NORTH SPUR PUMP STATION, FORCE MAIN AND WATER MAIN EXTENSION

ACCOMACK COUNTY, VIRGINIA

PROJECT MANUAL

MAY 2019

Bowman CONSULTING

COMMONWEALTH OF VIRGINIA
NITANT N. DESAI
Lic. No. 42635
5/2/19
PROFESSIONAL ENGINEER

PROJECT NO. 8158-01-007

BOWMAN CONSULTING GROUP, LTD.

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TABLE OF CONTENTS

Invitation For Bids #722

Northern Spur Pump
Station, Force Main &
Water Main Extension

The County of Accomack is seeking **sealed bids** from qualified licensed contractors for the construction of the Northern Spur Pump Station, Force Main and Water Main Extension in Onley, VA.

The project is generally described as construction of a **new wastewater pump station and force main** to serve the Northern Spur of the Central Accomack Service Area. The new pump station shall consist of a wet well containing two submersible non-clog pumps, acting in lead and lag mode along with pump controls and stand-by power. Approximately 3,600 linear feet of 6" force main is included. The project also includes a **bid alternate of extending the existing water main** in order to supply the Northern Spur commercial area.

A non-mandatory pre-bid meeting will be held at the County Public Works office on Thursday, May 23, 2019 at 11:00 AM at 24401 Joynes Neck Road, Accomac, VA 23301.

Bid documents may be obtained upon payment of a non-refundable fee of $50 per set payable to Bowman Consulting Group, Ltd. Upon payment, bid documents may be picked up at **Bowman Consulting Group, Ltd. located at 460 McLaws Circle, Suite 120, Williamsburg, VA 23185**, or received by mail or freight. Bid documents may also be inspected at the County Administrator's Office 23296 Courthouse Ave., Suite 203, Accomac, VA 23301 and at Builder's and Contractor's Exchange Inc., 1118 Azalea Garden Rd., Norfolk, VA 23502. Bid documents may also be found on the Accomack County website at https://www.co.accomack.va.us/ by clicking on the IFBs & RFPs tab and on the eVA website at https://eva.virginia.gov/index.html by clicking on the "Business Opportunities" (VBO) tab.

Bids must be clearly marked with name of project and IFB number on the outside of the envelope. Sealed bids may be delivered to the Accomack County Administrator's Office, 23296 Courthouse Ave., Suite 203, Accomac, VA **or may be mailed to** the Accomack County Finance Office, c/o Lucy Huffman, P.O. Box 620 Accomac, VA 23301 until **Wednesday, June 13, 2019 at 3:00 PM**. Immediately thereafter, all bids received by the due date and time will be publicly opened and read aloud in the Board Chambers on the first floor of the County Administration Building, Suite 104.

Questions shall be submitted in writing (email) to Lucy Huffman, Procurement Assistant lhuffman@co.accomack.va.us with cc to Stewart Hall, Deputy County Administrator – Public Works & Facilities, at shall@co.accomack.va.us.

Withdrawal of Bids shall be according to procedure § 2.2-4330 of the Code of Virginia, as amended. Bidders must be licensed as a Contractor in the Commonwealth of Virginia, as required, and the Bidder's attention is directed to the requirements of Title 54.1, Chapter 11, of the Code of Virginia.

The County reserves the right to reject any and all bids, or to contact any Bidder prior to award for explanations or clarifications. The County does not discriminate against any Bidder on any basis.

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GENERAL TERMS, CONDITIONS AND INSTRUCTIONS TO BIDDERS

Tax Exemption

The County of Accomack is exempt from and will not pay Federal Excise Tax, Transportation Tax or the Commonwealth of Virginia Sales and Use Tax. The County is also exempt from the local 911 tax.

A signed certificate to document the County's tax-exempt status is available upon request by contacting the Purchasing office.

1. **Contractor's License:** Bidders (as required) must be licensed as a Contractor in the State of Virginia; and bidder's attention is directed to Chapter 11, Title 54.1, Code of Virginia as amended. Bidder shall include a copy of his license with the completed bid form.

2. **Business License**: All businesses who wish to engage in business with the County of Accomack must possess a valid Accomack County Business License or must document why they are exempt from licensure. Most businesses who have obtained business licenses from other county jurisdictions are exempt from Accomack County licensure requirements; however, rules differ for building contractors and tradesmen who may be required to possess multiple business licenses. Businesses should contact the Commissioner of the Revenue for specific guidance on this issue. Main office number: 757-787-5747.

3. **Insurance: (**A contractor is defined as an individual or firm which has entered into an agreement to provide goods or services to the County of Accomack.) Any contractor doing business with the County shall maintain insurance to protect the County of Accomack, Virginia from claims under the Worker's Compensation Act, and from any other claim for damages for personal injury, including death, and for damage to property which may arise from operation under a contract, whether such operations by the contractor or subcontractor, or anyone directly or indirectly employed by either, such insurance to conform to the amounts as prescribed by law. For construction contracts, if any subcontractors are involved, the subcontractor will have workers' compensation insurance in accordance with §§ 2.2-4332 and 65.2-800 et seq. of the *Code of Virginia* during the entire term of the contract.

   Whenever work is to be performed on County-owned or -leased property or facilities, the contractor shall be required to have the insurance specified with an insurance company acceptable to the County of Accomack and licensed to do business in the state of Virginia. All insurance must be obtained before any work is commenced and kept in effect until its completion.

   Minimum insurance requirements for the County of Accomack are as follows:

   A. Commercial General Liability: $1,000,000 per occurrence /$2,000,000 aggregate and is to include:
      1) Premises/Operations' Liability,
      2) Products and Completed Operations Coverage, and
      3) Independent Contractor's Liability or Owner's and Contractor's Protective Liability.
      The County of Accomack, Virginia must be endorsed as an "additional insured" when a Contractor is required to obtain Commercial General Liability coverage.
   B. Automotive Liability: $1,000,000 combined single limit and only if motor vehicle is to be used in the contract.
   C. Worker's Compensation Liability: Virginia statutory requirements and benefits (if the contractor has three or more employees).
   D. Employer's Liability: $100,000 (if employees are paid a wage or salary).

E. In addition, various Professional Liability/Errors and Omissions insurance coverages are required when providing those services as follows:

Profession/Service	Occurrence Limit	Aggregate Limit
Accounting	$1,000,000	$3,000,000
Architecture	$2,000,000	$6,000,000
Asbestos Design, Inspection, or Abatement Contractors	$1,000,000	$3,000,000
Health Care Practitioner	$1,650,000	$3,000,000
Insurance/Risk Management	$1,000,000	$3,000,000
Landscape/Architecture	$500,000	$1,000,000
Legal	$1,000,000	$5,000,000
Professional Engineer	$2,000,000	$6,000,000
Surveying	$100,000	$300,000

The minimum amount of professional liability insurance required to be carried by the A/E shall be calculated as not less than an amount equal to 5% of the estimated cost of construction of all County-owned projects designed by the A/E which are currently under construction, but in no event shall the amount of professional liability insurance be less than $100,000 per claim. As an alternative to the calculated amount indicated above, the A/E may work with the County to procure a 'Project Insurance' package for that project which is satisfactory to the County; or, the A/E may provide a Certificate of Insurance indicating coverage in the amount of $2,000,000 per claim and $6,000,000 in the aggregate.

4. Non Discrimination: The County of Accomack does not discriminate against faith-based organizations in accordance with the Code of Virginia, §2.2-4310 and 2.2-4343.1 *Code of Virginia* as amended, or against a bidder or offeror because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment.

Contractors shall agree as follows:

A. The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor.
B. The contractor shall agree to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
C. The contractor, shall in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that such contractor is an equal-opportunity employer. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this provision.
D. The contractor shall include the provisions of paragraphs a, b, and c above in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

5. Drug-Free Workplace: During the performance of contracts, contractors shall agree to (i) provide a drug-free workplace for the contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana

is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf on the contractor that the contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract of over $10,000, so that the provisions will be binding upon each subcontractor or vendor. For the purposes of this section, "drug-free workplace" means a site for the performance of work done in conjunction with a specific contract awarded to a contractor in accordance with this section, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

6. **Qualifications of Bidder/Offeror:** Each bidder shall be prepared to supply evidence of qualifications and capacity to perform work as proposed. Items which may be considered evidence are as follows:
   A. Current financial statement
   B. List of current and past similar contracts
   C. Explanation of methods to be used in fulfilling this contract
   D. Statement of current work load and/or capacity

   Additional particular items may be requested as needed by the County. All qualifications shall be received within ten (10) days of request by the County.

7. **Competency of Bidder/Offeror:**
   A. The bidder, if requested, shall present evidence of performance ability and possession of necessary facilities, pecuniary resources, and adequate insurance to comply with the terms of these specifications and contract documents. Such evidence shall be presented within a specified time and to the satisfaction of the County.
   B. Bidders certify that their bid is made without any previous understanding, agreement, or connection with any person, firm, or corporation making a bid for the same project; without prior knowledge of competitive prices; and is in all respects fair, without outside control, collusion, fraud, or otherwise illegal action.
   C. Bidders or their authorized agents are expected to fully inform themselves as to the conditions, requirements, and specifications before submitting bids. Failure to do so will be at the bidder's own risk.
   D. Bids and contracts issued by the County of Accomack shall bind bidders to applicable conditions and requirements set forth in the bid boilerplate, unless otherwise specified in the bid documents, and are subject to all federal, state, and municipal laws, rules, regulations, and limitations.

8. **Completing Bid Forms:**
   A. Use only the bid form supplied by the County.
   B. One original signed bid shall be submitted.
   C. All blanks on the bid form shall be completed in ink.
   D. Any interlineation, alteration, or erasure on the bid form shall be initialed by the signer of the bid.
   E. Each bid shall be signed by the person or persons legally authorized to bind the bidder to a contract, using the legal name of the signer.
   F. A bid submitted by an agent shall have a current Power of Attorney attached certifying the agent's authority to bind the bidder.
   G. Bidders shall supply all information and submittals required by the bid documents to constitute a proper and responsive bid. Any ambiguity in any bid as a result of omission, error, lack of clarity or noncompliance by the bidder with specifications, instructions, and/or all conditions of bidding shall be construed in the light most favorable to the County.

H. When an error is made in extending total prices, the unit bid price will govern.
I. Erasures in bids must be initialed by the bidder. Carelessness in quoting prices or in preparation of bid otherwise will not relieve the bidder.
J. Bidders are cautioned to recheck their bids for possible error.

9. **Descriptive Literature:** Bidder may be required to submit with bid complete pertinent descriptive literature and specifications fully describing the materials proposed to be furnished.

10. **Specifications Exceptions:** Exceptions to the specifications or general instructions must be in writing and submitted with the bid form. Exceptions to the specifications contained in bids are specifically discouraged. Bidders should attempt to submit a bid fully conforming to the specifications. Failure to clearly identify any exception may result in disqualification of the bid.

11. **Use of Brand Names:** The name of a certain brand, make, manufacturer, or definite specification is to set forth to convey to prospective bidders the general style, type, character, and quality of the article desired. Any article that the County in its sole discretion determines to be the equal of that specified, considering quality, workmanship, economy of operation, and suitability for the purpose, shall be acceptable.

12. **Eligible Vendors:** Vendors responding to a request for supplies must be the manufacturer or authorized distributor of all products bid.

13. **Delivery Terms:** Bid prices must be net, based on delivery to the specified location(s) in Accomack County. Prices shall include all applicable freight charges; extra charges will not be allowed.

14. **Comments/Questions:** Any information relative to interpretation of specifications and drawings shall be requested of the Procurement Agent, in writing, in ample time before the opening of bids. No inquiries, if received by the Procurement Agent within five (5) business days of the date set for the opening of bids, will be given any consideration. Any material interpretation of a specification, as determined by the County Procurement Agent, will be expressed in the form of an addendum to the specification which will be sent to all prospective bidders no later than three (3) business days before the date set for receipt of bids. Oral answers will not be authoritative. Comments concerning specifications or other provisions of the bid documents may be directed to Lucy Huffman, Procurement Assistant, County of Accomack, P.O. Box 620, Accomac VA 23301, via fax at 757-787-2468, or by e-mail to lhuffman@co.accomack.va.us.

15. **Bid/Proposal Delivery:** Bids/ proposals may be delivered to the Accomack County Administrator's Office, Suite 203, 23296 Courthouse Avenue, Accomac, VA 23301 **or** may be mailed to the Accomack County Finance Office c/o Lucy Huffman, Procurement Assistant, P.O. Box 620, Accomac, VA 23301.

16. **Bid/Proposal Preparation:** The bid/proposal and any other documents required to be submitted with the bid shall be enclosed in a **sealed**, opaque envelope. The envelope must have the notation indicated in the Invitation for Bid package. **If the bid is sent by mail or any other mail service**, the sealed, opaque, bid envelope shall be enclosed in a separate mailing envelope addressed to the Accomack County Finance Office, 23296 Courthouse Avenue, Suite 204, P.O. Box 620, Accomac, VA 23301, with the notation **"IFB or RFP #_____ ENCLOSED"** on the face thereof.

17. **Bid/Proposal Receipt:** Bids/proposals shall be received by the due date and time stated in the Invitation for Bid or the Request for Proposal. The bidder/offeror shall assume full responsibility for

taking whatever measures are necessary to ensure that the bid/proposal reaches the Office of the County Administrator or the Finance Office by the due date and (local prevailing) time specified in the IFB or RFP. The County will not be responsible for any bid/proposal delayed in the postal or other delivery service nor any late bid/proposal or amendment thereto received after the bid due date and time. Bids/proposals received after the time and date for receipt of bids will be returned to the bidder unopened.

18. Opening of Bids: Bids received by the due date and time will be opened publicly and read aloud at the location specified in the Invitation for Bid. The device or mechanism for establishing the opening time shall be established by the County.

19. Acceptance or Rejection of Bids:

A. Unless otherwise specified, the contract shall be awarded to the lowest **responsible** and **responsive** bidder complying with the provisions of the IFB documents, provided the bid price is reasonable, does not exceed the funds available, and is in the best interest of the County. The County reserves the right to reject the bid of any bidder who has failed to perform properly in any way or to complete on time contracts previously awarded, or a bid from any bidder who investigation shows is not in a position to perform the contract.

B. In determining a bidder's **responsibility,** the County may consider the following in addition to price:
   1) The bidder's ability, capacity, and skill to provide the goods and/or services required within the specified time.
   2) The bidder's ability to provide needed maintenance and service.
   3) The character, integrity, reputation, experience, and efficiency of bidder. The quality of bidder's performance of previous and/or existing contracts.
   4) Whether the bidder is in arrears to the County, in debt on a contract, or in default on any surety.

C. In determining a bidder's **responsiveness,** the County shall consider whether the bid conforms in all material respects to the bid documents. To be responsive, a bid must include all information required by the solicitation.

D. The County reserves the right to waive any irregularities.

E. The County reserves the right to reject any and all bids, to accept any bid in whole or in part, to add or delete quantities, to waive any informalities in bids received, to reject a bid not accompanied by any required bid security or other data required by bidding documents, and to accept or reject any bid which deviates from specifications when in the best interest of the County.

F. In the event that the lowest responsive bid received from a responsible bidder exceeds available funds, the County reserves the right to negotiate with that bidder to obtain a contract price within available funds.

G. Such other information as may be secured by the County Procurement Agent having a bearing on the decision to award the contract. If an apparent low bidder is not awarded a contract for reasons of non-responsibility, the County Procurement Agent shall so notify that bidder and shall have recorded the reasons in the contract file.

20. Binding Bids/Proposals: Bids/proposals are to be binding for sixty (60) calendar days following the opening date, unless extended by mutual consent of all parties or unless otherwise specified in Special Terms and Conditions.

GENERAL TERMS, CONDITIONS AND INSTRUCTIONS TO BIDDERS

21. Bid Bond: Bidders shall be required to provide a Bid Bond in an amount equal to 5% of the bid amount.

22. Withdrawal of Bids:

A. A bidder for a public construction contract, other than a contract for construction or maintenance of public highways, may withdraw his or her bid from consideration if the price bid was substantially lower than the other bids due solely to a mistake therein, provided the bid was submitted in good faith, and the mistake was a clerical mistake as *opposed* to a judgment mistake, and was actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor, or material made directly in the compilation of a bid, which unintentional arithmetic error or unintentional omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents, and materials used in the preparation of the bid sought to be withdrawn. If a bid contains *both* clerical and judgment mistakes, a bidder may withdraw his bid from consideration if the price bid would have been substantially lower than the other bids due solely to the clerical mistake, that was an unintentional arithmetic error or an unintentional omission of a quantity of work, labor, or material made directly in the compilation of a bid which shall be clearly shown by objective evidence drawn from inspection of original work papers, documents, and materials used in the preparation of the bid sought to be withdrawn. The bidder shall give notice in writing to the Procurement Agent of his or her claim of right to withdraw his or her bid within two (2) business days after the conclusion of the bid-opening procedure and shall submit original work papers with such notice.

B. A bidder for a contract other than for public construction may request withdrawal of his or her bid under the following circumstances:
   1) Requests for withdrawal of bids prior to opening of such bids shall be transmitted to the County Procurement Agent in writing.
   2) Requests for withdrawal of bids after opening of such bids but prior to award shall be transmitted to the County Procurement Agent, in writing, accompanied by full documentation supporting the request. If the request is based on a claim of error, documentation must show the basis of the error. Such documentation may take the form of supplier quotations, vendor work sheets, etc. If bid bonds were tendered with the bid, the County may exercise its right of collection.
   3) No bid may be withdrawn under this paragraph when the result would be the awarding of the contract on another bid of the same bidder or of another bidder in which the ownership of the withdrawing bidder is more than five percent.
   4) If a bid is withdrawn under the authority of this paragraph, the lowest remaining bid shall be deemed to be the low bid.

23. Contract Award:

Bid -- Award will be made on basis of information submitted with the bid and based on what is determined to be in the County's best interest, taking into consideration pricing and qualifications of bidders. A written award in the form of a purchase order, acceptance agreement, or formal contract shall result in a binding contract without further action by either party. If a contract or acceptance agreement is used, the same shall be executed by the successful bidder within ten (10) working days of receipt of notice of award.

GENERAL TERMS, CONDITIONS AND INSTRUCTIONS TO BIDDERS

Proposal – A Selection Committee will review and evaluate all proposals submitted in response to a Request for Proposals. The Committee shall conduct a preliminary evaluation of all proposals on the basis of the information provided with the proposal and the evaluation criteria listed herein. The Committee shall make recommendation to the County Board of Supervisors, and the Board of Supervisors shall make the final decision. The County shall be the sole judge as to the merits of qualifications submitted by offerors. The decision of the County shall be final. In the event the County determines, in writing and in its sole discretion, that only one offeror is fully qualified, or that one offeror is clearly more highly qualified and suitable than the others under consideration, a contract may be negotiated and awarded to that offeror.

The following documents, which are included in the solicitation, shall be incorporated by reference in the resulting contract and become a part of said contract:

A. County of Accomack Solicitation Form/Acceptance Agreement (Cover Sheet) and other documents which may be incorporated by reference, if applicable,
B. General Terms, Conditions and Instructions to Bidders,
C. Special Provisions and Specifications,
D. Pricing Schedule (if required)
E. Any addenda/amendments/Memoranda of Negotiations.

24. Tie Bids: If all bids are for the same total amount or unit price (including authorized discounts and delivery times) and if the public interest will not permit the delay of re-advertisement for bids, the County Procurement Agent is authorized to award the contract to the resident Accomack County tie bidder whose firm has its principal place of business in the County, or if there be none, to the resident Virginia tie bidder, or if there be none, to one of the tie bidders by drawing lots in public. The decision of the County to make award to one or more such bidders shall be final.

25. Notification of Award: Successful bidders/offerors will be notified immediately upon acceptance of their bid/proposal.

26. Guarantees & Warranties: All guarantees and warranties required shall be furnished by the Contractor and shall be delivered to the Procurement Agent before final payment on the contract is made. Unless otherwise stated, manufacturer's standard warranty applies.

27. Permits: Any and all required permits shall be obtained by the contractor.

28. Performance Bond and Payment Bond: The successful bidder shall be required to provide to the County a Performance Bond and Payment Bond in an amount equal to the amount of the contract.

