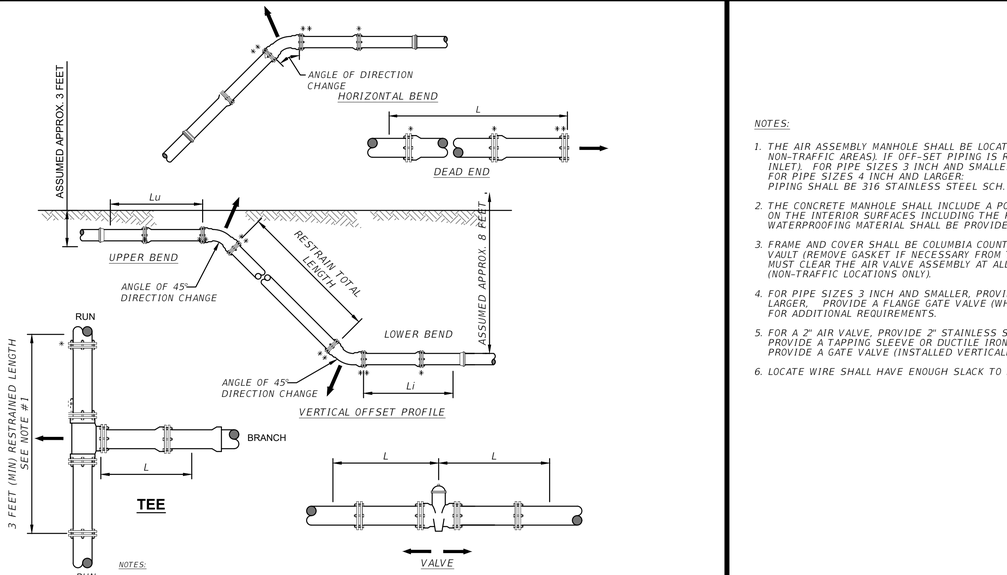


NOTES:

1. THE AIR ASSEMBLY MANHOLE SHALL BE LOCATED OUTSIDE OF THE ROADWAY PAVEMENT AREA (I.E. LOCATED IN NON-TRAFFIC AREAS).
2. THE CONCRETE MANHOLE SHALL INCLUDE A POLYURETHANE SPECIALTY LINER (PER SPEC SECTION 446) TO BE INSTALLED ON THE INTERIOR SURFACES INCLUDING THE RISER SECTION TOP AND THE ADJUSTMENT RINGS. A BITUMINOUS WATERPROOFING MATERIAL SHALL BE PROVIDED ON THE OUTSIDE SURFACES OF THE MANHOLE.
3. FRAME AND COVER SHALL BE COLUMBIA COUNTY/FDOT STANDARD. THE COVER SHALL HAVE NO GASKET TO ALLOW AIR TO EXIT VAULT (REMOVE GASKET IF NECESSARY FROM THE UNDER SIDE OF STANDARD COVER). THE COVER (WHEN FLIPPED OPEN) MUST CLEAR THE AIR VALVE ASSEMBLY AT ALL TIMES OR A SQUARE TOP WITH ALUMINUM DOOR SHALL BE PROVIDED (NON-TRAFFIC LOCATIONS ONLY).
4. FOR PIPE SIZES 3 INCH AND SMALLER, PROVIDE A STAINLESS STEEL BALL VALVE (2" MIN). FOR PIPE SIZES 4 INCH AND LARGER, PROVIDE A FLANGE GATE VALVE (WHEEL OPERATOR) OR PLUG VALVE. (LEVER ARM OPERATOR) SEE SPECIFICATION FOR ADDITIONAL REQUIREMENTS.
5. FOR A 2" AIR VALVE, PROVIDE 2" STAINLESS STEEL BALL VALVE AT THE MAIN. FOR AIR VALVES LARGER THAN 2" SIZE, PROVIDE A TAPPING SLEEVE OR DUCTILE IRON TEE FITTING. ALSO, FOR OFF-SET PIPING LARGER THAN 2 INCH SIZE, PROVIDE A GATE VALVE (INSTALLED VERTICALLY NEAR MAIN). SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
6. LOCATE WIRE SHALL HAVE ENOUGH SLACK TO REACH 4' ABOVE FINAL GRADE.

SN12 IN-LINE AIR RELEASE VALVE (ARV)

N.T.S.



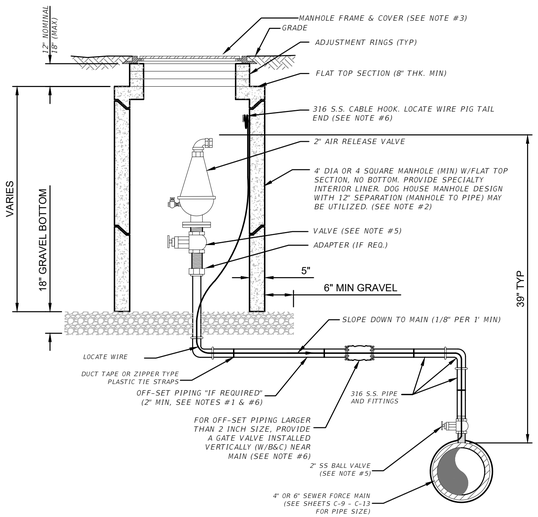
NOTES:

1. TOTAL LENGTH BETWEEN FIRST JOINTS OR RESTRAINED LENGTH ON EITHER SIDE OF TEE (RUN) SHALL BE A TOTAL DISTANCE OF 6 FEET (MIN.). THE PROJECT ENGINEER CAN INCREASE THIS LENGTH TO REDUCE THE NUMBER OF RESTRAINS REQUIRED. ANY CHANGES TO THIS TABLE MUST BE SUMMITTED TO ENGINEER OF RECORD FOR APPROVAL.

SN8 MECHANICAL RESTRAINT DETAILS - II

NOTES:

1. THE AIR ASSEMBLY MANHOLE SHALL BE LOCATED OUTSIDE OF THE ROADWAY PAVEMENT AREA (I.E. LOCATED IN NON-TRAFFIC AREAS). IF OFF-SET PIPING IS REQUIRED, THE PIPING SHALL BE 2 INCH MINIMUM, (SAME SIZE AS AIR VALVE INLET). FOR PIPE SIZES 3 INCH AND SMALLER: PIPING SHALL BE 316 STAINLESS STEEL SCH.40, STD GRADE, THREADED. FOR PIPE SIZES 4 INCH AND LARGER: PIPING SHALL BE 316 STAINLESS STEEL SCH. 10 (MIN), WELDED OR PVC DR-18 PIPE AND FITTINGS-RESTRAINED.
2. THE CONCRETE MANHOLE SHALL INCLUDE A POLYURETHANE SPECIALTY LINER (PER SPEC SECTION 446) TO BE INSTALLED ON THE INTERIOR SURFACES INCLUDING THE RISER SECTION TOP AND THE ADJUSTMENT RINGS. A BITUMINOUS WATERPROOFING MATERIAL SHALL BE PROVIDED ON THE OUTSIDE SURFACES OF THE MANHOLE.
3. FRAME AND COVER SHALL BE COLUMBIA COUNTY STANDARD. THE COVER SHALL HAVE NO GASKET TO ALLOW AIR TO EXIT VAULT (REMOVE GASKET IF NECESSARY FROM THE UNDER SIDE OF STANDARD COVER). THE COVER (WHEN FLIPPED OPEN) MUST CLEAR THE AIR VALVE ASSEMBLY AT ALL TIMES OR A SQUARE TOP WITH ALUMINUM DOOR SHALL BE PROVIDED (NON-TRAFFIC LOCATIONS ONLY).
4. FOR PIPE SIZES 3 INCH AND SMALLER, PROVIDE A STAINLESS STEEL BALL VALVE (2" MIN). FOR PIPE SIZES 4 INCH AND LARGER, PROVIDE A FLANGE GATE VALVE (WHEEL OPERATOR) OR PLUG VALVE. (LEVER ARM OPERATOR) SEE SPECIFICATION FOR ADDITIONAL REQUIREMENTS.
5. FOR A 2" AIR VALVE, PROVIDE 2" STAINLESS STEEL BALL VALVE AT THE MAIN. FOR AIR VALVES LARGER THAN 2" SIZE, PROVIDE A TAPPING SLEEVE OR DUCTILE IRON TEE FITTING. ALSO, FOR OFF-SET PIPING LARGER THAN 2 INCH SIZE, PROVIDE A GATE VALVE (INSTALLED VERTICALLY NEAR MAIN). SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
6. LOCATE WIRE SHALL HAVE ENOUGH SLACK TO REACH 4' ABOVE FINAL GRADE.



SN11 OFFSET AIR RELEASE VALVE (ARV)

N.T.S.

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FORCEMAIN DETAILS
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY, FL

SHEET NO. C-17

X:\2023\L231019CCB\4-CADD\Ellisville WWTP\Details\Forcemain Details.dwg C-17 FM DETAILS