29. Termination for Convenience: A contract may be terminated in whole or in part by the County in accordance with this clause whenever the County Procurement Agent shall determine that such a termination is in the best interest of the County. Any such termination shall be effected by delivery to the Contractor at least five (5) working days prior to the termination date of a Notice of Termination specifying the extent to which performance shall be terminated and the date upon which termination becomes effective. An equitable adjustment in the contract price shall be made for completed service, but no amount shall be allowed for anticipated profit on unperformed services.

30. Termination of Contract for Cause

A. If, through any cause, the Contractor shall fail to fulfill in a timely and proper manner his or her obligations under this contract, or if the Contractor shall violate any of the covenants, agreements,

or stipulations of this contract, the County shall thereupon have the right to terminate, specifying the effective date thereof, at least five (5) days before the effective date of such termination. In such event, all finished or unfinished documents, data, studies, surveys, drawings, maps, models, and reports prepared by the Contractor under the contract shall, at the option of the County, become its property and the Contractor shall be entitled to receive just and equitable compensation for any satisfactory work completed on such documents.

B. Notwithstanding the above, the Contractor shall not be relieved of liability to the County for damages sustained by the County by virtue of any breach of contract by the Contractor for the purpose of set off until such time as the exact amount of damages due to the County from the Contractor is determined.

31. Contract Alterations: No alterations in the terms of a contract shall be valid or binding upon the County unless made in writing and signed by the Procurement Agent or his or her authorized agent.

32. Subletting of Contract or Assignment of Contract Funds: It is mutually understood and agreed that the Contractor shall not assign, transfer, convey, sublet, or otherwise dispose of his or her contractual duties to any other person, firm, or corporation without the previous written consent of the Procurement Agent. If the Contractor desires to assign his or her right to payment of the contract, Contractor shall notify the Procurement Agent immediately, in writing, of such assignment of right to payment. In no case shall such assignment of Contract relieve the Contractor from his or her obligations or change the terms of the contract.

33. Funding: A contract shall be deemed binding only to the extent of appropriations available to each Department or Office for the purchase of goods and services.

34. Delivery/Service Failures: Failure of a Contractor to deliver goods or services within the time specified, or within reasonable time as interpreted by the Procurement Agent, or failure to make replacements/corrections of rejected articles/services when so requested, immediately or as directed by the Procurement Agent, shall constitute authority for the Procurement Agent to purchase in the open market articles/services of comparable grade/quality to replace the services, articles rejected, and/or not delivered. On all such purchases, the Contractor shall reimburse the County, within a reasonable time specified by the Procurement Agent, of any expense incurred in excess of contract prices. Such purchases shall be deducted from the contract quantities if applicable. Should public necessity demand it, the County reserves the right to use or consume articles delivered or services performed which are substandard in quality, subject to an adjustment in price to be determined by the Procurement Agent.

35. Non-Liability: The Contractor shall not be liable in damages for delay in shipment or failure to deliver when such delay or failure is the result of fire, flood, strike, the transportation carrier, act of God, act of Government, act of an alien enemy, or by any other circumstances which, in the Procurement Agent's opinion, are beyond the control of the Contractor. Under such circumstances, however, the Procurement Agent may, at his or her discretion, cancel the contract.

36. Responsibility for Supplies Tendered: Unless otherwise specified in the solicitation, the Contractor shall be responsible for the materials or supplies covered by the contract until they are delivered at the designated point; but, the Contractor shall bear all risk on rejected materials or supplies after notice of rejection. Rejected materials or supplies must be removed by and at the expense of the Contractor promptly after notification of rejection, unless public health and safety require immediate destruction or other disposal of rejected delivery. If rejected materials are not removed by the Contractor within

ten (10) days after date of notification, the County may return the rejected materials or supplies to the Contractor at his or her risk and expense or dispose of them as its own property.

37. Replacement: Materials or components that have been rejected by the Procurement Agent, in accordance with the terms of a contract, shall be replaced by the Contractor at no cost to the County.

38. General Guaranty:

Contractor agrees to:

A. Save the County, its agents, and employees harmless from liability of any nature or kind for the use of any copyrighted or uncopyrighted composition; secret process, patented or unpatented; invention; article or appliance furnished or used in the performance of a contract for which the Contractor is not the patentee, assignee, licensee, or owner.
B. Protect the County against latent defective material or workmanship and to repair or replace any damages or marring occasioned in transit or delivery.
C. Furnish adequate protection against damage to all work and to repair damages of any kind to the building or equipment, to his or her own work, or to the work of other contractors, for which his or her workers are responsible.
D. Pay for all permits, licenses, and fees and give all notices and comply with all laws, ordinances, rules, and regulations of the County.
E. Protect the County from loss or damage to County-owned property while it is in the custody of the Contractor.

39. Service Contract Guaranty:

Contractor agrees to:

A. Furnish services described in the solicitation and resultant contract at the times and places and in the manner and subject to conditions therein set forth provided that the County may reduce the said services at any time.
B. Enter upon the performance of services with all due diligence and dispatch, assiduously press to its complete performance, and exercise therein the highest degree of skill and competence.
C. All work and services rendered in strict conformance to all laws, statutes, and ordinances and the applicable rules, regulations, methods, and procedures of all government boards, bureaus, offices, and other agents.
D. Allow services to be inspected or reviewed by an employee of the County at any reasonable time and place selected by the County.
E. The County of Accomack shall be under no obligation to compensate the Contractor for any services not rendered in strict conformity with the contract.

40. Indemnification: The Contractor shall indemnify, keep and save harmless the County, its agents, officials, employees, and volunteers against claims of injuries, death, damage to property, patent claims, suits, liabilities, judgments, cost, and expenses which may otherwise accrue against the County in consequence of the granting of a contract or which may otherwise result therefrom, if it shall be determined that the act was caused through negligence or error or omission of the Contractor or his or her employees, or that of the subcontractor or his or her employees, if any; and, the Contractor shall, at his or her own expense, appear, defend, and pay all charges of attorneys and all costs and other expenses arising therefrom or incurred in connection therewith; and, if any judgment

shall be rendered against the County in any such action, the Contractor shall, at his or her own expense, satisfy and discharge the same. Contractor expressly understands and agrees that any performance bond or insurance protection required by this contract, or otherwise provided by the Contractor, shall in no way limit the responsibility to indemnify, keep and save harmless and defend the County as herein provided.

41. Virginia Freedom of Information Act: All proceedings, records, contracts, and other public records relating to procurement transactions shall be open to the inspection of any citizen or any interested person, firm, or corporation in accordance with the Virginia Freedom of Information Act ***except*** as provided below:

A. Cost estimates relating to a proposed procurement transaction prepared by or for a public body shall not be open to public inspection.

B. Any competitive sealed bidding bidder, upon request, shall be afforded the opportunity to inspect bid records within a reasonable time after the opening of all bids but prior to award, **except** in the event that the County decides not to accept any of the bids and to reopen the contract. Otherwise, bid records shall be open to public inspection only after award of the contract. Any competitive negotiation offeror, upon request, shall be afforded the opportunity to inspect proposal records within a reasonable time after the evaluation and negotiations of proposals are completed but prior to award, **except** in the event that the County decides not to accept any of the proposals and to reopen the contract. Otherwise, proposal records shall be open to the public inspection only after award of the contract **except** as provided in paragraph "C" below. Any inspection of procurement transaction records under this section shall be subject to reasonable restrictions to ensure the security and integrity of the records.

C. Trade secrets or proprietary information submitted by a bidder, offeror, or contractor in connection with a procurement transaction or prequalification application submitted pursuant to the prequalification process identified in the Special Provisions, shall not be subject to the Virginia Freedom of Information Act; however, the bidder, offeror, or contractor shall (i) invoke the protections of this section prior to or upon submission of the data or other materials, (ii) identify the data or other materials to be protected, and (iii) state the reasons why protection is necessary. Any offeror shall not identify as trade secret or proprietary information their entire completed proposal.

D. Nothing contained in this section shall be construed to require the County, when procuring by "competitive negotiation" (Request for Proposal), to furnish a statement of the reasons why a particular proposal was not deemed to be the most advantageous to the County.

42. <u>Applicable Law and Courts:</u> The contract shall be governed in all respects by the laws of the Commonwealth of Virginia, and exclusive jurisdiction for the resolution of any dispute arising out of this contract shall be in the Circuit Court of Accomack County, Virginia.

43. General Terms and Conditions stated herein are controlling, and any variance or inconsistency with terms elsewhere shall be resolved in favor of these General Terms and Conditions.

SECTION 00120

INSTRUCTIONS TO BIDDERS

TABLE OF CONTENTS

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 where the bidding procedures are to be administered.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents may be obtained from the Issuing Office in the number and format stated in the advertisement or invitation to bid.

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

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

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, Bidder shall submit (a) written evidence establishing its qualifications such as financial data, previous experience, and present commitments, and such other data with the bid form.

ARTICLE 4 – SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

4.01 *Site and Other Areas*

A. 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.

4.02 *Existing Site Conditions*

A. Subsurface and Physical Conditions; Hazardous Environmental Conditions

1. The Supplementary Conditions identify:

a. Those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.

b. Those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

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.

B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or adjacent to the Site are set forth in the Contract Documents and are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

C. Adequacy of Data: Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 5.03, 5.04, and 5.05 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 5.06 of the General Conditions.

4.03 *Site Visit and Testing by Bidders*

A. Bidder shall conduct the required Site visit during normal working hours, and shall not disturb any ongoing operations at the Site.

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

C. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder 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.

D. Bidder shall 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.

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

4.04 *Owner's Safety Program*

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

4.05 *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 5 – BIDDER'S REPRESENTATIONS

5.01 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;

B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work;

D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings;

E. consider 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 Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs;

F. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;

G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder;

I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and

J. agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 6 – PRE-BID CONFERENCE

6.01 A pre-Bid conference will be held at the time and location stated in the invitation or advertisement to bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are required to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all parties recorded as having received the Bidding Documents. Questions received less than seven days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, supplement, or change the Bidding Documents.

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 certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions.

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 Documents, 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 Documents 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. Such forfeiture shall 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 seven 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 seven days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

9.01 The number of days within which, or the dates by which, **[Milestones are to be achieved and]** the Work is to be substantially completed, and completed and ready for final payment, are set forth in the Agreement.

ARTICLE 10 – LIQUIDATED DAMAGES

10.01 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.

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 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 at least 15 days prior to the date for receipt of Bids. Each such request shall comply with the requirements of Paragraphs 7.04 and 7.05 of the General Conditions. 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 prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

11.02 All prices that Bidder sets forth in its Bid shall 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 12 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.01 A Bidder shall be prepared to retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of the Work if required by the Bidding Documents (most commonly in the Specifications) to do so. If a prospective Bidder objects to retaining any such Subcontractor, Supplier, or other individual or entity, and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.

12.02 Subsequent to the submittal of the Bid, Owner may not require the Successful Bidder or Contractor to retain any Subcontractor, Supplier, or other individual or entity against which Contractor has reasonable objection.

12.03 The apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of the Subcontractors or Suppliers proposed for the Work.

If requested by Owner, such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder shall 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.

12.04 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, Suppliers, or other individuals or entities. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity 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 7.06 of the General Conditions.

ARTICLE 13 – PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents.

A. All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall 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."

13.02 A Bid by a corporation shall 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 shall be shown.

13.03 A Bid by a partnership shall 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 partnership's address for receiving notices shall be shown.

13.04 A Bid by a limited liability company shall 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 firm's address for receiving notices shall be shown.

13.05 A Bid by an individual shall show the Bidder's name and address for receiving notices.

13.06 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture's address for receiving notices shall be shown.

13.07 All names shall be printed in ink below the signatures.

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

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

13.10 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 – BASIS OF BID

14.01 *Lump Sum*

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

14.02 *Unit Price*

A. Bidders shall 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.

14.03 *Allowances*

A. For cash allowances the Bid price shall 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.

ARTICLE 15 – SUBMITTAL OF BID

15.01 With each copy of the Bidding Documents, a Bidder is furnished 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 7 of the Bid Form.

15.02 A Bid shall be received no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall 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 shall 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 shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED."

15.03 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 16 – MODIFICATION AND WITHDRAWAL OF BID

16.01 A 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.

16.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.

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

ARTICLE 17 – OPENING OF BIDS

17.01 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.

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 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 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible. 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, then the Owner will reject the Bid as nonresponsive; provided that Owner also reserves the right to waive all minor informalities not involving price, time, or changes in the Work.

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

19.03 Evaluation of Bids

A. In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form 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 shall 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.

19.04 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.

19.05 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.

19.06 If the Contract is to be awarded, Owner will award the Contract to the responsible Bidder whose Bid, conforming with all the material terms and conditions of the Instructions to Bidders, is lowest, price and other factors considered.

ARTICLE 20 – BONDS AND INSURANCE

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

ARTICLE 21 – SIGNING OF AGREEMENT

21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall 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 shall 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 ten days thereafter, Owner shall 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.

SECTION 00130

BID FORM

TABLE OF CONTENTS

Page

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Accomack County Department of Public Works

24401 Joynes Neck Road

P.O. Box 476

Accomack, VA 23301

Ph: (757) 787-1468

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 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. 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.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

Addendum No.	**Addendum, Date**

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. 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 any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.

F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

G. 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.

H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.

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

J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

A. 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;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

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

2. "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;

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 e execution of the Contract.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

(Amounts to be shown in both words and numerals. In case of discrepancy, amounts shown in words will govern.)

North Spur Pump Station, Force Main and Water Main Extension

Item 1 - Lump Sum Bid Price for mobilization, bonds, and permits, Sitework, Fencing, erosion control measures as shown on the drawings for a total of _____	$
Item 2 – Lump Sum Price for Installation of the precast concrete pump station wet well, valve vault, flow meter/bypass vault, all piping and appurtenances for a total of _____ _____	$
Item 3 – Generator, Electrical, Instrumentations, control panels, and remote wireless alarm system as shown on the drawings, for total of _____	$
Item 4 – Lump Sum Price for Installation approximately 3,600 linear feet of 6-inch forcemain, to include all required valves and air release valves, for a total of _____	$
Total of items 1 to 4 Lump Sums for total of _____	$
***BID ALTERNATE –** The County seeks a bid alternate to extend the Water Main in order to supply the North Spur commercial area, to include approximately 5,300 linear feet of 8-inch Water main, and all associated piping appurtenances, for a total of (See Sheets 12 to 15 and technical specifications)_____ _____	$

*The Owner will determine whether to go ahead with the Bid Alternate within 30 days of the bid date. The Owner also reserves the right to not go through with the bid alternate by the Contractor at its sole discretion.

- The cost of this bid alternate will not be considered in the bid evaluation / selection. Only the total of items 1-4 will be used in the selection of the contractor.

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 14.07 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidate damages in the event of failure to complete the work within the Contract Times.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 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. List of Project References (Minimum of 5 submitted with the Bid);

E. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids;

F. Contractor's License No.: _____ **[or]** Evidence of Bidder's ability to obtain a State Contractor's License and a covenant by Bidder to obtain said license within the time for acceptance of Bids;

G. Required Bidder Qualification Statement. The supporting data shall be submitted as specified under Instruction to Bidders – Article 3; and

H. County Inserts

ARTICLE 8 – DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

_____

By:
[Signature] _____

[Printed name] _____
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:
[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

_____

_____

_____

Telephone Number: _____

Fax Number: _____

Contact Name and e-mail address: _____

_____

Bidder's License No.: _____
(where applicable)

NOTE TO USER: Use in those states or other jurisdictions where applicable or required.

BID FORM

It is the intention of the County of Accomack to comply fully with relevant federal and state laws, orders, and regulations and to promote the interests of the Virginia Department of Small Business and Supplier Diversity and like agencies. The procurement practices of the County of Accomack are non-discriminatory and promote equality of opportunity for all qualified businesses.

PLEASE INDICATE THE FOLLOWING INFORMATION RELEVANT TO YOUR FIRM, IF ANY:

DESIGNATIONS: (Please refer to the definitions provided by the Virginia Department of Small Business and Supplier Diversity.)

Micro Business	☐ Yes	☐ No
Small Business	☐ Yes	☐ No
Women-Owned Business	☐ Yes	☐ No
Minority Business	☐ Yes	☐ No
Service Disabled Veteran	☐ Yes	☐ No

The above information is requested for statistical purposes only. All firms tendering responses will receive equal consideration for award.

CONTACT FOR ADMINISTRATION

Name: _____

Office Address: _____

Office Phone Number: _____

Please return this page

BID FORM

VENDOR ELIGIBILITY CERTIFICATION

This is to certify that this person/firm/corporation has neither been barred from bidding on contracts by any agency of the Commonwealth of Virginia, nor is this person/firm/corporation a part of any firm/corporation that has been barred from bidding on contracts by any agency of the Commonwealth of Virginia.

_____
Name of Official

_____
Title

_____
Firm or Corporation

Please return this page.

PROOF OF AUTHORITY TO TRANSACT BUSINESS IN VIRGINIATHIS FORM MUST BE SUBMITTED WITH YOUR PROPOSAL/BID. FAILURE TO INCLUDE THIS FORM MAY RESULT IN REJECTION OF YOUR PROPOSAL/BID.

Pursuant to Virginia Code §2.2-4311.2, an Offeror/Bidder organized or authorized to transact business in the Commonwealth pursuant to Title 13.1 or Title 50 of the code of Virginia shall include in its proposal/bid the identification number issued to it by the State Corporation Commission ("SCC"). Any Offeror/ Bidder that is not required to be authorized to transact business in the Commonwealth as a foreign business entity under Title 13.1 or Title 50 of the code of Virginia or as otherwise required by law shall include in its proposal/bid a statement describing why the Offeror/ Bidder is not required to be so authorized. Any Offeror/ Bidder described herein that fails to provide the required information shall not receive an award unless a waiver of this requirement and the administrative policies and procedures established to implement this section is granted by the County Administrator as applicable.

If this quote for goods or services is accepted by the County of Accomack, Virginia, the undersigned agrees that the requirements of the Code of Virginia Section 2.2-4311.2 have been met.

Please complete the following by checking the appropriate line that applies and providing the requested information.

A._____ Offeror/Bidder is a Virginia business entity organized and authorized to transact business in Virginia by the SCC and such vendor's Identification Number issued to it by the SCC is _____.

B._____ Offeror/Bidder is an out-of-state (foreign) business entity that is authorized to transact business in Virginia by the SCC and such vendor's identification Number issued to it by the SCC is _____.

C._____ Offeror/Bidder does not have an Identification Number issued to it by the SCC and such vendor is not required to be authorized to transact business in Virginia by the SCC for the following reason(s):

Please attach additional sheets if you need to explain why such Offeror/ Bidder is not required to be authorized to transact business in Virginia.

_____

Legal Name of Company (as listed on W-9)

_____

Legal Name of Offeror/ Bidder

_____

Date

_____

Authorized Signature

_____

Print or Type Name and Title

Please return this page.

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BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER *(Name and Address)*:

SURETY *(Name, and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:
Accomack County Public Works
24401 Joynes Neck Road, P.O. Box 318
Accomac, VA 23301

BID
Bid Due Date:
Description *(Project Name— Include Location)*:

BOND
Bond Number:
Date:
Penal sum _____ $ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
Title	Title

Note: Addresses are to be used for giving any required notice.
Provide execution by any additional parties, such as joint venturers, if necessary.

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 shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur 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 shall 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 shall not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.

6. No suit or action shall 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 shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall 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 Registered or Certified Mail, return receipt requested, postage pre-paid, and shall 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 shall 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 provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

NOTICE OF AWARD

Date of Issuance:

Owner: Owner's Contract No.:

Engineer: Engineer's Project No.:

Project: Contract Name:

Bidder:

Bidder's Address:

TO BIDDER:

You are notified that Owner has accepted your Bid dated [_____] 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: $_____ *[note if subject to unit prices, or cost-plus]*

[ ] 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. *[revise if multiple copies accompany the Notice of Award]*

☐ a set of the 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 [____]counterparts of the Agreement, fully executed by Bidder.
2. Deliver with the executed Agreement(s) the Contract security *[e.g., performance and payment bonds]* and insurance documentation as specified in the Instructions to Bidders and General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any):

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 ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner**:**

Authorized Signature

By:

Title:

Copy: Engineer

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SUGGESTED FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE) FUNDING AGENCY EDITION

THIS AGREEMENT is by and between Accomack County Public Works ("Owner") and ("Contractor").

Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, 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:

The project is generally described as construction of a new wastewater pump station to serve the North Spur area of Accomack County service area. The new pump station shall consist of wet well containing two submersible non-clog pumps. The pumps will act in lead and lag mode. The North Spur Pump Station will include wet well, submersible pumps, pump controls, and stand by power. Approximately 3,600 linear feet of 6" forcemain will discharge to the influent manhole near the Regional Pump Station. The project also includes a bid alternate of extending the existing Water main in order to supply the North Spur commercial area.

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:

North Spur Pump Station, Force Main and Water Main Extension

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by Bowman Consulting Group, Ltd. (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.

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 *Days to Achieve Substantial Completion and Final Payment*

A. The Work will be substantially completed within **240 days** after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within **270 days** after the date when the Contract Times commence to run.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. 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), Contractor shall pay Owner $_0 for each day that expires after the time specified in Paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner $_0 for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A below:

The lump sum amount of the project work in accordance with the Contract Documents is provided in Paragraph 9.01.A.9. There are zero unit price work items on this project.

A. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in this paragraph 5.01.A:

As provided in Paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 9.07 of the General Conditions. Unit prices have been computed as provided in Paragraph 11.03 of the General Conditions.

UNIT PRICE WORK

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total Estimated Price
	Not Applicable				

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 5th day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of 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 in the General Requirements:

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 Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:

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

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

2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions.

6.03 *Final Payment*

A. Upon receipt of the final Application for Payment accompanied by Engineer's recommendation of payment in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay Contractor as provided in Paragraph 14.07 of the General Conditions the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages.

ARTICLE 7 – INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the maximum legal rate.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor does not consider that any 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 Documents.

E. 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.

F. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

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

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

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement (pages 1 to 6, inclusive).

2. Performance bond (pages 1 to 3, inclusive).

3. Payment bond (pages 1 to 3, inclusive).

4. Other bonds (pages 1 to 2, inclusive).

   a. Bid Bond (pages 1 to 2, inclusive).

   b. _____ (pages _____ to _____, inclusive).

   c. _____ (pages _____ to _____, inclusive).

5. General Conditions (pages 1 to 57, inclusive).

6. Supplementary Conditions (pages 1 to 6, inclusive).

7. Drawings consisting of 21 sheets with each sheet bearing the following general title: North Spur Pump Station, Force Main and Water Main Extension.

8. Addenda (numbers 0 to 0, inclusive).

9. Exhibits to this Agreement (enumerated as follows):

   a. Contractor's Bid (pages 1 to 20, inclusive).

   b. Documentation submitted by Contractor prior to Notice of Award (pages 0 to 0, inclusive).

   a. Notice to Proceed (pages 1 to 1)

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

    a. Work Change Directives.

    b. Change Order(s).

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

TABLE OF CONTENTS

Page

GENERAL CONDITIONS

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

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

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

2. *Agency* – The Federal or state agency named as such in the Agreement.

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

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

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

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

7. *Bidder* – The individual or entity who submits a Bid directly to Owner.

8. *Bidding Documents* – The Bidding Requirements and the proposed Contract Documents (including all Addenda).

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

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

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

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

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

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

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

16. *Contractor* – The individual or entity with whom Owner has entered into the Agreement.

17. *Cost of the Work* – See Paragraph 11.01.A for definition.

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

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

20. *Engineer* – The individual or entity named as such in the Agreement.

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

22. *General Requirements* – Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

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

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

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

26. *Liens* – Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

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

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

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

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

31. *PCBs* – Polychlorinated biphenyls.

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

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

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

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

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

37. *Related Entity* – An officer, director, partner, employee, agent, consultant, or subcontractor.

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

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

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

41. *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.

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

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

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

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

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

47. *Successful Bidder* – The Bidder submitting a responsive Bid to whom Owner makes an award.

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

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

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

51. Unit Price Work – Work to be paid for on the basis of unit prices.

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

53. *Work Change Directive* – A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and Agency upon recommendation of the Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

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

B. *Intent of Certain Terms or Adjectives*

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

C. *Day*

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

D. *Defective*

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

   a. does not conform to the Contract Documents, or

   b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or

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

E. *Furnish, Install, Perform, Provide*

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

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

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

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

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

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

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

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

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement.

2.04 *Starting the Work*

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

2.05 *Before Starting Construction*

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

1. a preliminary Progress Schedule;

2. a preliminary Schedule of Submittals; and

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

2.06 *Preconstruction Conference*

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

2.07 *Initial Acceptance of Schedules*

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

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

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

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

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

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

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage

as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.

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

3.02 *Reference Standards*

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

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

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

3.03 *Reporting and Resolving Discrepancies*

A. Reporting Discrepancies

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

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

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

B. Resolving Discrepancies

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

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

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

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

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3) or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

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

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

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

3.06 *Electronic Data*

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

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

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

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

4.01 *Availability of Lands*

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

of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

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

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

4.02 *Subsurface and Physical Conditions*

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

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and

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

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

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

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

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by

Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

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

C. *Possible Price and Times Adjustments*

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

a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

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

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

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

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

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

4.04 *Underground Facilities*

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

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

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

a. reviewing and checking all such information and data,

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

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

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

B. *Not Shown or Indicated*

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

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

4.05 *Reference Points*

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

4.06 *Hazardous Environmental Condition at Site*

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

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

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

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

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

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

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

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

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

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

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

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

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

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

5.02 *Licensed Sureties and Insurers*

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

5.03 *Certificates of Insurance*

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

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

5.04 *Contractor's Liability Insurance*

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

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

   a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

   b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

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

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

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

3. include completed operations insurance;

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

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

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

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

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

5.05 *Owner's Liability Insurance*

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

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (Contractor shall be responsible for any deductible or self-insured retention.). This insurance shall:

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

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

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

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

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

6. include testing and startup; and

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

B. Contractor shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

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

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

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Contractor as trustee or otherwise payable under any policy so issued.

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

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

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

5.08 *Receipt and Application of Insurance Proceeds*

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

B. Contractor as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Contractor's exercise of this power. If such objection be made, Contractor as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Contractor as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Contractor as fiduciary shall give bond for the proper performance of such duties.

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

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

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

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

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

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

6.02 *Labor; Working Hours*

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

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

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances,

fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

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

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

6.04 *Progress Schedule*

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

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

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

6.05 *Substitutes and "Or-Equals"*

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

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

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

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

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

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

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

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

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

2. Substitute Items

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

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

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

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

1) shall certify that the proposed substitute item will:

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

b) be similar in substance to that specified, and

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

2) will state:

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

b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

a) all variations of the proposed substitute item from that specified , and

b) available engineering, sales, maintenance, repair, and replacement services;

4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is

equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

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

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

E. *Engineer's Cost Reimbursement*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

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

6.06 *Concerning Subcontractors, Suppliers, and Others*

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

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

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

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

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

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

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

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

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

6.07 *Patent Fees and Royalties*

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

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

6.08 *Permits*

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

6.09 *Laws and Regulations*

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

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

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

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

6.11 *Use of Site and Other Areas*

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

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

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

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

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

C. *Cleaning:* Prior to Substantial Completion of the Work, Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

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

6.12 *Record Documents*

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

6.13 *Safety and Protection*

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

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

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

C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

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

6.14 *Safety Representative*

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

6.15 *Hazard Communication Programs*

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

6.16 *Emergencies*

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

6.17 *Shop Drawings and Samples*

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

1. *Shop Drawings*

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

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

2. *Samples*

a. Submit number of Samples specified in the Specifications.

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

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

C. *Submittal Procedures*

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

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

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

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

d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

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

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

D. *Engineer's Review*

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

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

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

E. *Resubmittal Procedures*

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

6.18 *Continuing the Work*

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

6.19 *Contractor's General Warranty and Guarantee*

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

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

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

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

Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 *Indemnification*

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

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

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

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

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

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all

performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

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

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

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

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

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

1. written notice thereof will be given to Contractor prior to starting any such other work; and

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

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

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

7.02 *Coordination*

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

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

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

7.03 *Legal Relationships*

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

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.

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

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

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

8.02 *Replacement of Engineer*

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

8.03 *Furnish Data*

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

8.04 *Pay When Due*

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

8.05 *Lands and Easements; Reports and Tests*

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

8.06 *Insurance*

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

8.07 *Change Orders*

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

8.08 *Inspections, Tests, and Approvals*

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

8.09 *Limitations on Owner's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

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

8.11 *Evidence of Financial Arrangements*

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

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

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

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

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

9.03 *Project Representative*

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

9.04 *Authorized Variations in Work*

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

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

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

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

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

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

9.07 *Determinations for Unit Price Work*

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

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

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

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

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

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

9.09 *Limitations on Engineer's Authority and Responsibilities*

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

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

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

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

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

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

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

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

10.02 *Unauthorized Changes in the Work*

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

10.03 *Execution of Change Orders*

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

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

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

10.05 *Claims*

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

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

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

1. deny the Claim in whole or in part,

2. approve the Claim, or

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

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

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

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

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

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

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

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

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

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

5. Supplemental costs including the following:

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

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

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

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

    e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

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

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

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

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

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

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, 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 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

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

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

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

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

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

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

11.02 *Allowances*

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

B. Cash Allowances

1. Contractor agrees that:

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

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

C. *Contingency Allowance*

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

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

11.03 *Unit Price Work*

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

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

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

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

1. the Bid price of a particular item of Unit Price Work amounts to more than 5 percent of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 25 percent from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

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

12.01 *Change of Contract Price*

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

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

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

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

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

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

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

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

12.02 *Change of Contract Times*

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

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

12.03 *Delays*

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

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

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

1. delays caused by or within the control of Contractor; or

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

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

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

13.01 *Notice of Defects*

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

13.02 *Access to Work*

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

13.03 *Tests and Inspections*

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

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

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

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

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

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

13.04 *Uncovering Work*

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

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

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

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

13.05 *Owner May Stop the Work*

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

13.06 *Correction or Removal of Defective Work*

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

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

13.07 *Correction Period*

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

1. repair such defective land or areas; or

2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

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

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

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

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

13.08 *Acceptance of Defective Work*

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

13.09 *Owner May Correct Defective Work*

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

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

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

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

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

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

14.02 *Progress Payments*

A. *Applications for Payments*

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

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

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

B. *Review of Applications*

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

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

a. the Work has progressed to the point indicated;

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

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

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

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

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

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

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

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due*

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

D. *Reduction in Payment*

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

   a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

   b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

   c. the Contractor's performance or furnishing of the Work is inconsistent with funding Agency requirements;

   d. there are other items entitling Owner to a set-off against the amount recommended; or

   e. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

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

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

14.03 *Contractor's Warranty of Title*

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

14.04 *Substantial Completion*

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

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

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

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

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

14.05 *Partial Utilization*

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

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

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

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

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

14.06 *Final Inspection*

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

14.07 *Final Payment*

A. *Application for Payment*

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

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

   a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;

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

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

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

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

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

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

C. *Payment Becomes Due*

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

14.08 *Final Completion Delayed*

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

14.09 *Waiver of Claims*

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

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

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

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

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

15.02 *Owner May Terminate for Cause*

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

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

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

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages

incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.

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

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

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

15.03 *Owner May Terminate For Convenience*

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

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

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

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

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

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

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

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

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

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or

2. agrees with the other party to submit the Claim to another dispute resolution process, or

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

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

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

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

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

17.03 *Cumulative Remedies*

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

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

17.06 *Headings*

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

ARTICLE 18 – FEDERAL REQUIREMENTS

18.01 *Agency Not a Party*

A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees is a party to this Contract.

18.02 *Contract Approval*

A. Owner and Contractor will furnish Owner's attorney such evidence as required so that Owner's attorney can complete and execute the following "Certificate of Owner's Attorney" (Exhibit GC-A) before Owner submits the executed Contract Documents to Agency for approval.

B. Concurrence by Agency in the award of the Contract is required before the Contract is effective.

18.03 *Conflict of Interest*

A. Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer.

B. Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in Contractor. Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

18.04 *Gratuities*

A. If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

B. In the event this Contract is terminated as provided in paragraph 18.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an

amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

18.05 *Audit and Access to Records*

A. For all negotiated contracts and negotiated modifications (except those of $10,000 or less), Owner, Agency, the Comptroller General, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the Contractor, which are pertinent to the Contract, for the purpose of making audits, examinations, excerpts and transcriptions. Contractor shall maintain all required records for three years after final payment is made and all other pending matters are closed.

18.06 *Small, Minority and Women's Businesses*

A. If Contractor intends to let any subcontracts for a portion of the work, Contractor shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction, and services. Affirmative steps shall consist of: (1) including qualified small, minority and women's businesses on solicitation lists; (2) assuring that small, minority and women's businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority, and women's businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women's businesses; (5) using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. Department of Commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) Contractor is encouraged to procure goods and services from labor surplus area firms.

18.07 *Anti-Kickback*

A. Contractor shall comply with the Copeland Anti-Kickback Act (18 USC 874 and 40 USC 276c) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

18.08 *Clean Air and Pollution Control Acts*

A. If this Contract exceeds $100,000, Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 USC 7401 *et seq.*) and the Federal Water Pollution Control Act as amended (33 USC 1251 *et seq.*). Contractor will report violations to the Agency and the Regional Office of the EPA.

18.09 *State Energy Policy*

A. Contractor shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in any applicable State Energy Conservation Plan, shall be utilized.

18.10 *Equal Opportunity Requirements*

A. If this Contract exceeds $10,000, Contractor shall comply with Executive Order 11246, "Equal Employment Opportunity," as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and as supplemented by regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

B. Contractor's compliance with Executive Order 11246 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative active obligations required by the Standard Federal Equal Employment

Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographical area where the Contract is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the Contract, and in each trade, and Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting Contractor's goals shall be a violation of the Contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

C. Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the Contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the Contract is to be performed.

18.11 *Restrictions on Lobbying*

A. Contractor and each subcontractor shall comply with Restrictions on Lobbying (Public Law 101-121, Section 319) as supplemented by applicable Agency regulations. This Law applies to the recipients of contracts and subcontracts that exceed $100,000 at any tier under a Federal loan that exceeds $150,000 or a Federal grant that exceeds $100,000. If applicable, Contractor must complete a certification form on lobbying activities related to a specific Federal loan or grant that is a funding source for this Contract. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 USC 1352. Each tier shall disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Certifications and disclosures are forwarded from tier to tier up to the Owner. Necessary certification and disclosure forms shall be provided by Owner.

18.12 *Environmental Requirements*

A. When constructing a project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental constraints:

1. Wetlands – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.

2. Floodplains – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert 100 year floodplain areas delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, i.e., alluvial soils on NRCS Soil Survey Maps.

3. Historic Preservation – Any excavation by Contractor that uncovers an historical or archaeological artifact shall be immediately reported to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the State Historic Preservation Officer (SHPO).

4. Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.

EXHIBIT GC-A

Certificate of Owner's Attorney

I, the undersigned, _____, the duly authorized and acting legal representative of _____, do hereby certify as follows:

I have examined the attached Contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements is adequate and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions, and provisions thereof.

_____

Date: _____

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EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

PERFORMANCE BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

CONSTRUCTION CONTRACT
Effective Date of the Agreement:
Amount:
Description *(name and location)*:

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
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 shall be considered plural where applicable.

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 shall 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 shall 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 shall 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 shall 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 shall 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:

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 shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall 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 shall not be reduced or set off on account of any such unrelated obligations. No right of action shall 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 may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall 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 shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

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 shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall 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 shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

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EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

PAYMENT BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

CONSTRUCTION CONTRACT

Effective Date of the Agreement:
Amount:
Description *(name and location)*:

BOND

Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
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 shall be considered plural where applicable.

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 shall 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 shall 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 shall 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.

8. The Surety's total obligation shall 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 shall 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 shall 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 satisfy 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 shall 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 shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall 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 shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall 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:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
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;
4. A brief description of the labor, materials, or equipment furnished;
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;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
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 shall be 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 shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

18. Modifications to this Bond are as follows:

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EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

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)	**$** _____
4. TOTAL COMPLETED AND STORED TO DATE (Column F total on Progress Estimates)	**$** _____
5. RETAINAGE:	
a. X _____ Work Completed	**$** _____
b. X _____ Stored Material	**$** _____
c. Total Retainage (Line 5.a + Line 5.b)	**$** _____
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5.c)	**$** _____
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	**$** _____
8. AMOUNT DUE THIS APPLICATION	**$** _____
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G total on Progress Estimates + Line 5.c above)	**$** _____

Contractor's Certification

The undersigned Contractor certifies, to the best of its knowledge, the following:
(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 the Work covered by prior Applications for Payment;
(2) Title to all Work, materials and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all Liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such Liens, security interest, or encumbrances); and
(3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Contractor Signature

By:	Date:

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is recommended by: _____ _____
(Engineer) (Date)

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is approved by: _____ _____
(Owner) (Date)

Approved by: _____ _____
Funding or Financing Entity (if applicable) (Date)

Progress Estimate - Lump Sum Work

Contractor's Application

For (Contract):	Application Number:
Application Period:	Application Date:

			Work Completed		E	F		G
A		B	C	D				
Specification Section No.	Description	Scheduled Value ($)	From Previous Application (C+D)	This Period	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F / B)	Balance to Finish (B - F)
	Totals							

Progress Estimate - Unit Price Work

Contractor's Application

For (Contract):								Application Number:			
Application Period:								Application Date:			
A					B	C	D	E	F		
Item		Contract Information									
Bid Item No.	Description	Item Quantity	Units	Unit Price	Total Value of Item ($)	Estimated Quantity Installed	Value of Work Installed to Date	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F / B)	Balance to Finish (B - F)
	Totals										

Stored Material Summary

Contractor's Application

For (Contract):								Application Number:			
Application Period:								Application Date:			
A		B	C		D		E		F		G
Bid Item No.	Supplier Invoice No.	Submittal No. (with Specification Section No.)	Storage Location	Description of Materials or Equipment Stored	Stored Previously		Amount Stored this Month ($)	Subtotal Amount Completed and Stored to Date (D + E)	Incorporated in Work		Materials Remaining in Storage ($) (D + E - F)
					Date Placed into Storage (Month/Year)	Amount ($)			Date (Month/ Year)	Amount ($)	
				Totals							

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Change Order No. _____

Date of Issuance:	Effective Date:
Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

The Contract is modified as follows upon execution of this Change Order:

Description:

Attachments: *[List documents supporting change]*

CHANGE IN CONTRACT PRICE	**CHANGE IN CONTRACT TIMES** *[note changes in Milestones if applicable]*
Original Contract Price: $_____	Original Contract Times: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: $_____	[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: Substantial Completion: _____ Ready for Final Payment: _____ days
Contract Price prior to this Change Order: $_____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] of this Change Order: $_____	[Increase] [Decrease] of this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
Contract Price incorporating this Change Order: $_____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for Final Payment: _____ days or dates

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____	By: _____	By: _____
Engineer (if required)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Title: _____	Title _____	Title _____
Date: _____	Date _____	Date _____

Approved by Funding Agency (if applicable)

By: _____ Date:

Title: _____

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EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

NOTICE TO PROCEED

Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:
	Effective Date of Contract:

TO CONTRACTOR:

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on [_____, 20__]. *[see Paragraph 4.01 of the General Conditions]*

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work shall be done at the Site prior to such date. In accordance with the Agreement, [the date of Substantial Completion is _____, and the date of readiness for final payment is_____] ***or*** [the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____].

Before starting any Work at the Site, Contractor must comply with the following:
[Note any access limitations, security procedures, or other restrictions]

Owner**:**

Authorized Signature

By:

Title:

Date Issued:

Copy: Engineer

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EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner: Town of Waverly	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

This [preliminary] [final] Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

Date of Substantial Completion

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.

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 shall be as provided in the Contract, except as amended as follows: *[Note: 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.]*

Amendments to Owner's responsibilities:
☐ None
☐ As follows

Amendments to Contractor's responsibilities:
☐ None
☐ As follows:

The following documents are attached to and made a part of this Certificate: *[punch list; others]*

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.

EXECUTED BY ENGINEER:	RECEIVED:	RECEIVED:
By: _____ (Authorized signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

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SECTION 00150

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Condition of the Construction Contract Funding Agency Edition (No. C-710, 2002 Edition) and other provisions of the Contract Documents as indicated below. All provisions that are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

TABLE OF CONTENTS

SC-1.01.A.4. Add the following language to the end of Paragraph 1.01.A.4:

The Application for Payment form to be used on this Project is EJCDC No. 620. The Agency must approve all Applications for Payment before payment is made.

SC-1.01.A.10. Add the following language to the end of paragraph 1.01.A.10:

The Change Order form to be used on this Project is EJCDC No. C-941. Agency approval is required before Change Orders are effective.

SC-2.03.A. Delete paragraph 2.03.A in its entirety and insert the following in its place:

A. The Contract Times will commence to run on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of

the Agreement.

SC-5.03. Add the following new paragraph immediately after Paragraph 5.03.B:

C. Failure of the Owner to demand such certificates or other evidence of full compliance with these insurance requirements or failure of the Owner to identify a deficiency from evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

SC-5.04. Add the following new paragraph immediately after paragraph 5.04.B:

C. The limits of liability for insurance required by paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under paragraphs 5.04.A.1 and A.2 of the General Conditions:

a.	State:	Statutory
b.	Applicable Federal (e.g., Longshoremen's)	Statutory
c.	Employer's Liability	*$ 500,000*

2. Contractor's General Liability under paragraphs 5.04.A.3 and A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody, and control of the Contractor:

a.	General Aggregate	*$ 2,000,000*
b.	Products - Completed Operations Aggregate	*$ 1,000,000*
c.	Personal and Advertising Injury	*$ 1,000,000*
d.	Each Occurrence (Bodily Injury and Property Damage)	*$ 1,000,000*
e.	Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages where applicable.	
f.	Excess or Umbrella Liability	
	1) General Aggregate	*$ 5,000,000*
	2) Each Occurrence	*$ 5,000,000*

3. Automobile Liability under paragraph 5.04.A.6 of the General Conditions:

a. Bodily Injury:
   Each Person *$1,000,000*
   Each Accident *$1,000,000*
b. Property Damage:
   Each Accident *$1,000,000*
c. Combined Single Limit of *$ 1,000,000*

4. The Contractual Liability coverage required by paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:

a. Bodily Injury:
   Each Person *$2,000,000*
   Each Accident *$2,000,000*
b. Property Damage:
   Each Accident *$2,000,000*
   Annual Aggregate *$2,000,000*

SC-6.05.C. Amend the paragraph by making two subparagraphs under the title C. Engineer's Evaluation. The paragraph text is retitled, 6.05.C.2 After Effective Date of Agreement. A new paragraph is added before this paragraph to read as follows:

1. During Bidding. The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, or "or-equal" materials and equipment as defined in paragraph 6.05 of the General Conditions, or those substitute or materials and equipment approved by the Engineer and identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function, and quality to be met by any proposed substitute or "or-equal" item. Request for Engineer's clarification of materials and equipment considered "or-equal" prior to the Effective Date of the Agreement must be received by the Engineer at least 5 days prior to the date for receipt of Bids. No item of material or equipment will be considered by Engineer as a substitute unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids. Each request shall conform to the requirements of paragraph 6.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon the Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any proposed substitute item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

SC-6.06. Add new paragraph immediately after Paragraph 6.06G:

H. The Contractor shall not award work valued at more than fifty (50%) percent of the Contract Price to Subcontractor(s), without prior written approval of the Owner.

SC-9.03.A. Add the following language at the end of paragraph 9.03.A:

The Owner will provide Resident Project Representative services for this project.

SC-12.03.E. Add the following new paragraph immediately after paragraph 12.03 E:

When establishing the contract time, an allowance will be made for four (4) calendar days of work lost per month due to inclement weather conditions. The Contractor, at the time of each periodic pay request, shall submit to the Engineer and Owner for approval a list of all working days lost due to either inclement weather or site conditions caused by inclement weather for the period. Accompanying his list should be a summary of the specific conditions which caused the loss. This request will be reviewed by the Engineer in light of observations made by the Engineer and resident inspector. Approval of the periodic payment estimate by the Engineer, Owner, and Agency will also include approval of the weather delay request. After substantial completion, and not until then, a change order must be executed if a time extension for weather related delays is requested by the Contractor. The time extension must be based solely on the time requested within the periodic payment estimates. Subtracted from this time will be the four (4) days per month allowance assumed in the contract. There cannot be a decrease in contract length if the allowance for inclement weather exceeds the actual number of days lost due to inclement weather. To convert working days into calendar days, multiply the working days by seven (7) and divide by the number of working days in a typical work week.

SC-14.02.C.1. Delete Paragraph 14.02.C.1 in its entirety and insert the following in its place:

A. The Application for Payment with Engineer's recommendations will be presented to the Owner for consideration. If both the Owner find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 14.02.D will become due thirty days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC-17.05. The Code of Virginia (Virginia Public Procurement Act) requires all public bodies to include in every contract of more than $10,000 the following two provisions: Section 2.2-4311, Employment discrimination by contractor prohibited; required contract provisions, and Section 2.2-4312, Drug-free workplace to be maintained by contractor; required contract provisions. The entire text of these two sections must be incorporated into SC -17.05.A. The sections are as follows:

A. §2.2-4311 Employment discrimination by contractor prohibited; required contract provisions.

1. During the performance of this contract, the contractor agrees as follows:

   a. The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

   b. The contractor, in all solicitations or advertisements for employees placed by or on behalf of the contractor, will state that such contractor is an equal opportunity employer.

   c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

2. The contractor will include the provisions of the foregoing paragraphs a, b and c in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

B. §2.2-4312 Drug-free workplace to be maintained by contractor; required contract provisions.

All public bodies shall include in every contract over $10,000 the following provisions: During the performance of this contract, the contractor agrees to (i) provide a drug-free workplace for the contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the contractor that the contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

SC-18.08. Delete paragraph 18.08.A in its entirety and insert the following in its place:

A. Where this Contract exceeds $100,000 Contractor shall comply with all applicable standards, orders, or requirements issued under Section 306 of the Clean Air Act (42 USC §1857(h)*)*, Section 508 of the Clean Water Act (33 U.S.C.§1368), executive order 11738, and Environmental Protection Agency regulations (40 CFR Part 15).

END OF SECTION

SECTION 01010
SUMMARY OF THE WORK

PART 1 – GENERAL

1.01 PROJECT/WORK IDENTIFICATION

A. General: Project name is: North Spur Pump Station, Forcemain and Watermain Extension, Accomack County, Virginia, as shown on Contract Documents prepared by Bowman Consulting Group, Ltd. Drawings and specifications are dated November 30, 2018.

B. Summary of Work by Reference: Work of the Contract (as well as the bidding requirements) can be generally summarized by reference to the Table of Contents contained in the Project Manual. The Work of the Contract includes, but is not necessarily limited to, the following Contract Documents:
   1. Contractual Legal Requirements.
   2. Drawings as listed in the Schedule of Drawings.
   3. Technical Specifications.

C. Addenda and Modifications: The Work of the Contract also includes addenda and modifications to the Contract Documents issued subsequent to the initial printing of the Contract Documents and include, but are not necessarily limited to, printed matter referenced by any of these.

D. Abbreviated Written Summary: Briefly, and without force and effect upon Contract Documents, the work of Contract can be summarized as follows:
   1. A new North Spur Pump Station will be constructed to serve northern Accomack County. A wet well will contain two submersible non-clog pumps. The pumps will act in lead and lag mode. The North Spur Pump Station will include wet well, submersible pumps, pump controls, and stand by power. The Forcemain will discharge to the influent manhole near Regional Pump Station.
   2. A portion of the watermain, currently looped around the Shore Memorial Hospital, will be extended in order to provide water supply to the North Spur commercial area.

1.02 DRAWINGS

The general character and scope of the work is illustrated by the drawings listed at the end of this section. Any additional detail drawings and other information deemed necessary by the Engineer will be furnished to the Contractor when required.

DRAWING NO.	DRAWING TITLE
1	Cover Sheet
2	Erosion & Sediment Control Notes
3	Erosion & Sediment Control Details
4	Pump Station Site Plan
5	Pump Station Plan & Section
6	Pump Station Details - 1
7	Pump Station Details - 2

8	Forcemain Plan & Profile – STA. 10+00 To 24+00
9	Forcemain Plan & Profile – STA. 24+00 To 38+00
10	Forcemain Plan & Profile – STA. 38+00 To 45+76
11	Waterline Plan & Profile – STA. 10+00 To 25+00
12	Waterline Plan & Profile – STA. 25+00 To 33+50
13	Waterline Plan & Profile – STA. 33+50 To 48+50
14	Waterline Plan & Profile – STA. 48+50 To 62+81
15	Electrical One-Line Diagram & Symbol
16	Electrical Details -1
17	Electrical Comm. Diagrams
18	Electrical Details - 2
19	Electrical Schedules
20	Electrical Site Plan

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION (not applicable)

END OF SECTION

SECTION 01300
SHOP DRAWING AND PRODUCT DATA SUBMITTALS

PART 1 - GENERAL

1.01 SUMMARY

This section specifies the requirements for submittal of shop drawings and catalog data.

1.02 REQUIREMENTS

A. Shop Drawings and Product Data: Submit six (6) copies of all shop drawings and product data to Engineer for approval by Accomack County and Engineer. Four (4) copies will be returned to contractors.

1. Shop Fabrication Drawings shall be provided the following:
    a. Wet wells and valve vaults
    b. Identifying devices
    c. Control panels
    d. Generator installation
2. Product data shall be submitted for all material and equipment.
3. Control panel submittals shall include product data for all components, panel layout drawings, formal ladder control drawings, and sequences of operation. Final submittals shall be three complete laminated and individually bound As-Built sets including Bills of Material, schematic drawings, ladder control drawings, shop drawings and sequences of operation for each controller. All submittal drawings shall be done using AutoCAD or equal and electronic AutoCAD DWG files shall be delivered for all controller drawings.

B. Manufacturer's Shop Test: The Contractor shall provide the Engineer with manufacturer's certificates that the following equipment has be shop tested and operates within the requirements specified herein:

1. Pumps
2. Pump Control Panels
3. Flow Meters and Instrumentation
4. Generator Set
5. Process Equipment

PART 2 – PRODUCTS - Not Used

PART 3 – EXECUTION - Not Used

END OF SECTION

SECTION 01640
TRAINING

PART 1 GENERAL

1.01 SUMMARY

This section includes requirements for training the Owner's operations personnel on the proper care, maintenance and operation of the equipment.

1.02 REQUIREMENTS

A. Provide the services of qualified factory trained representatives of the equipment manufacturers for all equipment furnished under this Contract, who shall provide operations and maintenance training.

B. Training shall be complete after Reliability/Demonstration Testing and after field testing and start up. Training shall not be conducted earlier than sixty (60) days prior to Substantial Completion. Training shall not be conducted on the same day as field testing and start-up services.

C. Operations and Maintenance manuals are required to be approved prior to beginning training.

1.03 SUBMITTALS

A. The contractor shall submit the following items:
   1. Instructor Qualifications
   2. Training Aids

1.04 TRAINING

A. The training shall consist of field instruction. Field instruction is the Owner's preference and is to be "hands on type training" conducted at the equipment installations. Field testing shall identify the location and proper use and function of any valves, pushbuttons, control panels, switches, and other similar equipment required for operation. Field training shall also identify the location and proper use and function of any maintenance equipment such as grease fittings, oilers, isolation valves, safety lockout switches, and other equipment.

B. All field training shall take place at the project site.

C. Training sessions shall be grouped and conducted between the hours of 9:00 a.m. and 12:00 p.m. or 1:00 p.m. and 4:00 p.m.

D. For each piece of equipment, up to two (2) training sessions shall be conducted for up to 8 people per session for a time period as specified as appropriate for each equipment/system.

E. Schedule training sessions with the Owner and the Engineer, providing a minimum of fourteen (14) days prior notice of training, subject to the approval of the Engineer and the Owner.

F. Videotaping
   1. The Owner reserves the right to videotape all manufacturers' training.
   2. The manufacturer may offer prerecorded videotapes covering the equipment supplied. If prerecorded videotapes are provided, the Owner shall have the right to permanent ownership and use of at least two copies.

G. Training shall include specific information about each item of equipment or equipment

system, and cover the following topics:

1. Equipment Description
    a. Purpose and function of equipment and auxiliary equipment and systems.
    b. Physical arrangement of equipment components and electrical supply.
    c. General function of controls, including automatic and manual operation, interlocks, and shutdowns.
2. Equipment Operation
    a. Operating requirements for equipment to perform satisfactorily.
    b. Typical operating characteristics.
    c. Start-up and shut down procedures.
    d. Use of controls.
3. Equipment Monitoring
    a. Recommend routine instrument readings and operational checking.
    b. Early warning signs of developing operational or equipment problems.
4. Equipment Operational Troubleshooting Procedures
5. Safety and Housekeeping
    a. Safety features of the equipment.
    b. Safe work practices.
    c. Housekeeping practices.
6. Description of the use of the manufacturer's Operations and Maintenance Manual in regards to operation.
7. Preventative Maintenance Requirements
    a. Maintenance needs for equipment.
    b. Identification of procedure to satisfy maintenance need (relate to equipment manufacturer's O&M Manual, which should have detailed descriptions of maintenance procedures).
    c. Outline or summarize procedures.
    d. Recommended schedule for performing preventative maintenance.
    e. Provide preventative maintenance record forms.
8. Maintenance Inspection Program
    a. Parts, components, and areas of equipment to inspect for routine preventative maintenance.
    b. Recommend frequency of inspection.
    c. Inspection procedures.
    d. Problem identification
9. Maintenance Troubleshooting
    a. Sections in O&M Manual detailing troubleshooting procedures.
    b. Summarize troubleshooting procedures.
    c. Testing equipment used in troubleshooting
        i. Demonstration use of specialized testing equipment if supplied with equipment.
        ii. Other testing equipment
    d. Tests used to verify troubleshooting findings.
10. Disassembly and Assembly
    a. Summarize disassembly and assembly procedures.
    b. O&M Manual coverage of subject.
    c. Testing to verify success of corrective maintenance.

11. Equipment Calibration
    a. Calibration needs and tolerances.
    b. Calibration equipment.
    c. O&M manual listing of calibration ranges, tolerances and settings.

H. Training Aids: Training aids shall be provided by the Contractor as required as an integral part of the training program.
    1. Training aids shall include text and/or pictorial handouts specific to the equipment supplied.
        a. Handouts shall be legible and printed on good quality stock.
        b. Sufficient quantity of handouts for each attendee shall be provided by the Contractor.
    2. Additional training aids specific to the facility/system shall be used for maximum training effectiveness and shall include the following as appropriate:
        a. Audio visual aids, for example: films, videotapes, slides, overhead transparencies, posters, blueprints, diagrams and catalogue sheets.
        b. Models and samples, for example: cutaways, spare parts, tools, miniature models, equipment assembles, and damaged parts.
        c. Training equipment (laptops, projectors, screens, etc.) shall be provided by the Contractor.

I. Qualifications
    1. Submit documentation showing the qualifications of the proposed training specialists (instructor) for approval by the Engineer no less than 60 days prior to the date of the proposed training. Documentation shall include the following:
        a. Experience of the training specialists in operation and maintenance of the equipment.
        b. A Statement of Instructor Qualifications
        c. References for previous training on the equipment, including project names, contact names, and phone numbers.
    2. The training specialist must be knowledgeable of the equipment's application specific to this project.
    3. Only those training specialists whose qualifications have been approved by the Owner shall conduct training.

J. Coordinate training services with the Owner, the Engineer, and the Manufacturer.

K. The contractor shall coordinate and verify to ensure prior to the scheduled training times:
    1. That all associated construction required to operate the equipment in all normal and anticipated operating modes is complete and that the equipment is ready to be used for training purposes.
    2. That the equipment area is well lit and unobstructed so that all training class attendees may access, view, and hear the training.
    3. That the equipment area is free of construction activities that could present a hazard to training class participants.

PART 2 – PRODUCTS - Not Used

PART 3 – EXECUTION - Not Used

END OF SECTION

SECTION 01650
FIELD TESTING AND STARTUP

PART 1 GENERAL

1.01 SUMMARY

This section specifies the requirements for field testing and startup activities that shall comprise a phased approach for accomplishing equipment and systems checkout, verification of operation and reliability/demonstration testing as described herein.

1.02 REQUIREMENTS

A. Provide the services of qualified factory trained representatives of the equipment manufacturers for all equipment furnished under this Contract, who shall provide the following services:
   1. Supervise and assist in the installation of the equipment to ensure proper installation.
   2. Check the installation of the equipment and make all necessary adjustments prior to testing.
   3. Supervise the equipment and system field tests and startup as described herein.
   4. Provide additional manufacturer services as specified in each relevant equipment and system specification section in addition to the services specified herein.

B. Provide field testing and start up services in compliance with the specified requirements.

C. Field testing, startup and Reliability/Demonstration testing are prerequisites to Substantial Completion and, therefore, shall be completed within the time specified for Substantial Completion.

D. Training as specified in Section 01640 shall be completed after completion of the reliability/demonstration test.

E. Field Testing and Startup services shall not be conducted on the same day as training as specified in Section 01640.

F. The Contractor shall include sufficient time in the construction schedule to complete all equipment and system testing, troubleshooting, corrections, startup activities, and reliability/demonstration testing as specified. The Owner's personnel will witness all field testing and startup activities.

G. Contractor shall provide a commissioning test plan for all control panel I/Os two weeks before start-up.

1.03 SUBMITTALS

A. Equipment Checkout Report
B. Test Schedule
C. Test Plans
D. Test Reports

1.04 STARTUP SERVICES

A. Beginning of Startup: Equipment startup and initial operating period shall begin after satisfactory completion and acceptance of the preliminary and final equipment and preliminary system field tests.

B. Completion of startup: Equipment startup and initial operating period shall be complete when the manufacturer and Engineer have mutually agreed that the equipment is in suitable condition for continuous operation.

1.05 PRELIMINARY CHECKS

A. The following operations shall be conducted in the presence of the field inspectors, as a prerequisite for the field tests:
   1. Set, align and assemble all equipment and systems in conformance with the manufacturer's drawings and instructions.
   2. Check direct coupled shafts with flexible or rigid couplings for parallel and angular misalignment.
   3. Check equipment for proper rotation.
   4. Check motors for no-load current draw.
   5. Run the equipment dry if applicable and check equipment for excessive vibration and noise.

B. Equipment Checkout Report (refer to Attachment 01650 of this section)

   1. When the checkout operations have been completed, submit a signed Equipment Checkout Report with all pertinent data from the preliminary checks.
   2. An Equipment Checkout Report shall not be valid if not initiated by the Owner or Owner's representative.
   3. Field Tests shall not be initiated until a valid Equipment Checkout Report has been provided for the equipment to be tested.

1.06 FIELD TESTS OF EQUIPMENT AND SYSTEMS

A. Provide the services of an experienced and authorized representative of the manufacturer of each item of the equipment (excluding minor items of equipment specifically exempted by the Engineer in writing), who shall visit the site and inspect, check, adjust if necessary, and approve the equipment installation. The representative shall revisit the job site as often as necessary until the equipment installation and operation are as specified in the Contract Documents and are satisfactory to the Owner.

B. Each representative shall conduct tests as required on the equipment and furnish to the Owner a written report, certifying that the equipment has been properly installed, lubricated, is in accurate alignment and has been tested, operated satisfactorily under full-load conditions and is ready for operation.

C. Scope of System Testing: System testing shall be required to demonstrate that an equipment item along with interconnections and accessories performs as specified. In addition to specific requirements called for in the specific sections of the Contract Specifications, the following shall be considered a part of preliminary, final and intersystem test procedures:
   1. Variable capacity equipment shall be operated over the full capacity range and at a minimum of three intermediate points for at least thirty (30) minutes at each point.
   2. Multiple equipment groupings shall be operated both singly and together up to the design capacity of the system.
   3. Manifold and cross-connected groups of units shall be operated using all connecting combinations.
   4. All equipment items, including standby units shall be tested. It may be necessary

to repeat system tests at design conditions to ensure that standby units are included in system tests.