ABBREVIATIONS

A	AMPS	MNT	MOUNTING HEIGHT
AC	ABOVE COUNTER	MTG	MOUNTING
ACS	ACCESS CONTROL SYSTEM	MTS	MANUAL TRANSFER SWITCH
AF	AMP FRAME	MV	MEDIUM VOLTAGE
AFF	ABOVE FINISHED FLOOR	NAC	NOTIFICATION APPLIANCE CIRCUIT
AFG	ABOVE FINISHED GRADE	N1	NEMA 1
AHU	AIR HANDLING UNIT	N3R	NEMA 3R
AL	ALUMINUM	N/A, NA	NOT APPLICABLE
ARCH	ARCHITECT OR ARCHITECTURAL	NEC	NATIONAL ELECTRICAL CODE
AT	AMP TRIP	NESC	NATIONAL ELECTRICAL SAFETY CODE
ATS	AUTOMATIC TRANSFER SWITCH	N, NEU	NEUTRAL
ATU	AIR TERMINAL UNIT	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
AWG	AMERICAN WIRE GAUGE	NTS	NOT TO SCALE
BAS	BUILDING AUTOMATION SYSTEM	OC	ON CENTER
BJ	BONDING JUMPER	OCPD	OVERCURRENT PROTECTION DEVICE
BKR	CIRCUIT BREAKER	OFOI	OWNER FURNISHED OWNER INSTALLED
BLDG	BUILDING	OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
BOD	BASIS OF DESIGN	OH	OVERHEAD
C	CONDUIT	OHE	OVERHEAD ELECTRIC
C/B, CB	CIRCUIT BREAKER	OHP	OVERHEAD PRIMARY
CL	CURRENT LIMITING	OHS	OVERHEAD SECONDARY
C/L	CENTERLINE	P	POLE OR PHASE
CLG	CEILING	PBD	PANELBOARD
CKT	CIRCUIT	PEM	POWER ENERGY MONITOR
CT	CURRENT TRANSFORMER	PF	POWER FACTOR
CU	COPPER	PNL	PANELBOARD
DDC	DIRECT DIGITAL CONTROL	PQM	POWER QUALITY METER
DEMO	DEMOLISH	PT	POTENTIAL TRANSFORMER
DIV	DIVISION	PWR	POWER
EC	ELECTRICAL CONTRACTOR	RCPT	RECEPTACLE
EGC	EQUIPMENT GROUNDING CONDUCTOR	REQD	REQUIRED
ELCU	EMERGENCY LIGHTING CONTROL UNIT	RM	ROOM
ELEC	ELECTRICAL	RGS	RIGID GALVANIZED STEEL CONDUIT
EMGB	ELECTRICAL MAIN GROUNDING BUSBAR	RNC	RIGID NON-METALLIC CONDUIT
EF	EXHAUST FAN	RVSS	REDUCED VOLTAGE SOLID STATE
EX	EXISTING TO REMAIN	SA	SURGE ARRESTER
EXT	EXTERIOR	SCA	SHORT CIRCUIT AMPS
EWC	ELECTRIC WATER COOLER	SCCA	SHORT CIRCUIT CURRENT RATING
EMT	ELECTRICAL METALLIC TUBING	SF	SUPPLY FAN
EQUIP	EQUIPMENT	SLC	SIGNALING LINE CIRCUIT
FMC	FLEXIBLE METAL CONDUIT	SPD	SURGE PROTECTIVE DEVICE
FACP	FIRE ALARM SYSTEM CONTROL PANEL	SPEC	SPECIFICATION
FU	FUSE	SS	SAFETY SWITCH
FA, F/A	FIRE ALARM	SWBD	SWITCHBOARD
FLA	FULL LOAD AMPS	SWGR	SWITCHGEAR
FLR	FLOOR	TBB	TELECOMMUNICATIONS BONDING BACKBONE
FSS	FUSED SAFETY SWITCH	TCC	TIME CURRENT CURVE
FVNR	FULL VOLTAGE NON-REVERSING	TR	TELECOMMUNICATIONS ROOM
GFI	GROUND FAULT INTERRUPTER	TGB	TELECOMMUNICATIONS GROUND BUSBAR
G	GROUND (OR GFI FOR SUBSCRIPT)	TMGB	TELECOMMUNICATIONS MAIN GROUND BUSBAR
GC	GENERAL CONTRACTOR	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
GND	GROUND	TX	TRANSFORMER
GEC	GROUNDING ELECTRODE CONDUCTOR	TYP	TYPICAL
GTD	GENERATOR TRANSFER DEVICE	UFR	UNDERFLOOR RACEWAY
HH	HANDHOLE	UG	UNDERGROUND
HOA	HAND-OFF-AUTOMATIC	UGE	UNDERGROUND ELECTRIC
HP	HEAT PUMP OR HORSEPOWER	UGP	UNDERGROUND PRIMARY
HVAC	HEATING, VENTILATION & AIR-CONDITIONING	UGS	UNDERGROUND SECONDARY
IG	ISOLATED GROUND	UL	UNDERWRITERS' LABORATORIES
IMC	INTERMEDIATE METAL CONDUIT	UNO	UNLESS NOTED OTHERWISE
JB, JBOX	JUNCTION BOX	UPS	UNINTERRUPTIBLE POWER SUPPLY
K	KILO	V	VOLT
KAIC	KILO-AMPERE INTERRUPTING CAPABILITY	VA	VOLT-AMPERES
KCMIL	THOUSAND CIRCULAR MILS	VAR	VOLT-AMPERES REACTIVE
LCP	LIGHTING CONTROL PANEL	VAV	VARIABLE AIR VOLUME UNIT
LTG	LIGHTING	VFD	VARIABLE FREQUENCY DRIVE
LFMC	LIQUID TIGHT FLEXIBLE METAL CONDUIT	W	WATTS OR WIRE
LV	LOW VOLTAGE	WAO	WORK AREA OUTLET
MAX	MAXIMUM	WP	WEATHERPROOF
MC	MECHANICAL CONTRCATOR	WSR	WITHSTAND RATING
MCA	MINIMUM CIRCUIT AMPACITY	XD	EXISTING TO BE DEMOLISHED
MCC	MOTOR CONTROL CENTER	XFMR	TRANSFORMER
MCE	MAIN COMMUNICATIONS EQUIPMENT ROOM	XP	EXPLOSION PROOF
MCM	THOUSAND CIRCULAR MILS	XR	EXISTING TO BE RELOCATED
MH	MANHOLE	Φ	PHASE
MIN	MINIMUM	72°	DEGREES
MISC	MISCELLANEOUS	Δ	DELTA
MLO	MAIN LUGS ONLY	Ω	OHMS

LEGEND

MISCELLANEOUS

- MOTOR.
- E — ELECTRICAL CONNECTION TO EQUIPMENT. VERIFY LOCATION WITH EQUIPMENT PROVIDER.

GENERAL WIRING DEVICES

- $ — TOGGLE SWITCH. MOUNT 48" AFF TO TOP UNLESS NOTED OTHERWISE. SUBSCRIPT INDICATES AS FOLLOWS:
  - 3 - THREE-WAY LIGHTING SWITCH.
  - 4 - FOUR-WAY LIGHTING SWITCH.
  - D - SLIDE DIMMER SWITCH WITH PRESET.
  - M - MANUAL MOTOR STARTER.
- DUPLEX RECEPTACLE NEMA 5-20R. MOUNT 18" AFF UNLESS NOTED OTHERWISE. VERIFY DUPLEX MOUNTING REQUIREMENTS WITH ARCHITECTURAL DRAWINGS PRIOR TO ROUGH-IN. ALL GFI DEVICES AND DEVICES IN DAMP AND WET LOCATIONS SHALL BE WEATHER-RESISTANT "WR" TYPE. SUBSCRIPT INDICATES AS FOLLOWS:
  - G - GROUND FAULT CIRCUIT INTERRUPTER TYPE.
  - WP - GFI DEVICE WITH CLEAR WEATHERPROOF (IN-USE) COVERPLATE. IN EXTERIOR LOCATIONS MOUNT 30" AFG.
  - 84" - MOUNTING HEIGHT OF DEVICE AFF.

CIRCUITING

- CIRCUIT RUN CONCEALED BELOW FLOOR, ABOVE CEILING OR IN WALL.
- P,3 — HOMERUN TO PANELBOARD. UNDERLINED TEXT INDICATES PANEL & CIRCUIT DESIGNATION.

LINETYPES

- EXISTING TO REMAIN.
- EXISTING TO BE DEMOLISHED.
- NEW WORK.