5. Each operating unit shall be run for at least one (1) hour alone (equipment field test) and four (4) hours as a system at design capacity after reaching stable operating conditions.
6. All equipment, interconnections, and accessories shall be checked to verify condition and specified performance capability. Instrumentation and controls shall be tested as part of the equipment to which they are connected.

D. Field Tests
1. Field tests of equipment shall prove that equipment and appurtenances meet their operating cycles and are free from defects such as overheating, overloading, and undue vibration.
2. Preliminary Field Tests shall be made with clean water, where practical, and air in lieu of medium (wastewater) for which the equipment and systems are designed.
3. Final Field Tests shall utilize the medium (wastewater) for which the equipment and systems are designed.

E. Successful Tests: For successful test of an equipment component or system, the equipment component or system shall operate trouble free for a continuous period of time as specified. If there are any interruptions in operation during the test, the test shall be repeated until the equipment or system operates trouble free for the specified time period.

F. Test Failure
1. Correction of Defects and Repetition of the Tests: Any defects in the equipment, or failure to meet the guarantees or performance requirements of the specifications shall be promptly corrected by the Contractor. The test shall be repeated as directed at no additional cost to the Owner.
2. Rejection of Equipment: If the Contractor fails to make the required corrections, or if the corrected equipment fails again to meet the guarantees or specified requirements, the Owner, notwithstanding having made partial payment for work and materials of the equipment, may reject the equipment and the Contractor shall remove it from the premises at the Contractor's expense.

G. Contractor's and Equipment Representative's Responsibilities
1. Contractor:
    a. Prepare submittals as specified.
    b. Coordinate and schedule with manufacturers to ensure presence of a qualified equipment representative during testing.
    c. Assist in start up and testing activities as necessary.
    d. Provide power, water, fuel, personnel, chemicals, lubricants, and other process materials and equipment required for specified testing.
    e. Coordinate and schedule testing with the Owner. Site visits shall be coordinated with the Owner to allow the Owner's personnel to accompany the representatives during the site visits.
2. Equipment Manufacturer's Representative
    a. Supervise field tests of equipment components and systems under provision of the individual specification section.
    b. Inspect equipment on site and complete and submit and Equipment Checkout Record for each type/style or differing model of equipment provided for the project.

H. Contractor's Liabilities: Contractor shall be liable for, and shall neither have nor make any claim for:
   1. Accidents occurring to Owners, Engineers and manufacturer's personnel during the field tests.
   2. Improper operation of equipment during tests and instruction periods.
   3. Any damage which may occur to equipment prior to the time when the Owner assumes responsibility of the operation (normally at Substantial Completion).

I. Test Schedule
   1. Perform all testing during regular weekday (daytime) working hours (Monday through Friday) between the hours of 8:00 a.m. and 4:00 p.m.
   2. Submit two (2) copies of the test schedule no later than thirty (30) days before commencement of the first tests.
   3. Content of test schedule:
      a. Proposed test dates
      b. Preliminary or final field test, equipment, or system being tested, reliability demonstration test.
      c. Specification references
      d. Equipment identification numbers.

J. Field Test Reports: Prepared test report forms will be used for the field tests. These forms shall be used by the Contractor for data recording and notes during the tests. When the tests have been completed and accepted by the Engineer, the Contractor shall sign the Test Report, and the witnessing Engineer will initial the report.

K. The Contractor shall be responsible for all costs in connection with field testing of equipment and systems, such as electrical power, water, lubricants, instruments, chemicals, labor, equipment, disposal of fluids and waste, etc.

PART 2 – PRODUCTS – (Not Used)

PART 3 – EXECUTION

3.01 EXAMINATION AND VERIFICATION OF CONDITION

A. The Contractor shall inspect systems and equipment for readiness prior to testing and startup. Hazardous conditions shall be corrected by the Contractor prior to proceeding.
   1. Testing and startup shall not proceed using temporary power or temporary instrumentation and control wiring.
   2. All electrical and control connections shall be permanent and complete, and all such electrical components and equipment fully functional.
   3. Clearly identify all electrical equipment which is energized during testing.

3.02 PREPARATION

A. Prior to testing of equipment or systems verify that all necessary test equipment is in place and operable.

B. The Contractor shall notify the Owner of any startup activities a minimum of 72 hours before the scheduled startup. Notification shall be made during normal working hours.

C. Contractor shall not proceed with any testing until the Test Plan has been approved as specified.

3.03 CONDUCT

A. All tests and startup shall be performed in the presence of a manufacturer's representative, who shall be present for the entire duration of the test.

B. The Contractor is responsible for the performance and operation of the equipment and systems during testing and startup.

C. Any failures of equipment or systems operated under the direction of the Contractor shall be considered deficiencies and shall be corrected.

D. The Contractor shall repair, replace or modify any equipment or system which fails to perform as specified.

E. The Contractor shall make all adjustments and corrections necessary to achieve normal, stable operation or the systems.

F. Any failure of a system or equipment previously started prior to the date of Final Completion shall require additional testing and startup service to be performed, under the direction of the equipment manufacturer's representative.

3.04 PRELIMINARY FIELD TESTS

A. Preliminary Field Tests of Equipment: A successful test shall consist of at least one (1) continuous hour of trouble free operation, or longer as specified in individual applicable specification sections. Final Field Test shall not commence until the completion of successful Preliminary Field Tests.

B. Preliminary Field Tests of Systems:

1. Test all systems by operation the system equipment together as a unity with al related piping, valves, electrical controls and mechanical operations.

2. For a successful test, run each system trouble free for four (4) continuous hours or as specified in individual applicable specification sections.

3.05 FINAL FIELD TESTS

A. Final Field Tests of Equipment: A successful test shall consist of at least one (1) continuous hour of trouble free operation, or longer a specified in individual applicable specification sections.

B. Final Field Tests of Systems:

1. Final field tests shall not commence until completion of successful Preliminary Field Tests.

2. Test all systems by operating the equipment as a unit with all related piping, valves, electrical controls, instrumentation and mechanical operation.

3. For a successful test, run each system trouble free for four (4) continuous hours or as specified in individual applicable specification sections.

3.06 INTERSYSTEM TEST

A. The Intersystem Test shall not commence until completion of successful Final Field Tests.

B. Test the complete system by operation all of the equipment and systems as a unit with all related piping, valves, ducting, electrical controls, instrumentation, and mechanical operation. The tests shall prove the systems, equipment and appurtenances are properly installed, free from defects, meet their operating cycles and characteristics as specified.

C. For a successful test, run the complete system trouble free for eight (8) continuous hours.

3.07 RELIABILITY/DEMONSTRATION TEST

A. Following completion of a successful Intersystem Test, the Contractor shall conduct a Reliability Demonstration Test for the Facility.

B. The five-day reliability test shall not be scheduled to take place during any of the manufacturers representatives training efforts.

C. Any Contractor-installed and operated temporary or by-pass operations shall remain available for the duration of the five-day reliability test.

D. The test shall be conducted as specified to run the facility in a continuous operational mode for 24 hours per day. The test shall be performed to verify that all pieces of equipment, electrical and control systems, and other components are operating as specified at normal operating conditions. Major pieces of equipment shall include: pumps, flow meter, check valves, generator, Automatic Transfer Switch, control system.

E. The Contractor shall continuously operate the facility as designed for a period of five (5) calendar days, without shutdowns, delays nor work-arounds in place, in order to demonstrate satisfactory operation of the facility as a whole to the Owner.

F. The Contractor shall provide personnel to operate the facility for the entire duration of the Reliability/Demonstration Test and any required re-tests. The Contractor shall be responsible for responding to any alarm conditions that may occur during the normal business and non-business hours (24 hours per day). Minor adjustments of control settings within the normal operating parameters are allowed as long as the pumping station remains operational and no un-planned alarm signals are generated.

G. The Contractor shall replace any equipment, parts, fuel, or materials that are damaged or consumed during the testing.

H. A successful Reliability/Demonstration Test is a prerequisite of Substantial Completion.

I. Test Failure

The following (at a minimum) shall be considered conditions for a failed test:

1. Failure of any major piece of equipment or system.
2. Leaks of any kind including leaks from any pipes, equipment, or structures.
3. Failure of any equipment or system including controls such that the facility cannot continue to operate safely and perform as intended within the design requirements.

J. Re-Test

1. If the Reliability/Demonstration Test fails for any reason, the Contractor shall conduct a re-test.
2. Prior to scheduling a re-test the Contractor shall provide, if required, a written description of the failed test including:
    a. A description of the cause or causes of the failed test.
    b. A description of any damage caused by the failure of the test.
    c. Any repairs to the facility that are required because of the failed test.
    d. Any changes to the facility that are required in order to obtain a successful test.
3. Upon approval by the Owner, the Contractor shall make all required repairs or changes to the facility prior to the re-test.

END OF SECTION

SECTION 01700
PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 specification sections apply to work of this section.

1.02 DESCRIPTION OF REQUIREMENTS

A. Definitions:

1. The term Owner has been used to describe Accomack County.
2. Accomack County shall also be the agency which will own and operate the wastewater treatment system once it is completely installed.
3. Project closeout is the term used to describe collective project requirements, indicating completion of the Work that are to be fulfilled near the end of the Contract time in preparation for final acceptance and occupancy of the Work by the Owner, as well as final payment to the Contractor and the normal termination of the Contract with the Owner.
    a. Specific requirements for individual units of work are included in the appropriate sections in Divisions 2 through 16.
    b. Time of closeout is directly related to "Substantial Completion"; therefore, the time of closeout may be either a single time period for the entire Work or a series of time periods for individual elements of the Work that have been certified as substantially complete at different dates. This time variation, if any, shall be applicable to the other provisions of this section.

1.03 PREREQUISITES TO SUBSTANTIAL COMPLETION AND OWNERS INITIAL ACCEPTANCE OF THE WORK

A. General: Prior to requesting Engineer's inspection for certification of substantial completion (for either entire work or portions thereof), complete the following steps and list all known exceptions in the request:

1. The Contractor shall conduct his own thorough inspection and shall prepare a detailed, itemized punch list which shall be termed the "Pre-Final Punch List". The Contractor shall correct the work on this punch list. The corrected work shall include all items necessary for the safe, efficient, and reliable operation and security of the facility.
2. When all work is complete (less any items, which must be delayed for a reasonable cause) the Contractor shall notify the Engineer in writing that the Work is complete. This notice shall be accompanied by the itemized Pre-Final Punch List as outlined in the above paragraph which lists all work remaining incomplete. Unless agreed otherwise by the Engineer, this Pre-Final Punch List shall refer specifically to individual items of work and shall not be general or collective in nature.
3. Advise Engineer of pending insurance changeover requirements including proof of extended coverage as required.

4. Obtain and submit releases enabling the Owner's full and unrestricted use of the work and access to services and utilities, including (where required) occupancy permits, operating certificates, and similar releases.
5. Complete final cleaning up requirements.
6. Touch-up and otherwise repair and restore marred exposed finishes including paint finishes.
7. Vendor O&M Manuals shall be submitted 30 days prior to substantial completion.
8. Vendors shall conduct site inspections and certify that each major equipment item is properly installed and ready to run. Vendors shall provide password codes to all devices with event or data logging and recording capabilities.
9. Vendor and Contractor shall carry out performance testing of major equipment, witnessed by Engineer and Owner staff, to confirm equipment operates as designed.
10. Contractor shall carry out reliability testing (5 continuous days without operational problems, including simulated emergency alarm conditions).
11. Vendor shall provide, following start-up and testing, one (1) separate day of training on major equipment.
12. Deliver tools, spare parts, extra stocks of materials, and similar physical items to the Owner.
13. Maintenance Manuals: Organize maintenance and operating manual information into suitable sets of manageable size, and bind into individual binders properly identified and indexed (thumb-tabbed). Include emergency instructions, spare parts listing, copies of warranties, wiring diagrams, recommended "turn-around" cycles, inspection procedures, shop drawings, product data, and similar applicable information. Operation and Maintenance manuals must be marked specifically to show the equipment supplied. General website literature will not be accepted. Bind each manual of each set in a heavy-duty 3-ring vinyl-covered binder, and include pocket folders for folded sheet information. Mark identification on both front and spine of each binder. Provide four (4) copies of the maintenance manuals (both paper and electronic) to the Engineer for transfer to the owner. Engineer shall submit to the Owner three hard copies of the manual for review at least 30 days prior to start up.
14. General Operating and Maintenance Instructions: Arrange for each installer of operating equipment and other work that requires regular or continuing maintenance, to meet at the site with the Owner's personnel to provide necessary basic instruction in the proper operation and maintenance of the entire Work. Where installers are not experienced in the required procedures, include instruction by the manufacturer's representatives. A trained manufacturer's representative shall provide training at a time suitable to the Owner.
    a. As part of this instruction provide a detailed review of the following items:
        i. Maintenance manuals
        ii. Record documents
        iii. Spare parts and materials
        iv. Tools
        v. Lubricants
        vi. Fuels
        vii. Identifications systems

viii. Control sequences
ix. Hazards
x. Cleaning
xi. Warranties, bonds, maintenance agreements and similar continuing commitments.

b. As part of this instruction for operating equipment demonstrate the following procedures:
i. Start-up
ii. Shut-down
iii. Emergency operations
iv. Noise and vibration adjustments
v. Safety procedures
vi. Economy and efficiency adjustments
vii. Effective energy utilization

B. Inspection Procedures: Upon receipt of Contractor's written notice of substantial completion of the work or designated portion thereof, along with the attached Pre-Final Punch List outlining work not yet complete, the Engineer will schedule an inspection to be conducted jointly with the Owner, the Contractor, and the Engineer.

1. If any additional items of work requiring correction are observed during this inspection, these items shall be added to the Pre-Final Punch List which shall then become the Final Punch List.
2. If the Owner and Engineer determine that any item on the Final Punch List must be completed prior to the work being accepted as substantially complete, the Contractor will be promptly notified.
3. When the Engineer determines that the work is substantially complete, the Engineer will then prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion and which shall outline the responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, and insurance requirements and shall establish the time frame within which the Contractor shall complete the items as listed on the Final Punch List to be attached thereto.
4. Make change over of locks and transmit keys to the Owner and advise the Owner's personnel of change over.

1.04 PREREQUISITES TO FINAL COMPLETION AND OWNERS FINAL ACCEPTANCE OF THE WORK

A. General: Prior to requesting Engineer's inspection for certification of final acceptance and final payment the following shall be completed:

1. Submit specific warranties, workmanship and maintenance bonds, maintenance agreements, final certifications, and similar documents.
2. Make final changeover of all locks that were not changed over at the time of substantial completion and transmit keys to Owner, and advise Owner's personnel of changeover in security provisions. All doors shall be keyed alike to that specified by the Owner.
3. Submit record drawings, final project photographs, damage or settlement survey, property survey, and similar final record information. The Contractor shall provide to the Owner in labeled electronic files digital photographs of aspects of the project that deserve documentation, such as items hidden in walls and underground, of sufficient quality to enlarge up to 8" x 10".

4. Submit all final releases including the affidavit of waiver of liens and consent and acknowledgment of surety.
5. Submit final application for payment accounting for all previously established changes to the Contract Sum.
6. Submit a written notification certifying that all work is complete in accordance with the Contract Documents and request that a final inspection be scheduled. This notice shall be accompanied by a copy of the Final Punch List of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved and accepted by the Owner.

B. Final Inspection Procedure: Upon receipt of the Contractor's written notice certifying that all work is completed along with the copy of their Final Punch List stating that each item of punch list work has been completed or otherwise resolved, the Engineer will schedule a final inspection to be held jointly with the Owner, the Contractor, and the Engineer.
1. If the Owner and Engineer determine that any items on the Final Punch List are not complete, the inspection may be terminated at that point and the above outlined procedures will be repeated.
2. If any additional items or work are noted during the Final Inspection which were not previously listed on the Final Punch List these items will not be added to the Final Punch List but will be listed as separate items to be corrected by the Contractor.
3. If the work is complete the Engineer will recommend to the Owner that the work be accepted.

1.05 RECORD DOCUMENT SUBMITTALS

A. Record Drawings: A complete set of record drawings shall be provided to the Engineer for approval at project completion.

B. Record Specifications: Maintain one copy of specifications, including addenda, change orders and similar modifications issued in printed form during construction, and mark-up variations in actual work in comparison with text of specifications and modifications as issued. Give particular attention to substitutions, selection of options, and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date. Note related record drawing information and product data, where applicable. Upon completion of mark-up, submit to Engineer for the owner's records.

C. Miscellaneous Record Submittals: Refer to other sections of these specifications for requirements of miscellaneous record keeping and submittals in connection with actual performance of the work. Prior to final completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to Engineer for the owner's records.

D. The Contractor and Engineer shall create a start-up plan two months prior to start-up to include dry and wet start-up procedures. At a minimum, the provisions for water to be used in testing, who will be on site, when training will occur and what it will entail, how air and materials will be removed from the lines shall be included in the start-up plan.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION

3.01 FINAL CLEANING

A. Cleaning: Final cleaning of the Work shall be performed at the time indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to the condition expected from a normal, commercial building cleaning and maintenance program. Comply with the manufacturer's instruction for cleaning. Complete the following cleaning operations before requesting the Engineer's inspection for certification of substantial completion.

1. Remove labels that are not required as permanent labels.
2. Clean exposed exterior and interim hard-surfaced finishes to a dirt-free condition, free of dust, stain, films and similar noticeable distracting substances. Restore reflective surfaces to their original reflective condition.
3. Wipe surfaces of mechanical and electrical equipment clean. Remove excess lubrication and other substances.
4. Remove debris and surface dust from limited access spaces including roofs, plenums, shafts, trenches, equipment vaults, manholes, and similar spaces.
5. Clean concrete floor to broom clean, dust free condition.
6. Clean light fixtures and lamps so as to function with full efficiency. Re-lamp fixtures that have burned out.
7. Clean project site (yard and grounds), including landscape development areas, of litter and foreign substances. Sweep paved areas to a broom-clean condition; remove stains, petro-chemical spills and other foreign deposits. Rake grounds, which are neither planted nor paved, to a smooth, even-textured surface.
8. Repair, patch and touch-up marred surfaces to match adjacent finishes.
9. Clean ducts and coils of mechanical equipment.

B. Pest Control: Engage an experienced exterminator to make a final inspection of the project, and rid the project of rodents, insects and other pests.

C. Compliances: Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at site, or bury debris or excess materials on Owner's property, or discharge volatile or other harmful or dangerous materials into drainage systems. Remove waste materials from site and dispose of in a lawful manner.

1. Where extra materials of value remaining after completion of associated work have become Owner's property, dispose of these to Owner's best advantage as directed.

END OF SECTION

SECTION 02200
EARTHWORK

PART 1 - GENERAL

1.01 SUMMARY

This section specifies the requirements for the earthwork necessary to complete this project.

1.02 DEFINITIONS

A. Backfill: Soil materials used to fill an excavation.

Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.

Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Layer placed between the subbase course and asphalt paving.

C. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.

E. Porous Fill Layer: Layer supporting slab-on-grade used to minimize capillary flow of pore water.

F. Additional Excavation: Removal of material encountered above subgrade elevations.

Additional Excavation: Excavation below subgrade elevations as directed by Engineer.

Bulk Excavation: Excavations more than 10 feet in width and pits more than 30 feet in either length or width.

Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Structures: Slabs, tanks, curbs, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Layer placed between the subgrade and base course for asphalt paving, or layer placed between the subgrade and a concrete pavement or walk.

J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

K. Utilities include on-site underground pipes, conduits, ducts, and cables.

1.03 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated. Notify Engineer not less than two days in advance of proposed utility interruptions. Contact utility-locator service for area where Project is located before excavating.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, and SP.

B. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.

C. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, and natural or crushed sand.

D. Backfill and Fill Materials: Satisfactory soil materials free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter. The moisture content of fill soils shall be maintained within ±2 percentage points of optimum moisture content determined from the Procter density test. Clayey soils acceptable to the Engineer may be used for backfill and fill material subject to approved placement and compaction.

PART 3 - EXECUTION

3.01 EXCAVATION

A. Excavation Classifications: The following classifications of excavation will be made when rock is encountered:

1. Earth Excavation includes excavation of pavements and other obstructions visible on surface; underground structures, utilities, and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation.

B. Blasting

1. Blasting, where required, shall be done with care in accordance with all applicable Federal, State and local laws, ordinances and regulations, and shall not be done within a distance of 25 feet from a previously laid pipe line or a previously installed structure if, in the opinion of the Authority, the safety or soundness of existing facilities is in any manner endangered.
2. Blasting shall not be permitted within 100 feet of the Plains of Raspberry WRF.

3.02 STABILITY OF EXCAVATIONS

A. Local codes, ordinances, and requirements of agencies having jurisdiction shall be complied with.

B. Sides of excavations shall be sloped to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

C. Materials for shoring and bracing shall be provided, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Shoring and bracing in excavations shall be maintained regardless of time period excavations will be open. Shoring and bracing shall be extended as excavation progresses.

3.03 DEWATERING

A. Surface waters and subsurface or groundwater shall be prevented from flowing into excavations and from project site and surrounding area.

B. Water shall not be allowed to accumulate in excavations. Pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations shall be provided and maintained.

C. Temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to areas shall be established and maintained. Trench excavations shall not be used as temporary drainage ditches.

3.04 STORAGE OF EXCAVATED MATERIALS

A. Excavated materials acceptable for backfilling and fill shall be stockpiled where directed.

B. Soil materials shall be located and retained away from edge of excavations.

C. Excess excavated soil material and materials not acceptable for use as backfill or fill shall be disposed of.

3.05 TRENCH EXCAVATION FOR PIPES AND CONDUIT

A. Trenches shall be excavated to uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches of clearance on both sides of pipe or conduit. Trenches shall not be opened for a distance exceeding 300 feet at any time, when located along streets or highways. The width of the trench at any point below the top of the pipe shall not exceed the structural design assumption width. The width of the trench above the top of the pipe may be as wide as necessary for sheeting and bracing and the proper performance of the work.

B. Trenches shall be excavated to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil. Beyond building perimeter, trenches shall be excavated to allow installation of top of pipe below frost line.

C. Pipe Bedding

1. Pipe Installed in Trenches: Pipe to be located at elevations below the existing ground level shall be installed in trenches with Class A, B or C pipe bedding. Granular material under and around the pipe shall be placed in six (6)-inch layers and compacted by rodding, spading or with approved vibratory equipment to obtain not less than 80 percent (80%) relative density as determined by ASTM Method D2049.

2. Pipe Installed in Embankment: Pipe to be located at elevations above the existing ground level shall be installed in trenches excavated after embankment has been constructed and compacted to a minimum 90% relative density to a minimum elevation of one (1) foot above the proposed top of pipe.

3. Pipe Bedding Material: Bedding materials shall be crushed stone or gravel aggregate conforming to VDOT No. 57 stone, or as otherwise specified and shown on the Drawings.

4. Foundation in Poor Soil: Whenever the soil at the trench sub-grade elevation is soft, unstable, or saturated with water, such unsuitable material will be removed and the trench sub-grade stabilized with a granular stabilization material. Maximum size of granular material shall be two (2) inches. Depth of stabilization shall be as required to construct a firm sub-grade for pipe bedding material. Concrete cradle shall be provided when necessary to bridge highly unstable soils.
5. Stones and rocks shall be removed at least 6 inches below the pipe bottom and selected fill bedding provided.

D. Backfill

1. All material used for backfill of trenches shall be free of excessive amounts of deleterious materials such as all organic matter, frozen clods and sticky masses of clay and gumbo which are difficult to properly compact. Backfill to be placed within 12 inches of the installed pipe in any direction shall not contain earth clods or rock material greater than one (1) inch in greatest dimension. Backfill to be placed greater than 12 inches from the top of pipe shall not contain earth clods or rock material greater than four (4) inches in greatest dimension. Material as specified for pipe bedding may be substituted for backfill material defined above from top of pipe bedding to 12 inches above top of pipe.
2. Backfill shall be placed in six (6)-inch layers from top of pipe bedding to a point at least 12 inches above the top of pipe. Above this point, backfill shall be deposited in layers of a thickness that will permit compaction to a density as specified hereinafter.
3. The layers of material shall be compacted to a density of at least 90 percent (90%) of the maximum density as determined by the AASHO Standard Test (AASHO Designation T99) wherever the pipe is installed in open fields or areas which carry no vehicular traffic. The top portion of the backfill areas that are to be re-sodded shall be composed of topsoil at least six (6) inches in depth and corresponding to that of the adjoining sodded areas.
4. The layers of material shall be compacted to a density of at least 95 percent (95%) of the maximum density at optimum moisture content as determined by the AASHO Standard Test (ASSHO Designation T99) under all pavements and for future pavements. Pavement shall not be restored over trenches until the backfill material has been tested and determined as satisfactory according to the tests
5. Remove and dispose of any material not used for backfill.
6. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, the ground surface shall be broken up, pulverized and moisture conditioned to within $\pm$ 3% of optimum moisture content, and compacted to required depth and percentage of maximum density.
7. Backfill materials shall be placed evenly adjacent to piping, or conduit to required elevations. Wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure shall be placed, piping, or conduit shall be prevented.
8. Trenches shall not be backfilled until tests and inspections have been made and backfilling is authorized by Engineer. Care shall be used in backfilling to avoid

damage or displacement of pipe systems.

3.06 COLD WEATHER PROTECTION

Excavation bottoms shall be protected against freezing when atmospheric temperature is less than 35 degrees F.

3.07 PLACEMENT AND COMPACTION

A. Vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials shall be removed from ground surface prior to placement of fills. Sloped surfaces steeper than 1 vertical to 4 horizontal shall be broken up so that fill material will bond with existing surface.

B. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, the ground surface shall be broken up, pulverized and moisture conditioned to within $\pm$ 3% of optimum moisture content, and compacted to required depth and percentage of maximum density.

C. Before compaction, each layer shall be moistened or aerated as necessary to provide optimum moisture content. Each layer shall be compacted to required percentage of maximum dry density or relative dry density for each area classification.

D. Backfill materials shall be placed evenly adjacent to piping, or conduit to required elevations. Wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure shall be placed, piping, or conduit shall be prevented.

E. Where subgrade or layer of soil material must be moisture conditioned before compaction, water to surface of subgrade or layer of soil material shall be uniformly applied.

3.08 GRADING

A. Areas within limits of grading under this section, including adjacent transition areas shall be uniformly graded.

B. Areas to receive topsoil shall be finished to within not more than 0.10 foot above or below required subgrade elevations.

3.09 FIELD QUALITY CONTROL

Field density tests shall be performed by the contractor in accordance with ASTM D 1556 (sand cone method) or ASTM D 2167 (rubber balloon method), as applicable.

3.10 EROSION CONTROL

A. The Contractor shall be responsible for satisfying any and all erosion control and stormwater management requirements for any land disturbing activities, including but not limited to on-site or offsite borrow, on-site or offsite stockpiling or disposal of waste materials. Before undertaking any land management, the Contractor shall contact Accomack County to determine what erosion control and stormwater management measures are necessary. The Contractor shall completely satisfy all requirements of Accomack County before continuing with the concerned activity.

B. Erosion control methods shall be provided in accordance with requirements of authorities having jurisdiction.

3.11 DISPOSAL OF EXCESS AND WASTE MATERIALS

Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash, and debris, and dispose of it off Owner's property.

END OF SECTION

SECTION 02560
PIPING SYSTEMS

PART 1- GENERAL

1.01 SUMMARY

This section specifies the requirements for all piping systems to be installed as part of this project.

1.02 GENERAL REQUIREMENTS

The drawings show the general layout and do not necessarily reflect the exact location of the various items. Accordingly, the Contractor shall not scale the plans, but shall acquaint himself with the extent and character of the work required and its relation to the work under other items. It is the intention of the drawings and specifications to provide complete and workable piping systems; any miscellaneous valves and fittings required for proper completion of the work shall be provided at no additional cost to the Owner.

1.03 SUMMARY OF PIPING SYSTEMS

With the exception of through floor piping, the piping systems shall be as follows:

A. All gravity sewage piping 4" and larger shall be PVC C-900 DR25.
B. All forcemain piping 4" and larger shall be PVC C-900 DR 18.
C. All discharge piping from the wet well to the bypass manhole shall be CL52 DIP lined with Protecto 401.
D. All Water Main piping 8" and larger shall be PVC C-900.
E. All Water Service piping 6" and smaller shall be SCH 80 PVC.
F. All yard piping not specified elsewhere shall be ductile iron.

PART 2- PRODUCTS

2.01 GRAVITY SEWER, FORCEMAIN PIPING AND APPURTENANCES

A. PVC C-900
    1. Shall be DR18 or DR25 conforming to ASTM D1789 as indicated on the plans.
    2. Joints shall be push on type with elastomeric gasket joints.
    3. Fittings shall be mechanical joint class 350 ductile iron fittings conforming to ANSI 21.20, coated to match ductile iron pipe.
B. Ductile Iron
    1. Ductile iron pipe shall conform to American National Standard A21.51 (AWWA C151), latest revision, pressure class 350.
    2. Pipe shall be lined with Protecto 401 in accordance with ANSI A21.4 (AWWA C104), latest revision and a standard bituminous exterior coating.
    3. Joints shall be rubber-gasket joints of the mechanical or push-on type in accordance with ANSI A21.11 (AWWA C111), latest revision. Flanged joints

shall be used above grade and mechanical or push-on joints shall be used below grade.

4. Ductile iron fittings shall conform to ANSI A21.10 (AWWA C110), latest revision.
5. Fittings shall have double thickness lining of Protecto 401 and be seal coated, in accordance with ANSI A21.4-1974 (AWWA C104-74) specifications. The material thickness for sizes required shall be as follows:

Pipe Size	Thickness	Class
4"	.25" BM	51 or 52
6"	.26" BM	50 or 52
8"	.27" BM	50 or 52
12"	.31" BM	50 or 52
16"	.34" BM	50 or 52

C. Sleeve Type Couplings

Mechanical joint cast iron solid sleeves shall be used for below grade coupling.

2.02 WATER MAIN AND SERVICE LINE PIPING AND APPURTENANCES

A. PVC C-900

1. Shall be DR25 conforming to ASTM D1789 as indicated on the plans.
2. Joints shall be push on type with elastomeric gasket joints.
3. Fittings shall be mechanical joint class 350 ductile iron fittings conforming to ANSI 21.20, coated to match ductile iron pipe.

B. SCHEDULE 80 PVC

1. Schedule 80 PVC pipe shall conform to ASTM D1785 and ASTM 1785 and shall be NSF approved for potable water. PVC fittings shall be Schedule 80 PVC in accordance with ASTM 2467. Flanges shall be 2-piece Van Stone style flanges meeting ASTM 2467 and ANSI B16.1. All fittings shall be NSF approved for potable water.

C. Fittings shall be flared.

2.03 VALVES

A. Gate Valves

1. Gate valves shall have a minimum working pressure of 200 psig conforming to AWWA Standard C509, latest revision. The valves shall have non-rising bronze stems, resilient seats, rubber encapsulated iron discs, and O-ring seals. The valves shall open left (counter-clockwise). Provide hand wheels for all building and vault valves and 2-inch operating nuts for underground valves. All buried service valves shall have M.J. ends conforming to ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53. Gate valves shall be Kennedy Kenseal II, M& H, Mueller A-2360, or American Flow Control, or an approved equal. One valve wrench shall be provided for every three valves installed in a project.

2. Valve box tops shall be of cast iron construction, which shall be marked "Sewer." The riser pipe shall be 12-inch cast iron pipe (ASTM A48). The base shall be centered over the valve and shall rest on compacted backfill, which has been tamped around the valve and riser in accordance with Standard W6.0. The top of the base section shall be approximately on line with nut at top of valve stem and the entire assembly shall be plumb. Valve boxes shall be adjusted flush with the finished grade.

B. Check Valves

Check valves 3" and larger shall meet the requirements of AWWA standard C508 and shall be cushioned swing type valves constructed of cast iron or steel body with a stainless steel seat ring, resilient seat, non-corrosive shaft that extends through the body for attaching weight and lever, and completely non-corrosive cushion chamber. Valves shall be flanged with 125# rated flanges. Valves shall be Golden-Anderson or equal. They shall have a pressure rating of 200 psi with class 125 flanges. Non-corrosive swing arm indicators shall be provided for each check valve.

C. Plug Valves

Plug valves shall be cast iron eccentric plug valves as manufactured by Dezurik or approved equal. Plugs shall be of ASTM A126 Class B cast iron in compliance with AWWA C504, Section 2.2. Valves shall have heavy-duty stainless steel bearings, resilient plug facings with neoprene or hycar, and welded-in corrosion resistant nickel seat. Valves shall be capable of handling wastewater.

2.04 RESTRAINED JOINTS

Ductile iron restrained joint retainer glands shall be as manufactured by EBAA Iron Sales, Inc., "Megalug" Series 1100 or approved equal.

2.05 PIPE SUPPORTS

A. Pipe supports shall be provided where shown on the drawings; where specified or indicated; and as required to support the weight of pipe, liquid, and any anticipated thrust. The Contractor shall provide metal pipe hangers, inserts, struts, structural members, brackets, plates, anchors, and other supports.

B. The maximum distance between supports shall be 8 feet unless indicated otherwise, except the maximum distance between supports shall not exceed that recommended by the pipe manufacturer.

C. Standard pipe rings, clevis hangers, pipe clamps, and pipe saddles as manufactured by the ITT Grinnel Company, F&S Manufacturing Corporation, PHD Manufacturing, Inc., or equal shall be used. Pipe supports shall be made to fit the outside diameter of pipe or insulation for which they are to be used. Hangers suspended from structural steel shall be supported by forged steel beam clamps, using forged steel upper nuts and tie rods to lock clamps in place. Hangers suspended from concrete work shall be supported from approved metal inserts placed in the concrete; metal inserts shall be installed at the time concrete is placed.

2.06 PIPE SLEEVES, WALL PIPES, AND PIPE PLATES

A. Pipe sleeves shall be installed where piping passes through walls or slabs.

B. Sleeves for pipes three inches and larger, sleeves below grade, and sleeves into tanks containing liquid shall be galvanized steel sleeves with a compressible rubber gasket. No sleeves shall be installed through structural beams or joints unless the installation is specifically shown or approved.

C. Sleeves shall be fastened securely in floors and walls so they will not be displaced when concrete is poured or when other construction is built around them, and shall be protected to prevent concrete, plaster, or other materials from being forced into the space between the pipe and sleeve. Wall sleeves shall finish flush with finish line. The bottom of floor sleeves shall be set flush with the underside of the slab below, the top extending 3/4 inch above the finished floor. All piping passing through wall or floor sleeves shall be packed and sealed with silicone sealant.

D. Where pipes pass through concrete slabs on grade, a mechanical joint wall pipe shall be provided. Mechanical joint bell shall terminate 8 to 12 inches above finished floor. The buried end of the pipe shall extend through the slab and may extend to the next pipefitting.

2.07 PIPE SEALS

A. Contractor shall determine the required inside diameter of each individual wall opening or sleeve before ordering, fabricating or installing. The inside diameter of each wall opening shall be sized as recommended by the manufacturer to fit the pipe and to assure a watertight joint.

B. Contractor shall familiarize his installing personnel with manufacturer's instruction bulletin for the proper procedure for installing and tightening the seal to provide a watertight pipe penetration.

2.08 AIR/VACCUMM RELEASE VALVE

The air release valve shall be Model 200A clean water automatic air release valve as manufactured by Apco or an approved equal. The valve shall have cast iron body and stainless steel float and manufactured in accordance with ANSI/AWWA C-512 standards. Valve shall be capable of normal network pressures up to 150 psi. The size of the air/vacuum release valves are shown on the Contract Drawings.

PART 3 - EXECUTION

3.01 GENERAL

A. Handling and Storing Materials

1. The Contractor shall be responsible for the safe and proper delivery, unloading, storage and handling of materials furnished by him and

intended for the work until it has been incorporated in the complete project.

2. Proper care and protection shall be exercised in handling pipe, fittings and other accessories in unloading from delivery trucks. The pipe shall be lifted by hoists and slid or rolled on skidways in such a manner as to avoid shock. Under no circumstances shall the pipe be dropped. Pipe must not be skidded or rolled against pipe already on the ground.
3. Materials shall be stored in accordance with manufacturer's recommendations.

B. Excavating and Backfilling

1. Contractor shall do all excavating of any and all materials encountered in the course of excavating for all underground utility systems. After the work is in place, backfill with satisfactory materials as specified in Section 02200. All piping shall be entirely backfilled with suitable material.
   a. Exercise special care in backfilling trenches in which sewers are laid to guard against disturbing the joints. Such backfilling shall be placed evenly in 18-inch layers and carefully compacted. Compaction shall not start until Contractor has placed a minimum of 24 inches of backfill over top of pipe.
   b. Provide tracer wire and soil markers per Owner requirements.
2. Removal of subsurface obstructions, which are uncovered during excavation for installation of the utility systems, shall be removed by the Contractor at his expense. This shall include removal or rock, existing concrete or brick of existing building foundation, footings, abandoned utility piping, wires, structures, etc., which may not be visible from surface investigations before construction, but will interfere with new installations. If such obstructions are encountered, they shall be removed 2 feet from around the area of new manholes, catch basins, and sewer piping and backfilled with a suitable material as specified.

C. Separation of Water and Sewer Lines

1. Parallel Installation:
   Water lines shall be at least 10 feet horizontally from a sewer or sewer manhole whenever possible, and the distance shall be measured edge-to-edge.
2. Crossing:
   Water lines crossing over sewers shall be at least 18 inches between the bottom of the water line and the top of the sewer.

D. Thrust Restraint of Pressure Piping Systems

All mechanical joints shall be restrained with Mega Lug restraining glands or equal. Restrained joints shall also be used on one pipe joint in both directions of each fitting. Blocking shall also be provided.

E. Cleanup, Strawing, and Reseeding: Cleanup and reseeding shall be accomplished

in accordance with the Erosion and Sediment Control plan.

F. Labeling
   1. All piping shall be labeled with Seton Opti-Code™ pipe markers or an approved equal.
   2. Pipe markers shall meet ANSI/OSHA standards and shall be ANSI designated colors.

3.02 GRAVITY SEWERAGE PIPING

A. Laying of sewer pipe shall be accomplished to line and grade in the trench only after it has been dewatered and the foundation and/or bedding has been prepared. Mud, silt, gravel, and other foreign materials shall be kept out of the pipe and off the jointing surfaces.

B. Trench bottoms shall be shaped so that the entire length of pipe will have full bearing. No blocking of any kind shall be used to adjust the pipe to grade.

C. All pipe and fittings shall be carefully lowered into the trench in such a manner as to prevent damage to pipe or coatings. Under no circumstances shall pipe materials be dropped or dumped into the trench.

D. All pipe laid shall be retained in position so as to maintain alignment and joint closure until sufficient backfill has been completed to adequately hold the pipe in place. All pipes shall be laid to conform to the prescribed line and grade shown on the Drawings, within the limits that follow. At least three batterboards shall be maintained in position during all pipe laying operations, unless a laser beam is used.

E. Variance from established line and grade shall not be greater than 1/32 of an inch per inch of pipe diameter and not to exceed ½ inch, provided that any such variation does not result in a level or reverse sloping invert; provided also, that variation in the invert elevation between adjoining ends of pipe, due to nonconcentricity of joint surface and pipe interior surfaces, does not exceed 1/64 inch per inch of pipe diameter, or ½ inch maximum.

F. The sewer pipe, unless otherwise approved by the engineer, shall be laid up grade from point of connection of the existing sewer or from a designated starting point. The sewer pipe shall be installed with the bell end forward or upgrade. When pipe laying is not in progress the forward end of the pipe shall be kept tightly closed with temporary plug.

G. The pipe shall be fitted and matched so that units will form a smooth, uniform invert.

H. Prior to joining the pipe, all surfaces of the pipe to be joined and surfaces of factory made jointing materials shall be clean and dry. Lubricants, primers, adhesives, etc., shall be applied and the pipes joined as recommended by the manufacturer's specifications. Sufficient pressure shall be applied in making the joint to assure that the pipe is "home." The interior of the pipe shall be cleaned of all foreign materials as the work progresses. At the end of the workday, the last pipe laid shall be blocked to prevent creep, and closed with tight fitting cover.

I. Trenches shall be carefully backfilled with excavated materials approved for

backfilling, consisting of earth, loam, sandy clay, sand and gravel, soft shale, or other approved materials, free from large clods of earth or stones larger than one inch in diameter deposited in six inch layers, and thoroughly and carefully tamped until the pipe has a cover of not less than one foot.