POWER & DISTRIBUTION

- 2P1A — ELECTRICAL EQUIPMENT SUCH AS PANELBOARD, SWITCHBOARD, TRANSFORMER, ETC. TAG INDICATES TYPE OR SPECIFIC ITEM.
- ENCLOSED MOTOR STARTER.
- COMBINATION ENCLOSED MOTOR STARTER DISCONNECT.
- HEAVY DUTY SAFETY SWITCH OR ENBCLOSED CB.
- ELECTRICITY METER.
- HH2 — HANDHOLE. SEE DETAIL. TAG INDICATES TYPE.

SINGLE LINE

- CIRCUIT BREAKER.
- FUSE.
- SWITCH.
- OVERLOAD.
- CONTACT.
- TRANSFORMER.
- CURRENT TRANSFORMER.
- G — GENERATOR.
- M — MOTOR.

ANNOTATIONS

- # — KEY NOTE TAG. SEE KEY NOTES.
- 2P1A — BOLD UNDERLINED TEXT ADJACENT TO PLAN SYMBOL INDICATES ELECTRICAL OR MECHANICAL EQUIPMENT IDENTIFICATION TAG. TYPICAL FOR PANELS, LIGHT FIXTURES, FLOORBOXES, TRANSFORMERS, AHUS, ETC. FOR MECHANICAL EQUIPMENT IDENTIFICATION TAG SEE MECHANICAL EQUIPMENT ELECTRICAL SCHEDULE.
- LEADER.
- LEADER.

CODES & STANDARDS

GENERAL

1. ALL WORK UNDER DIVISION 26 SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CODES AND STANDARDS LISTED HEREIN. THE DESIGN HAS BEEN BASED ON THE REQUIREMENTS OF THESE CODES AND STANDARDS. WHILE IT IS NOT THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT ALL WORK CALLED FOR COMPLIES WITH THESE CODES AND STANDARDS, HE SHALL BE RESPONSIBLE FOR CALLING TO THE ENGINEER'S ATTENTION ANY DETAILS ON THE DRAWINGS AND/OR SPECIFICATIONS THAT ARE NOT IN CONFORMANCE WITH THESE OR OTHER CODES AND STANDARDS. CURRENT ISSUE OF CODE APPLIES UNLESS SPECIFICALLY NOTED OTHERWISE.
2. COMPLY WITH REGULATIONS AND CODES OF SUPPLIERS OF UTILITIES.
3. WHERE NO SPECIFIC METHOD OR FORM OF CONSTRUCTION IS CALLED FOR IN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL COMPLY WITH CODE REQUIREMENTS WHEN CARRYING OUT SUCH WORK.
4. WHERE CODE CONFLICT EXISTS, GENERALLY THE MOST STRINGENT REQUIREMENT APPLIES.
5. CODES OR STANDARDS APPLYING TO A SPECIFIC PART OF THE WORK MAY BE INCLUDED IN THAT SPECIFICATION SECTION.
6. ALL ELECTRICAL MATERIALS, INSTALLATION AND SYSTEMS SHALL MEET THE REQUIREMENTS OF THE LISTED STANDARDS, INCLUDING THE LATEST ADDENDA AND AMENDMENTS.

CODES

1. FLORIDA BUILDING CODE (FBC)
   - A. BUILDING - 2023 8TH EDITION
   - B. TEST PROTOCOLS FOR HIGH VELOCITY HURRICANE ZONES - 2023 8TH EDITION
2. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
   - A. NATIONAL ELECTRIC CODE (NFPA 70) - 2020
3. FLORIDA FIRE PREVENTION CODE - 2023 8TH EDITION
   - A. FIRE CODE (NFPA 1) - 2021 FLORIDA EDITION
   - B. LIFE SAFETY CODE (NFPA 101) - 2021 FLORIDA EDITION

STANDARDS

1. AMERICAN NATIONAL STANDARD INSTITUTES (ANSI)
2. ILLUMINATING ENGINEERING SOCIETY (IES)
3. INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
4. NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATIONS (NEMA)
5. NATIONAL ELECTRICAL CONTRACTOR'S ASSOCIATION (NECA)
6. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
7. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
8. UNDERWRITER'S LABORATORIES, INC. (UL)
9. OWNER'S PUBLISHED DESIGN/CONSTRUCTION STANDARDS

Akin Brooks Engineering

Akin Brooks Engineering, Inc. FL License 35307
14260 W Newberry Rd #115 352.281.7104
Newberry, FL 32669 Project#: AB24040 akinbrooks.com

REVISIONS	
DATE	DESCRIPTION

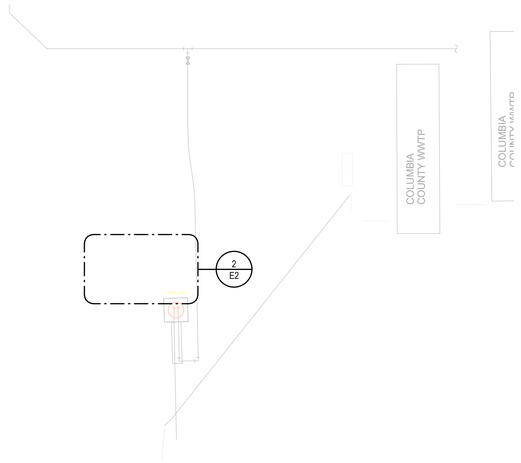
NORTH FLORIDA PROFESSIONAL SERVICES, INC.
P.O. BOX 38232551 LAKE CITY, FL 32056 PH. 386-752-4675 LIC NO. LB8356
BLAIRSTONE PINES DR. TALLAHASSEE, FL 32301 CA# 29011
4168 SOUTHPOINT PKWY. JACKSONVILLE, FL 32216 www.nfps.net/firstcoast/

JOB NUMBER: L231019CCB
EOR:
P.E. NO.:

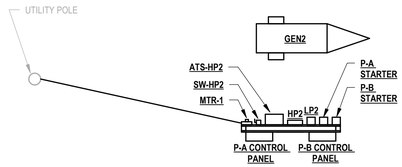
LEGEND, CODES, AND STANDARDS

ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY FL

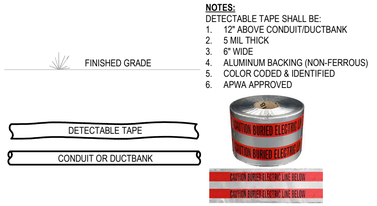
SHEET NO.
E1



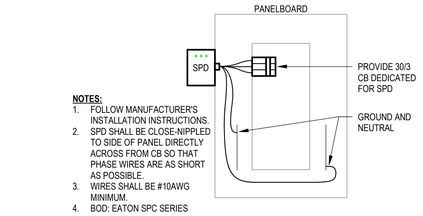
1 SITE PLAN
SCALE: 1" = 30'-0"



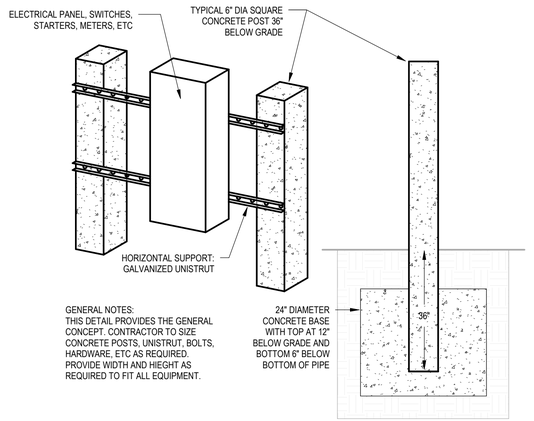
2 ENLARGED PLAN
SCALE: 1/8" = 1'-0"



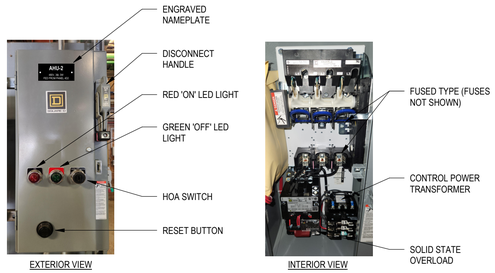
3 BURIED CONDUIT MARKER DETAIL
NOT TO SCALE



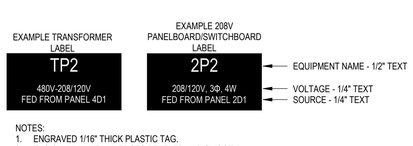
8 SPD EXTERNAL TO PANEL CONNECTION DETAIL
NOT TO SCALE



7 TYPICAL EXTERIOR FREESTANDING EQUIPMENT RACK DETAIL
NOT TO SCALE



4 TYPICAL MOTOR STARTER DETAIL
NOT TO SCALE



5 TYPICAL EQUIPMENT LABELING DETAIL
NOT TO SCALE

PANELBOARD SCHEDULE — **HP2**

BASIS OF DESIGN: NF
SUPPLY FROM: ATS
MOUNTING: SURFACE
ENCLOSURE: NEMA 3R
VOLTS: 480/277
PHASES: 3
WIRES: 4
KAIC: 14

BUSS RATING: 100A
MCB: MLO
IF MLO, UPSTREAM OCPD: 100A
NEUTRAL RATING: 100%
POM: NO
SPD: YES
 # OF VERTICAL SECTIONS: 1
SERVICE RATED: NO

FEEDER
PHASES: 3#1
NEUTRAL: #1
GROUND: #8
CONDUIT: 1-1/2"
 # OF SETS: 1
TOTAL AMPACITY: 110A

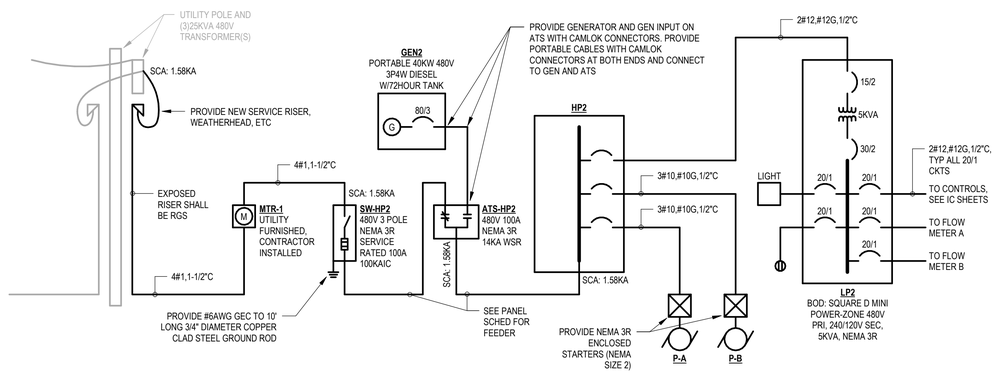
NOTES:

CKT	LOAD	BREAKER P	BREAKER TRIP	PHASE (kVA) A	PHASE (kVA) B	PHASE (kVA) C	PHASE (kVA) A	PHASE (kVA) B	PHASE (kVA) C	BREAKER TRIP	BREAKER P	LOAD	CKT
1	P-A	3	40	5.8			2.5			15	2	LP2	2
3					5.8			2.5					4
5						5.8			-	-	-	-	6
7	P-B	3	40	5.8			-			-	-	-	8
9					5.8			-		-	-	-	10
11						5.8			-	-	-	-	12
13	-	-	-	-			-			-	-	-	14
15	-	-	-		-			-		-	-	-	16
17	-	-	-			-			-	-	-	-	18
19	-	-	-	-			-			-	-	-	20
21	-	-	-		-			-		-	-	-	22
23	-	-	-			-			-	-	-	-	24
25	-	-	-	-			-			-	-	-	26
27	-	-	-		-			-		-	-	-	28
29	-	-	-			-			-	-	-	-	30