J. The remainder of the backfill shall be placed in the trench in layers not exceeding two feet and thoroughly tamped. No stone or rock larger than 5 inches in its greatest dimension shall be used in backfilling.

K. Gravity sewer line shall be tested by infiltration and exfiltration and shall not exceed 100 gallons per day per mile of sewer per inch of pipe diameter. The test pressure shall be measured at the highest point on the gravity line being tested.

3.03 BELOW GROUND FORCE MAIN PIPING AND APPURTENANCES

A. Laying of force main shall be accomplished in the trench only after it has been dewatered and the foundation and/or bedding has been prepared. Mud, silt, gravel and other foreign material shall be kept out of the pipe and off the jointing surfaces.

B. Trench bottoms shall be shaped so that the entire length of pipe will have full bearing. No blocking of any kind shall be used to adjust the pipe to grade.

C. All pipe and fittings shall be carefully lowered into the trench in such a manner as to prevent damage to pipe or coatings. Under no circumstances shall pipe materials be dropped or dumped into the trench.

D. All pipe laid shall be retained in position so as to maintain alignment and joint closure until sufficient backfill has been completed to adequately hold the pipe in place. All pipes shall be laid to conform to the prescribed line and grade shown on the Drawings.

E. The pipe shall be fitted and matched so that when laid in the work, units will form a smooth, uniform invert.

F. Prior to joining the pipe, all surfaces of the pipe to be joined and the surfaces to factory made jointing materials shall be clean and dry. Lubricants, primers, adhesives, etc., shall be applied and the pipes joined as recommended by the manufacturer's specifications. Sufficient pressure shall be applied in making the joint to assure that the pipe is "home." The interior of the pipe shall be cleaned of all foreign material as the work progresses. At the end of the workday, the last pipe laid shall be blocked to prevent creep, and closed with tight fitting cover.

G. All force main piping shall be tested at a minimum hydrostatic pressure of 150 PSI for a period of one hour. Leakage shall not exceed the amount given by the following formula:

$$L = \frac{sd(P)^{0.5}}{133{,}200}$$

Where: L = allowable leakage in gph
s = length of pipe in feet
d = diameter of pipe in inches

P = test pressure in psi

The method and equipment for conducting this test shall be subject to the approval of the Engineer. The test pressure during the leakage test shall be measured at the highest point on the force main.

3.04 ABOVE GROUND FORCE MAIN PIPING AND APPURTENANCES

A. All piping shall be installed according to the plans and applicable codes. Pipe runs shall be true and direct consistent with space utilization. Proper allowances shall be made for expansion, gaskets, and all lines shall be adequately supported and anchored as necessary to prevent undue stress on pipes or equipment to which it may be attached. Blocking shall be adequate to prevent noise or vibration when flows are turned on or off.

B. Piping shall be hydrostatically tested to verify that no leaks are present in accordance with Accomack County Standards, latest revision.

C. All ferrous metal piping surfaces shall be coated as follows:
One prime coat of TNEMEC Series 66 polyamide epoxy, color-white, 2.0 to 3.0 MILS DFT. One intermediate coat of TNEMEC Series 50-330 urethane, color-white, 2.5 to 3.5 MILS DFT. One finish coat of TNEMEC Series 75 acrylic polyurethane, color- battleship gray, 2.5 to 3.5 MILS DFT.

3.05 WATER SERVICE LINE AND YARD PIPING AND APPURTENANCES

A. Service line and yard piping shall be installed in accordance with manufacturer's installation instructions.

B. Service line and yard piping shall be tested at not less than 150 PSI for 2 hours. Pressure shall be increased in 50-psi increments and each joint inspected between increments. Test pressure shall be held for one hour; decrease to 0 psi. Test pressure shall be slowly achieved again and held for one more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within above limits.

C. Service line piping shall be cleaned and disinfected as follows:
   1. New water piping shall be purged and disinfected in accordance with AWWA C600 and C651.
   2. Piping shall be filled with a water/chlorine solution containing at least 50 parts per million of chlorine. Isolate (valve off) the system or part thereof and allow to stand for 24 hours.
   3. Piping shall be drained and refilled with a water/chlorine solution containing at least 200 parts per million of chlorine and isolate and allowed to stand for 3 hours.
   4. Following the allowed standing time, the piping shall be flushed with clean, potable water until chlorine residual is less than 2 parts per million.

3.06 REMOVAL OF ALL AIR

Contractor is responsible for the removal of all air after testing and tie in of all pipelines.

END OF SECTION

SECTION 03411

PRECAST CONCRETE STRUCTURES

PART 1 – GENERAL

1.01 SUMMARY

Contractor shall furnish precast concrete structures as shown on the contract drawings. Precast structure is to be delivered and placed on prepared stone foundation in accordance with manufacturer's recommendations. The structures to be provided with all necessary openings as specified in conformance with manufacturer's structural requirements.

1.02 SUBMITTALS

A. Submittals shall be per Section 01300.
B. Product Data: For each type of product indicated.
C. Product Drawings: Contractor shall provide precast concrete unit drawings for each structure.
D. Material: Test reports and certificates.

1.03 QUALITY ASSURANCE

Structures shall conform to the following codes and requirements:

A. The structures shall be in accordance with ASTM C478.
B. Reference Standards: Comply with applicable provisions and recommendations of the following except as otherwise shown or specified:
    1. PCI, Precast Concrete Institute.
    2. ACI, American Concrete Institute.
    3. ACI 301, "Specification for Structural Concrete."
    4. ASTM A36, Carbon Structural Steel, Standard Specification.
    5. ASTM C150, Portland Cement, Standard Specification.
    6. ASTM A153, Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

1.04 DESIGN REQUIREMENTS

A. North Spur Pump Station Wet well. 6-feet inside diameter.
B. Valve Vault – 5' - 0" SQ.
C. Bypass/Flow Meter Vault – 5' – 0" SQ.
D. Influent Manhole

PART 2 – PRODUCTS

2.01 WET WELL AND VALVE VAULT

A. Wet Well
    1. Wet well shall be constructed of precast concrete manhole sections set on

an extended base section. Base section with extensions shall be manufactured as one unit with reinforcement throughout.

2. Joints shall be offset type with gaskets meeting ASTM C443. The surface of all joints shall be coated with a 6-inch non-shrink grout band on the exterior to prevent any groundwater leakage into the wet well.
3. Connectors shall be flexible pipe connectors meeting ASTM C923.
4. Wet well interior shall be coasted with Tnemec Series 69 Hi-Build Epoxyline II coating. Total coating thickness of 12-16 mill D.F.T. shall be provided. Each coat shall be a different color with a final coat of gray. Finish shall be satin.
5. Wet well shall be adequate to withstand hydrostatic and soil bearing pressure loadings as indicated on design drawings.
6. Wet well top shall be provided with access hatch and appurtenances in accordance with contract drawings.
7. The external surfaces shall receive a total of 8 to 16 mil D.F.T. coat of Tnemec Series 181 Tneme-Crete. Color: gray. Finish: sand texture.
8. The Wet well shall be equipped with a Halliday Series X Retrograte, for fall protection.

B. Valve Vault and Bypass/Flow Meter Vault

1. Vaults shall be a precast concrete vault designed for underground service as indicated on design drawings and shall be provided with access hatch and appurtenances as indicated on the contract drawings.
2. The bottom interior of the vaults shall be grouted and sloped to the drain.
3. Connectors shall be flexible pipe connectors meeting ASTM C923.
4. Vaults shall be painted and waterproofed per Section 2.01.A.7.

PART 3 – EXECUTION

A. Wet well and valve shall be set level to prevent settlement.

B. The wet well shall be leak tested for a minimum of 48 hours prior to backfilling. Leak testing shall include filling wet well with clean water and measuring water levels. There shall be no leakage from the wet well.

END OF SECTION

SECTION 11200
PUMP EQUIPMENT

PART 1 – GENERAL

1.01 SUMMARY

This section specifies the requirements for the Pump Equipment. The North Spur Pump Station includes submersible pumps and accessories and pump controls.

1.02 QUALITY CONTROL

Submersible pumps and accessories and the pump control panel shall be provided as a packaged system.

1.03 COORDINATION

Contractor shall coordinate the precast concrete structures with Specification Section 03411. Contractor shall coordinate all precast concrete structure openings with contract drawings.

1.04 RELATED SECTIONS

A. Section 03411, Precast Concrete Structures
B. Division 15, Mechanical.
C. Division 16, Electrical

1.05 SUBMITTALS

A. Submittals shall be per Section 01300.
B. Control panel submittal shall include a list of equipment, product literature on the equipment, formal ladder diagrams with proper annotations, and panel elevations showing front mounted (or inner door) equipment layout. Provide circuit breaker and fuse time/current over-current protection curves for each fuse or circuit breaker provided in order to complete a short-circuit/coordination study.
C. Four (4) copies of a complete operations manual for all equipment, including detail drawings, spare parts, maintenance instructions and other pertinent data shall be compiled and submitted to the engineer for review and approval before acceptance of the facility. O&M manuals must be marked specifically to show the equipment installed. General website literature will not be accepted. Provide digital copy in addition to hard copies.
D. Equipment shall be warranted for one year from date of Owner's Substantial Completion.

1.06 CONTROL SUMMARY

A. Two (2) identical submersible pumps shall be provided. Pump control system shall consist of a controller with a level transducer for primary pump control and float switches for backup alarms. The pumps will operate in a lead/lag mode. The pumps will be automatically alternated.
B. Upon the rise of wastewater in the wet well to the "Lead Pumps On" level, the lead pump shall energize. When the level falls to the "Pump Off" level, the pumps shall stop. If the lead pump cannot handle the inflow or fail to operate, the level will rise to the "Lag Pump On" level, at which time the lag pump shall be energized. If lead and lag pumps cannot handle the inflow the level will rise to the "High Level Alarm" level, at which transducer

will send a signal to the light and horn alarm at control panel. The pump controls will alternate between the lead and lag pumps.

C. Backup float switches are provided for redundant alarms in case of transducer failure. If the level rises to the "backup high water level" the float switch will send a signal to the light and horn alarm at the control panel. It will also send a signal to Omnisite system with a phone call to OWNER and Operator. If the water falls to the "low level" the float switch will turn the pumps off and send a signal to Omnisite system with a phone call to OWNER and Operator.

D. A phase monitor will monitor the incoming power line quality and shut down the pumps if inadequate power quality is detected.

E. The following will cause pump shutdown: H-O-A switch in "Off"; motor overload, pump flow failure; motor over temperature; and phase loss/reversal and leakage. Motor over temperature and phase loss/reversal will automatically reset once; the second occurrence shall cause shut down and alarm. Motor overload, flow failure, and leakage will require a manual reset. Motor over temperature will illuminate a panel light which will latch "on" to advise the condition has occurred.

F. In the event of any power failure, re-starting of pumps shall be staggered to reduce system voltage/frequency dip in accordance with requirements in Section 16500, "Emergency Generator System."

1.07 GENERAL REQUIREMENTS

A. The control panel shall be mounted as shown on the contract drawings and shall provide control of the operation of the North Spur pump station pumps.

B. The power supply shall be a 230V, 3 Phase, 60 Hz from the power panelboard. A power block in the control panel shall be supplied for the electrical connection.

C. The control console shall be completely factory assembled and tested prior to shipment.

D. The control panel shall be in conformance with the latest edition of UL508 as an assembly and shall be UL labeled.

E. One set of manufacturer's standard spare parts shall be provided.

PART 2 - PRODUCTS

2.01 PUMPS

A. Manufacturer

1. Ebara Non-Clog Pump Model DFVU61.5
2. Flygt Non-Clog Pump Model NP 3127 HT 3~
3. Or Approved Equal.

B. Design Conditions:

Design Conditions	North Spur Pump Station Interim Pumps
Service	Raw Screened Wastewater
Quantity	2
Design Flow, gpm	112
Design TDH, ft	15
Motor HP	3
Motor Voltage	280
Speed, rpm	1740
Discharge Size, in	3
Solid Passing Size, in	3

C. The pump shall be heavy duty, electric submersible, centrifugal non-clog unit able of handling raw and unscreened sewage. The pump shall be capable of operating in an ambient liquid temperature of 104 degrees F.

D. The submersible pump to be located in wet well shall be supplied with motor, close coupled volute, cast iron discharge elbow, guide bar brackets, and power cable and accessories.

E. Pumps shall include seal failure probes wired to the control panel.

F. Motors shall include thermo switches which shut the motors off in the event of high motor winding temperatures. The switches shall be wired to the control panel with manual reset buttons. Indicating lights are also provided for high temperature conditions.

2.02 SLIDE RAIL SYSTEM

A. Stainless steel sliding guide brackets shall be an integral part of the pump unit.

B. The entire weight of the pumping units shall be guided by 2-inch diameter series 316 stainless steel guide bars and pressed tightly against the discharge connection elbow with metal-to-metal contact.

C. Sealing of the discharge interface by means of a diaphragm, O-ring, or other devices shall not be permitted.

2.03 ACCESS DOOR

A. Contractor shall coordinate all access door opening with precast concrete manufacturer and Specification Section 03411.

B. Access door for wet well shall be type Halliday Model S2R as shown on contract drawings or approved equal.

C. Access door for valve vault shall be type Halliday Model S2R as shown on contract drawings or approved equal.

D. Access door shall be manufactured entirely of aluminum with type 316 stainless steel hardware.

E. The access door shall have a load rating of 300 lbs per square feet.

F. Access Door shall have following features.

1. Stainless Steel compression spring assist
2. Auto-lock, Type 316 stainless steel hold-open arm with release handle
3. Access door shall have built-in neoprene cushion/gasket
4. Type 316 stainless steel slam lock with removable key

G. A non-ozone-depleting bituminous coating shall be applied to the access door exterior where it will come in contact with concrete.

H. Access door unit shall carry a Lifetime guarantee against defects in material and/or workmanship.

2.05 TRASH BASKET

A. Contractor shall provide trash basket as shown on contract drawings, manufactured by Halliday products Series B1A or approved equal.

B. The trash basket shall be bar screen style basket.

C. The channel rail system shall be stainless steel.

D. The trash basket shall be heavy duty unit capable of handling raw sewage.

2.06 PUMP PIPING, FITTINGS, AND VALVES

All piping, fittings, and valves shall be in accordance with Section 02560, Piping Systems.

2.07 LEVEL TRANSDUCERS

A. Transducers shall be Series 750 KPSI non-fouling submersible level transducers with an aneroid bellows as manufactured by PSI Ltd or equal.

B. The primary level transducer shall provide a 4-20 mA analog signal proportional to the wet well level to a digital panel meter in the control panel, and shall be calibrated from 0 to 16 feet.

2.08 PRESSURE GAUGES

A. Pressure gauges shall be Ashcroft oil filled pressure gauges with diaphragm seals, or an approved equal.

B. Pump discharge gauges shall have a pressure range of 0 to 50 feet with dual (feet and psi) markings.

C. Gauges shall have stainless steel socket, Bourdon tube, case, and ring.

D. Gauges shall be installed with isolation ball valves.

2.09 FLOW METER

A. A flow meter shall be provided within the pump station. The flow meter shall be a 3" Recordall Turbo Series Badger Meter or approved equal.

B. The flow meter shall be connected to and shall display the totalized flow within the pump control panel.

2.10 PUMP CONTROL PANEL

A. Control Panel Enclosure

1. All electrical control equipment shall be mounted within a separate NEMA 4X stainless steel enclosure provided with a rigid door designed for locking. All switches and other instruments shall be mounted on an inner door. All switches shall be clearly identified, and all internal wiring shall be factory installed. The inside of the control panel shall be painted white, and the exterior color of the panel shall be gray.

2. All control panel components shall be properly identified with an engraved nameplate mounted on the inside of the panel. All components not mounted on the front of the panel shall be mounted on a removable back panel secured to the enclosure with collar studs. All wiring and tubing shall be installed in a neat, workmanlike manner and shall be grouped, bundled, supported and routed horizontally and vertically to provide a neat appearance. All wires leaving the panel shall be terminated at the terminal strips inside the enclosure. All tubing inside the panel shall be run to bulkhead fittings. Terminal wires shall be identified in accordance with the Supplier's panel wiring diagrams.
3. Provide a copper grounding plate inside the control panel for terminating all ground wires.

B. Disconnect Operator

A flange or door mounted disconnect operator shall be provided to disconnect power to the control panel. Disconnect shall be Allen-Bradley or Square D.

C. Main Breaker

A 3-pole molded case circuit breaker, separate from pump circuit breakers shall be provided as the main disconnecting device. This breaker shall be properly sized to handle the entire load of the panel, including all pumps simultaneously starting and running.

D. Transient Voltage Surge Suppressor

A transient voltage surge suppressor shall be provided for the control circuit. The surge suppressor shall be a Phoenix Contact model MAINS-PUGTRAB UAK 2-PE/S power line protector, or an approved equal.

E. Three Phase Power Monitor

The control system shall include a digital three-phase monitor/control connected to the incoming side of the power input terminals. The unit shall provide instantaneous dropout protection in the event of phase unbalance, phase loss, phase reversal, incorrect phase sequence or low line voltage. The phase monitor shall include automatic reset circuitry. The monitor shall be manufactured by Time Mark Model 2652.

F. Control Circuit Breaker

Circuit breaker shall be a Square D or Cutler-Hammer or approved equal thermal-magnetic molded case type breaker individually mounted and identified.

G. Limit Switches

Proximity type limit switches shall be provided on the indicating arm of each check valve to detect when the valve lifts from the closed position.

H. Self-Protected Combination Motor Controllers

1. Motor controllers shall be properly sized non-reversing Square D Integral or approved equal self protected combination motor controllers with properly sized protection modules.
2. Protection modules shall be standard modules with thermal and magnetic trip.
3. Auxiliary contact blocks shall be provided

I. Control Transformer

A properly sized control transformer shall be installed in the panel to provide 115-volt single phase power for control circuits, and lights. The transformer shall be no less than 350 VA and shall be furnished with its own circuit fusing consisting of two primary fuses and one secondary fuse.

J. Alarm Light and Horn

1. The horn shall be Novatone, manufactured by Ametek or approved equal and

shall have an adjustable volume control.

2. The alarm beacon shall be Edwards number 58 provided remote from the panel on the outside wall. The light shall continue to flash after the horn is silenced
3. The following conditions shall cause the light and horn to energize: Power Fail, High Water Level, and Pump Fail.

K. Selector Switches

1. Selector switches shall be heavy-duty, 30.5 mm, non-illuminated, maintained contact type. Selector switches shall be Allen-Bradley Bulletin 800 or approved equal.
2. An HOA selector switch for each pump shall be provided. When the HOA switches are in the "auto" position, the pumps shall be automatically controlled by the level control system.
3. Two spares shall be provided.

L. Push Buttons

1. Push buttons shall be 30.5 mm Allen-Bradley Bulletin 800 or equal.
2. Two spares shall be provided.

M. Pilot Lights

1. Pilot lights shall be Allen-Bradley Bulletin 8415 or approved equal with Cluster LED lamps.
2. The following pilot light colors shall be provided:
   a. Green for pump RUN.
   b. Red for pump OFF.
   c. Amber for pump FAULT.
   d. White for POWER ON.
3. Pilot lights shall be 30.5 mm.
4. Three spare lights shall be provided for each color.

N. Relays

1. Relays shall be Allen-Bradley Bulletin 700HA or approved equal type relays with 10 amp contacts. Relays shall be Din rail mount type terminals. Contact configuration shall be as required for proper operation of the control logic. Relay coils shall operate on 120 volts AC and shall have an indicator light to indicate the relay coil is energized. Two spares shall be provided.
2. Two spares of each type shall be provided.

O. Intrinsically Safe Relays

Intrinsically safe relays shall be provided as required for wet well installed equipment, which shall meet Class 1, Division 1 requirements. They shall be manufactured by MTL, Inc.