TOTAL PHASE LOAD (kVA): 14.1 14.1 11.6 **HIGH PHASE (AMPS):** 50.9
TOTAL CONNECTED LOAD (kVA): 39.8 **TOTAL LOAD (AMPS):** 47.9

ELECTRIC UTILITY CONTACT:
CRAIG W. WACHA
ENGINEERING SUPERVISOR, LAKE CITY DISTRICT
CLAY ELECTRIC COOPERATIVE, INC.
OFFICE (386) 961-0106
CELL (386) 867-1978
CWACHA@CLAYELECTRIC.COM

LINETYPE LEGEND:
NEW WORK
EXISTING TO REMAIN



6 SINGLE LINE DIAGRAM
NOT TO SCALE

Akin Brooks Engineering, Inc. FL License 35307
14260 W Newberry Rd #115 352.281.7104
Newberry, FL 32669 Project#: AB24040 akinbrooks.com

REVISIONS	
DATE	DESCRIPTION

NORTH FLORIDA PROFESSIONAL SERVICES, INC.
P.O. BOX 38232551 LAKE CITY, FL 32056 PH. 386-752-4675 LIC NO. LB8356
BLAIRSTONE PINES DR. TALLAHASSEE, FL 32301 CA# 29011
4168 SOUTHPOINT PKWY. JACKSONVILLE, FL 32216 www.nfps.net/firstcoast/

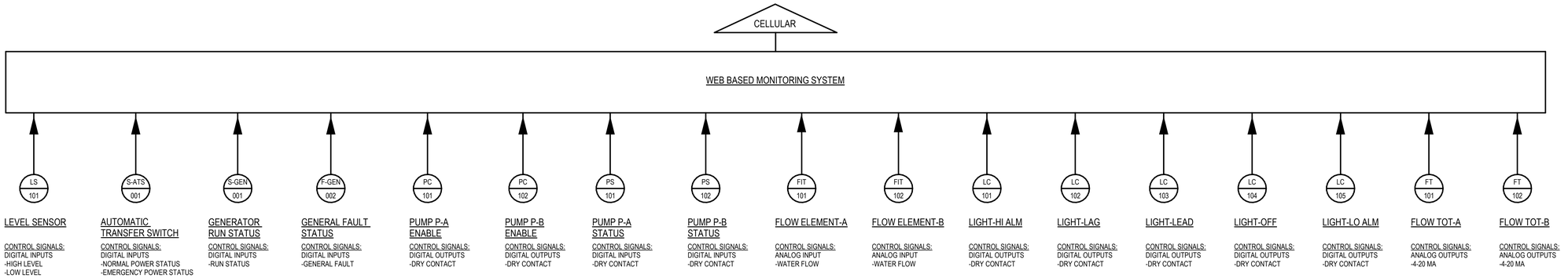
JOB NUMBER: L231019CCB
EOR:
P.E. NO.:

PLAN, DETAILS, SCHEDULE & SINGLE LINE DIAGRAM
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY FL

SHEET NO.
E2

LEGEND

DI	DIGITAL INPUT
DO	DIGITALOUTPUT
AI	ANALOG INPUT
AO	ANALOG OUTPUT
COM-#	BAS COMMUNICATION LINK, # INDICATES AS FOLLOWS: B (BACBET) M (MODBUS)
FE	FLOW ELEMENT
H/S	HORN STROBE (OUTDOOR RATED) SIMILAR TO EDWARDS SIGNALING MODEL 868STRR-N5
FIT XXX	FLOW INDICATING/TRANSMITTER
PS XXX	PUMP STATUS
PC XXX	PUMP CONTROL
F-GEN XXX	GENERAL FAULT GENERATOR
S-ATS XXX	AUTOMATIC TRANSFER SWITCH STATUS: TRANSFER TO EMERGENCY POWER SOURCE
P	PUMP
	CHECK VALVE
	GATE MANUAL VALVE
ATS	AUTOMATIC TRANSFER SWITCH
G	GENERATOR



1 CONTROL BLOCK DIAGRAM
NOT TO SCALE

SEQUENCE OF OPERATION

PUMP P-A AND PUMP P-B SHALL OPERATE AS LEAD/LAG PUMPS IN ACCORDANCE WITH LOOP A AND LOOP B SEQUENCE PRIORITY.

LEAD/LAG SEQUENCE A/B AND B/A INDICATES HOW DISTRIBUTION LOOPS ARE PRIORITIZED WITH RESPECT TO LEAD/LAG PUMPING AND DESTINATION WASTE WATER TREATMENT PLANT (WWTP).

LEAD/LAG SEQUENCE A/B INDICATES LOOP A IS ACTIVE, WITH PUMP A IN LEAD POSITION & PUMP B IN LAG POSITION. LEAD LAG SEQUENCE B/A INDICATES LOOP B IS ACTIVE, WITH PUMP B IN LEAD POSITION & PUMP A IN LAG POSITION. THE INTENT IS TO ALTERNATE THE DESTINATION WWTPs ON THE BASIS OF PRE-SET TIME PERIODS OR FLOW VOLUMES..

LEAD/LAG SEQUENCE: THE CONTROL SYSTEM SHALL MONITOR LEVEL USING DESIGNATED LEVEL SENSOR.

LO ALARM LEVEL = 2.5'
- LEAD PUMP OFF
- LAG PUMP OFF
- ALARM LIGHT & HORN ACTIVATION

PUMPS OFF LEVEL = 3.0'
- LEAD PUMP - OFF
- LAG PUMP - OFF

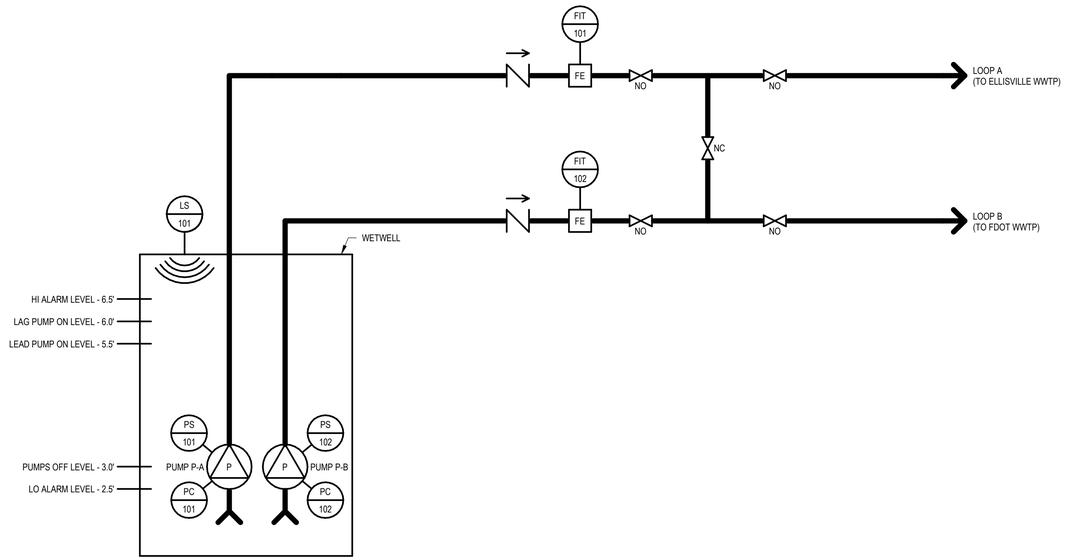
LEAD PUMP ON LEVEL = 5.5'
- LEAD PUMP - ON
- LAG PUMP - OFF

LAG PUMP ON LEVEL = 6.0'
- LEAD PUMP - ON
- LAG PUMP - ON

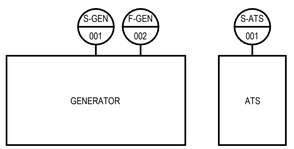
HI ALARM LEVEL = 6.5'
- LEAD PUMP - ON
- LAG PUMP - ON
- ALARM LIGHT AND HORN ACTIVATION

LEAD/LAG SEQUENCE A/B AND B/A SHALL BE ALTERNATED BASED THE FOLLOWING PRE-SET CONDITIONS:
- AFTER EACH 12-HR (ADJ) TIME PERIOD, OR
- AFTER PUMPED VOLUME IS REACHED: FOR LOOP A 10,000 GAL (ADJ) AND FOR LOOP B 15,000 GAL (ADJ).

ALARMS
- PUMP COMMAND DOES NOT MATCH PUMP STATUS (5 MIN DELAY)
- LOOP A TOTAL FLOW LIMIT > 30,000 GAL (ADJ)
- LOOP B TOTAL FLOW LIMIT > 40,000 GAL (ADJ)



2 DUPLEX PUMP CONTROL SYSTEM DIAGRAM
NOT TO SCALE



3 GENERATOR SYSTEM MONITORING DIAGRAM
NOT TO SCALE

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Newberry, FL 32669 Project#: AB24040 akinbrooks.com

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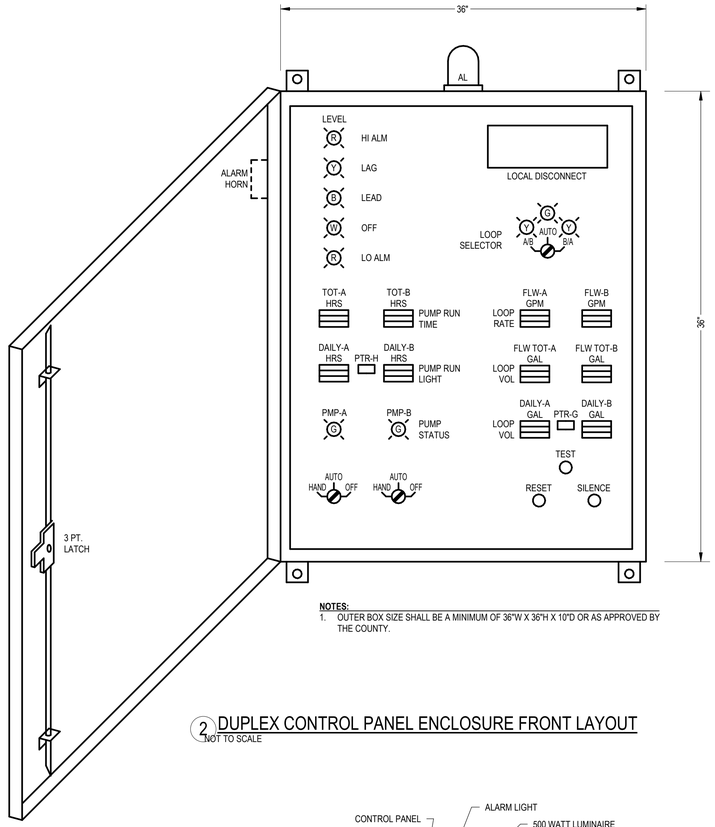
NORTH FLORIDA PROFESSIONAL SERVICES, INC.
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LAKE CITY, FL 32056 TALLAHASSEE, FL 32301 JACKSONVILLE, FL 32216
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LIC NO. LB8356

JOB NUMBER: L231019CCB
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P.E. NO.:

LEGEND AND DIAGRAMS

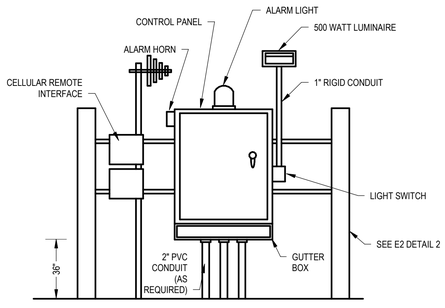
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY FL

SHEET NO.
IC1



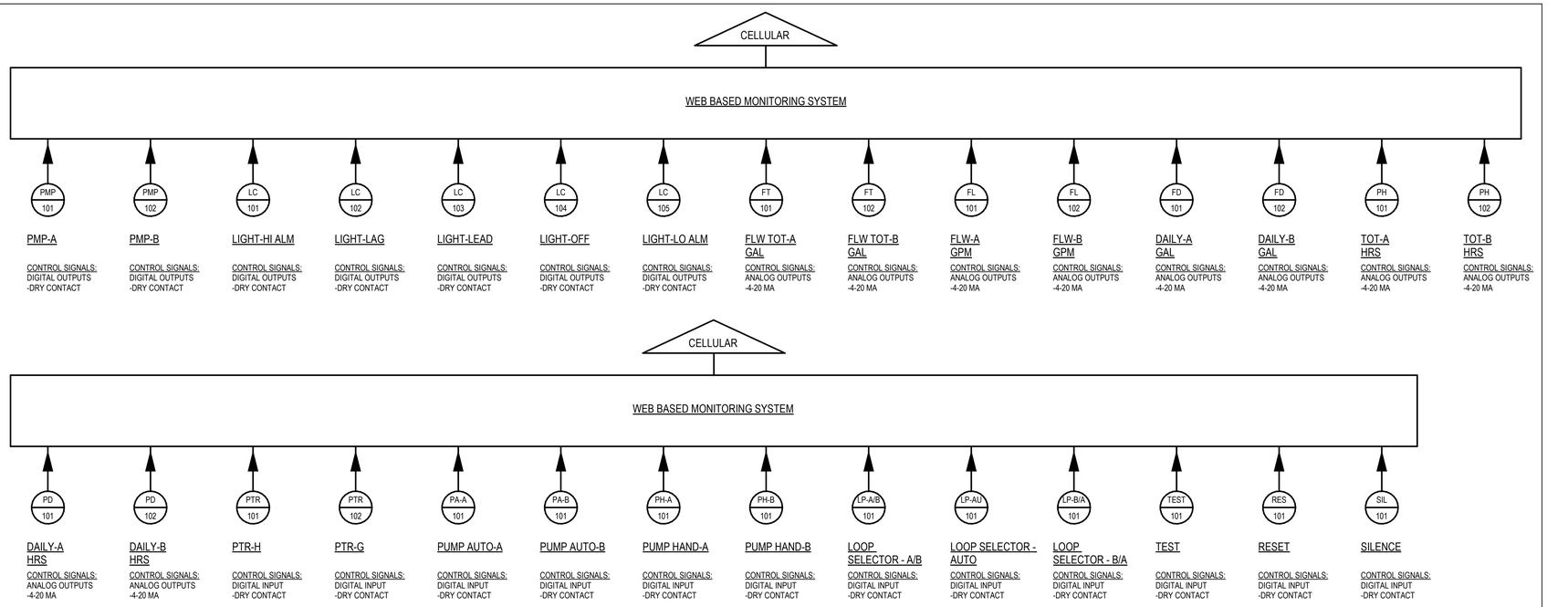
NOTES:
1. OUTER BOX SIZE SHALL BE A MINIMUM OF 36"W X 36"H X 10"D OR AS APPROVED BY THE COUNTY.

2 DUPLEX CONTROL PANEL ENCLOSURE FRONT LAYOUT
NOT TO SCALE

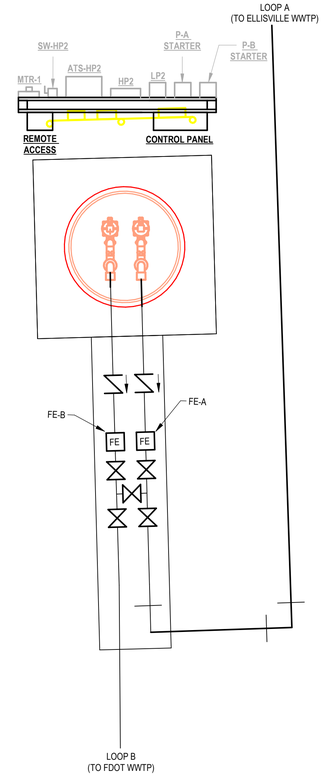


CONTROL PANEL NOTES:
1. CONTROL PANEL ASSEMBLY SHALL BE LOCATED AT PUMP STATION SITE.
2. PUMP CONTROL PANEL SHALL BE SUPPLIED BY CONTROL VENDOR AND GENERALLY CONSIST OF A 30"WX36"H NEMA TYPE 3R ENCLOSURE CONSTRUCTED OF NEMA 4X FIBERGLASS AND UL LISTED.
3. A 12"x 12"x 30" NEMA 4X FIBERGLASS GUTTER BOX SHALL BE ATTACHED TO THE CONTROL PANEL BY COMPRESSION CORD CONNECTORS ONLY (SIZED FOR THE SEAL, AND CONTROL LEADS). NO SEAL OFF FITTINGS SHALL BE INSTALLED IN THE CONDUITS IN EFFECTIVE SEAL SHALL BE MADE BETWEEN THE CONTROL PANEL AND THE GUTTER BOX, BY THE CORD CONNECTOR GROMETS.
4. CONTRACTOR SHALL INSTALL ALL MOUNTING COMPONENTS (UNISTRUTS, ETC.), CONTROL PANEL, GUTTER BOX, POLE LIGHT AND SWITCH.
5. COMMUNICATION SYSTEM SHALL BE INSTALLED BY COLUMBIA COUNTY

1 PUMP STATION CONTROL PANEL INSTALLATION DIAGRAM
NOT TO SCALE



4 CONTROL BLOCK DIAGRAM
NOT TO SCALE



3 SITE PLAN
SCALE: 1/4" = 1'-0"

Akin Brooks Engineering

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Newberry, FL 32669 Project#: AB24040 akinbrooks.com

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JOB NUMBER: L231019CCB
EOR:
P.E. NO.:

DIAGRAMS AND PLANS
ELLISVILLE - FDOT WASTEWATER INTERCONNECT
COLUMBIA COUNTY FL

SHEET NO.
IC2