P. Terminal Blocks

1. Provide terminal blocks for all wiring entering and leaving panels.
2. Provide terminal blocks which are suited to the particular signal type.
3. Terminal blocks shall minimize the amount panel space consumed.
4. Terminal blocks shall be arranged/selected so that related wiring is located adjacent to each other or on the same terminal block.
5. General applications shall use a single level feed-through type terminal block.
6. Discrete inputs and outputs, where control voltage is sourced within the panel, shall use a thermal miniature circuit breaker type terminal block. Select circuit breaker sizes for the load. Outgoing voltage shall be through circuit breaker).
7. Discrete inputs and outputs, where control voltage is foreign to the panel, shall

use a two-level feed-through type terminal block.

8. Analog signals shall use a three-level terminal block (shielded cables shall be grounded in the control panels only).
9. Thermocouple signals shall use three-level thermocouple type terminal blocks.
10. Provide individual terminals for all required tie points (one wire per terminal) and 20 percent spares.
11. Each terminal shall be clearly and neatly identified with factory numbering strips.
12. Terminal block manufacturer's standard type jumpers shall be used for bussing signals and power when required.
13. Provide 4-terminal strip screwdrivers with each enclosure.
14. Terminal blocks, breakers, and related accessories shall be as manufactured by Phoenix Contact, no substitutions.
15. Pre-manufactured field wiring termination systems may be used when interfacing with the pump controller modules. Provide termination systems designed for the specific module and compatible with the required field wiring.

Q. Wiring

1. All wiring, workmanship, and schematic wiring diagrams shall be in compliance with applicable standards and specifications set forth by the National Electrical Code (NEC). All wiring and terminal blocks shall be isolated by voltage levels to the greatest extent possible. There shall be no common (shared) neutrals.
2. All wiring in control panel and throughout facility shall be stranded copper, Type MTW, or THW, 600 volts, and shall be color-coded as follows:

a.	Line and Load Circuits, AC power	Black
b.	AC Control Circuit Less than Line Voltage	Red
c.	DC Control Circuit	Blue
d.	Interlock Control Circuits, from External Source	Yellow
e.	Radio Alarm Transmitter Wiring	Purple
f.	Equipment Grounding Conductor	Green
g.	Current Carrying Ground	White

3. All control wiring shall be tagged at each end in the control panel with a legible permanent coded wire-marking sleeve. Sleeves shall be white PVC tubing with machine printed black marking. Markings shall be in accordance with the wire numbers shown on the control wiring diagrams.

R. Nameplates

General nameplates shall be provided on the front of the pump control panel. Nameplates shall be laminated white with black engraved letters. Minimum size of engraved lettering shall be 1/4 inch.

Warning nameplates shall be red laminated with black lettering at least 1-1/2-inches high by 6-inches wide.

S. Condensation Heater

A properly sized heater shall be supplied in the panel. The heater shall consist of a thermostat, resistance type heating grid and fan to circulate air through the enclosure. The entire unit shall be enclosed with all heater components within the enclosure.

T. Backup Float Switches

Two float type mercury switches shall be provided as shown on drawings. The mercury

switches shall be sealed in a solid polyurethane float for corrosion and shock resistance. The support wires shall have a heavy neoprene jacket. A weight shall be attached to the cord above each float to hold the switch in place. Floats shall be suspended from a stainless steel mounting bracket attached to the side of the wet well opening and accessible from the opening.

U. Alarms

Provide wiring, conduit and programming to report the following alarms to the new Master Control Panel using Ethernet communications:

1. Local Alarms: Provide indicator lights and labels to identify the following alarms at the Pump Control Panel:

   Pump 1 Seal Failure

   Pump 2 Seal Failure

   Pump 1 Overtemp

   Pump 2 Overtemp

   Pump 1 Flow Failure

   Pump 2 Flow Failure

   Pump 1 Overload

   Pump 2 Overload

2. Remote Alarms: Provide an Omnisite Cellular Radio based system with all programming to send alarms as directed by the Accomack County Public Works. Provide wiring, conduit and programming to report the following alarms to the Omnisite cellular radio system:

   Pump 1 Summary Alarm

   Pump 2 Summary Alarm

   High Water Alarm

   Backup High Water Alarm

   Low Water Alarm

   Backup Low water Alarm

   Phase Loss/Reversal

Generator Summary Alarm

Generator Low Fuel

PART 3 – EXECUTION

3.01 Pipes passing through the chamber walls shall be provided with cast-in place rubber boots or approved equal as shown on the contract drawings.

3.02 Wet well and vault shall be set level to prevent settlement.

3.03 TESTING AND START-UP

A. All equipment shall be checked under operating conditions to ensure that the equipment is working properly. Prior to inspections, a letter from the equipment supplier shall be provided to the Engineer prior to inspection verifying the equipment is installed and working properly.

B. All pipes shall be pressure and leak tested in accordance Section 02560 PIPING SYSTEMS.

C. Prior to inspections, drawdown tests shall be performed prior to inspections to verify pump outputs. Contractor is responsible for water required for drawdown tests.

D. Control panel shall be factory tested in accordance with Section 13460 Control Panels – Construction and Accessories.

END OF SECTION

SECTION 16051

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Common electrical installation requirements.

1.02 SUBMITTALS

A. Utility Fault Current Letter.

B. Product Data: Pipe Sleeves.

C. Product Data: Grout.

PART 2 - PRODUCTS

2.01 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

2.02 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.01 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

3.02 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Cut sleeves to length for mounting flush with both surfaces of walls.

E. Extend sleeves installed in floors 2 inches above finished floor level.

F. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.

G. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

END OF SECTION

SECTION 16073

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Hangers and supports for electrical equipment and systems.

2. Construction requirements for concrete bases.

1.02 SUBMITTALS

A. Product Data: For steel slotted support systems.

1.03 QUALITY ASSURANCE

A. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. ERICO International Corporation.
d. GS Metals Corp.
e. Thomas & Betts Corporation.
f. Unistrut; Tyco International, Ltd.
g. Wesanco, Inc.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

3. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. 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.

D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. 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.

   a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

      1) Hilti Inc.
      2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      3) MKT Fastening, LLC.
      4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

   a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

      1) Cooper B-Line, Inc.; a division of Cooper Industries.
      2) Empire Tool and Manufacturing Co., Inc.
      3) Hilti Inc.
      4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.

4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.

5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.

6. Toggle Bolts: All-steel springhead type.

7. Hanger Rods: Threaded steel.

2.02 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 5 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.01 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

3.02 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, IMC or RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. 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.

D. 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:

1. To New Concrete: Bolt to concrete inserts.

2. 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.

3. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.03 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment. After completion, hot-dip galvanize assembly.

B. Field Welding: Comply with AWS D1.1/D1.1M.

3.04 CONCRETE BASES

A. 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.

B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 3 Section "Cast-in-Place Concrete."

C. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

2. Install anchor bolts to elevations required for proper attachment to supported equipment.

3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.05 PAINTING

A. 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.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 16075

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Identification for raceways.

2. Identification of power and control cables.

3. Identification for conductors.

4. Underground-line warning tape.

5. Warning labels and signs.

6. Instruction signs.

7. Equipment identification labels.

8. Miscellaneous identification products.

1.02 QUALITY ASSURANCE

A. Comply with ANSI A13.1.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

D. Comply with ANSI Z535.4 for safety signs and labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

PART 2 - PRODUCTS

2.01 POWER RACEWAY IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.

B. Colors for Raceways Carrying Circuits at 600 V or Less:

1. Black letters on an orange field.

2. Legend: Indicate voltage.

C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

2.02 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.

1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

D. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

2.03 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

D. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.

1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.04 UNDERGROUND-LINE WARNING TAPE

A. Tape:

1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.

2. Printing on tape shall be permanent and shall not be damaged by burial operations.

3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:

1. Comply with ANSI Z535.1 through 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.

2.05 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Baked-Enamel Warning Signs:

1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.

2. 1/4-inch grommets in corners for mounting.

3. Nominal size, 7 by 10 inches.

D. Metal-Backed, Butyrate Warning Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.

2. 1/4-inch grommets in corners for mounting.

3. Nominal size, 10 by 14 inches.

E. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."

2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.06 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.

1. Engraved legend with black letters on white face.

2. Punched or drilled for mechanical fasteners.

3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

2.07 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

B. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

C. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.08 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in Division 9 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Apply identification devices to surfaces that require finish after completing finish work.

C. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

E. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands 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.

F. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

G. Painted Identification: Comply with requirements in Division 9 painting Sections for surface preparation and paint application.

3.02 IDENTIFICATION SCHEDULE

A. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.

a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
b. Colors for 208/120-V Circuits:

1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.

c. Colors for 480/277-V Circuits:

1) Phase A: Brown.
2) Phase B: Orange.
3) Phase C: Yellow.

d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

B. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

C. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

D. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.

1. Limit use of underground-line warning tape to direct-buried cables.

2. Install underground-line warning tape for both direct-buried cables and cables in raceway.

E. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

F. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

G. 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.

H. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

a. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
b. Fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

END OF SECTION

SECTION 16120

CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.

2. Connectors, splices, and terminations rated 600 V and less.

3. Sleeves and sleeve seals for cables.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

1.03 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 CONDUCTORS AND CABLES

A. Copper Conductors: Comply with NEMA WC 70.

B. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN and SO.

C. Multiconductor Cable: Comply with NEMA WC 70 for Type SO with ground wire.

2.02 CONNECTORS AND SPLICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.

2. Hubbell Power Systems, Inc.

3. O-Z/Gedney; EGS Electrical Group LLC.

4. 3M; Electrical Products Division.

5. Tyco Electronics Corp.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.01 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.02 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN-THWN, single conductors in raceway.

B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

C. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

D. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

E. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

F. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

G. Class 1 Control Circuits: Type THHN-THWN, in raceway.

H. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.03 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. 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.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Division 16 Section "Electrical Supports and Seismic Restraints."

F. Identify and color-code conductors and cables according to Division 16 Section "Electrical Identification."

G. 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 and UL 486B.

H. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

I. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.2 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

C. Test Reports: Prepare a written report to record the following:

1. Test procedures used.

2. Test results that comply with requirements.

3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION

SECTION 16130

RACEWAYS AND BOXES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. See Division 2 Section "Underground Ducts and Utility Structures" for exterior ductbanks and manholes, and underground handholes, boxes, and utility construction.

1.02 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.03 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 METAL CONDUIT AND TUBING

A. Rigid Steel Conduit: ANSI C80.1.

B. IMC: ANSI C80.6.

C. LFMC: Flexible steel conduit with PVC jacket.

D. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.

2.02 NONMETALLIC CONDUIT AND TUBING

A. ENT: NEMA TC 13.

B. RNC: NEMA TC 2, Type EPC-80-PVC, unless otherwise indicated.

C. Fittings for RNC: NEMA TC 3; match to conduit or tubing type and material.

2.03 METAL WIREWAYS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper B-Line, Inc.

2. Hoffman.

3. Square D; Schneider Electric.

B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 3R, unless otherwise indicated.

C. Fittings and Accessories: Include 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.

D. Wireway Covers: Flanged-and-gasketed type.

E. Finish: Manufacturer's standard enamel finish.

2.04 BOXES, ENCLOSURES, AND CABINETS

A. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

C. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.

D. Hinged-Cover Enclosures: NEMA 250, Type 3R, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

E. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.

2. Hinged door in front cover with flush latch and concealed hinge.

3. Key latch to match panelboards.

4. Metal barriers to separate wiring of different systems and voltage.

5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.01 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Rigid steel conduit.

2. Underground Conduit: RNC, Type EPC-80-PVC, direct buried.

3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

5. 250, Type 4, [stainless steel] [nonmetallic] in damp or wet locations.

B. Minimum Raceway Size: 3/4-inch trade size.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.02 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. 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.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 16 Section "Electrical Supports."

E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

G. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

H. 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.

I. Raceways for Optical Fiber and Communications Cable: Install as follows:

1. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.

2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.

3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

J. Install raceway sealing fittings at suitable, approved, and accessible locations 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 at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.

2. Where otherwise required by NFPA 70.

K. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

3.2 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 2 Section "Earthwork" for pipe less than 6 inches in nominal diameter.

2. Install backfill as specified in Division 2 Section "Earthwork."

3. 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 as specified in Division 2 Section "Earthwork."

4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.

5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
    b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

    6. Warning Planks: Bury warning planks approximately 12 inches (300 mm) above direct-buried conduits, placing them 24 inches o.c. Align planks along the width and along the centerline of conduit.

END OF SECTION

SECTION 16140

WIRING DEVICES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Receptacles, receptacles with integral GFCI, and associated device plates.

2. Snap switches.

B. See Division 16 Section "Voice and Data Communication Cabling" for workstation outlets.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

1.03 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).

2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).

3. Leviton Mfg. Company Inc. (Leviton).

4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

2.02 GFCI RECEPTACLES

A. General Description: Straight blade, non-feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; GF20.
b. Pass & Seymour; 2084.

2.03 SNAP SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. Switches, 120/277 V, 20 A:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; 2221 (single pole), 2222 (two pole), 2223 (three way), 2224 (four way).
b. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
c. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
d. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

B. Coordination with Other Trades:

1. Take steps to insure that devices and their boxes are protected. 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 the boxes.

2. 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.

3. 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.

4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just 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 meet provisions of 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. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they 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.

5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.

6. Use a torque screwdriver when a torque is recommended or required by the 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.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

3.02 IDENTIFICATION

F. Comply with Division 16 Section "Electrical Identification."

1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with [black] [white] [red]-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.03 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Test Instruments: Use instruments that comply with UL 1436.

2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.

2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.

3. Ground Impedance: Values of up to 2 ohms are acceptable.

4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.

5. Using the test plug, verify that the device and its outlet box are securely mounted.

6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new, and retest as specified above.

END OF SECTION

SECTION 16231

PACKAGED ENGINE GENERATORS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes packaged engine-generator sets for standby power supply with the following features:

1. Diesel engine.

2. Unit-mounted cooling system.

3. Unit-mounted control and monitoring.

4. Outdoor enclosure.

5. Base mounted diesel fuel tank.

B. See Division 16 Section "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.

1.02 SUBMITTALS

A. Product Data: For each type of packaged engine generator and accessory indicated.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

C. Source quality-control test reports.

D. Field quality-control test reports.

E. Operation and maintenance data.

F. Warranty: Special warranty specified in this Section.

1.03 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with ASME B15.1.

E. Comply with NFPA 37.

F. Comply with NFPA 70.

G. Comply with NFPA 99.

H. Comply with NFPA 110 requirements for Level 1 emergency power supply system.

I. Comply with UL 2200.

J. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

K. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.04 PROJECT CONDITIONS

A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: Minus 15 to plus 40 deg C.

2. Relative Humidity: 0 to 95 percent.

3. Altitude: Sea level to 1000 feet.

1.05 WARRANTY

A. Special Warranty: Manufacturer's standard form in which 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.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Cummins C35 D6 or a comparable product by one of the following:

1. Caterpillar; Engine Div.

2. Generac Power Systems, Inc.

3. Kohler Co.; Generator Division.

4. Magnetek, Inc.

5. Onan/Cummins Power Generation; Industrial Business Group.

6. Spectrum Detroit Diesel.

2.02 ENGINE-GENERATOR SET

A. Factory-assembled and -tested, engine-generator set.

B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.

C. Capacities and Characteristics:

1. Power Output Ratings: Provide unit which will start and run the following loads:

a. T=0 (stage 1)

1)	Exterior Lighting	1 kW
2)	Gen Jacket Water Heater	1.5 kW
3)	Gen Battery Charger	1 kW
4)	Receptacles	0.6 kW
5)	Electronic Controls	3 kW
6)	Pump 1	7.5 HP

b. T= +15 sec (stage 2)

1)	Pump 2	7.5 HP

2. Output Connections: 208/120 V, Three-phase, four wire.

3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.

D. Generator-Set Performance:

1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.

2. 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.

3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.

4. 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.

5. 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.

6. 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 NEMA MG 1, shall not exceed 50 percent.

7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.

8. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.03 ENGINE

A. Fuel: Fuel oil, Grade DF-2.

B. Rated Engine Speed: 1800 rpm.

C. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm.

D. Lubrication System: The following items are mounted on engine or skid:

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.

2. 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.

3. 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.

E. Engine Fuel System:

1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.

2. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.

F. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.

G. Governor: Adjustable isochronous, with speed sensing.

H. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.

1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.

2. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.

I. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

1. Minimum sound attenuation of 25 dB at 500 Hz.

2. Sound level measured at a distance of 10 feet from exhaust discharge after installation is complete shall be 75 dBA or less.

J. Air-Intake Filter: Standard-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

K. Starting System: 12-24-V, per manufacturer, electric, with negative ground.

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.

2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.

3. Cranking Cycle: As required by NFPA 110 for system level specified.

4. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least twice without recharging.

5. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.

   a. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236.

2.04 FUEL OIL STORAGE

A. Comply with NFPA 30.

B. Base-Mounted Fuel Oil Tank: Factory installed and piped, complying with UL 142 fuel oil tank. Features include the following:

1. Tank level indicator.

2. Capacity: Fuel for 24 hours' continuous operation at 100 percent rated power output.

3. Vandal-resistant fill cap.

4. Containment Provisions: Comply with requirements of authorities having jurisdiction.

2.05 CONTROL AND MONITORING

A. 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 generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms.

B. 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 generator set. Mounting method shall isolate the control panel from generator-set vibration.

C. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 1 system, and the following:

1. AC voltmeter.

2. AC ammeter.

3. AC frequency meter.

4. DC voltmeter (alternator battery charging).

5. Engine-coolant temperature gage.

6. Engine lubricating-oil pressure gage.

7. Running-time meter.

8. Ammeter-voltmeter, phase-selector switch(es).

9. Generator-voltage adjusting rheostat.

10. Fuel tank derangement alarm.

11. Fuel tank high-level shutdown of fuel supply alarm.

12. Generator overload.

D. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

E. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.

1. Overcrank shutdown.

2. Coolant low-temperature alarm.

3. Control switch not in auto position.

4. Battery-charger malfunction alarm.

5. Battery low-voltage alarm.

6. Low fuel alarm.

7. Generator Summary alarm.

2.06 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with NEMA AB 1 and UL 489.

1. Tripping Characteristic: Designed specifically for generator protection.

2. Trip Rating: Matched to generator rating.

3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.

4. Mounting: Adjacent to or integrated with control and monitoring panel.

B. Generator Load Bank Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with NEMA AB 1 and UL 489.

1. Tripping Characteristic: Designed specifically for generator protection.

2. Trip Rating: Matched to generator rating.

3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.

4. Mounting: Adjacent to or integrated with control and monitoring panel.

C. Ground-Fault Indication: Comply with NFPA 70, "Emergency System" signals for ground-fault. Integrate ground-fault alarm indication with other generator-set alarm indications.

2.07 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H or Class F.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

E. 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.

F. Enclosure: Dripproof.

G. Instrument Transformers: Mounted within generator enclosure.

H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.

1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.

I. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.

J. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

K. Subtransient Reactance: 12 percent, maximum.

2.08 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: Vandal-resistant, weatherproof steel 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.

B. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.

1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.

2. Automatic Dampers: At engine cooling-air inlet and discharge. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating.

C. Genset enclosure to be sound attenuated for 73 dBA measured at 23'.

D. Convenience Outlets: Factory wired, GFCI. Arrange for external electrical connection.

2.09 VIBRATION ISOLATION DEVICES

A. 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.

1. Material: Standard neoprene.

2. Durometer Rating: Per manufacturer.

3. Number of Layers: Per manufacturer.

2.10 FINISHES

A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.11 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.

2. Report factory test results within 10 days of completion of test.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.

B. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

C. Install packaged engine generator with elastomeric isolator pads having a minimum deflection of 1 inch on 8-inch high concrete base. Secure sets to anchor bolts installed in concrete bases.

D. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

E. Ground equipment according to Division 16 Section "Grounding and Bonding."

F. Connect wiring according to Division 16 Section "Conductors and Cables."

G. Identify system components according to Division 15 Section "Mechanical Identification" and Division 16 Section "Electrical Identification."

3.02 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection (except those indicated to be optional) for "AC

Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.

2. 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.

3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.

   a. 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.
   b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
   c. Verify acceptance of charge for each element of the battery after discharge.
   d. Verify that measurements are within manufacturer's specifications.

4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.

5. 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.

6. Exhaust-System Back-Pressure Test: Use a manometer with a scale exceeding 40-inch wg. Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.

7. Exhaust Emissions Test: Comply with applicable government test criteria.

8. 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.

9. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.

10. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at four locations 23’ from the generator, and compare measured levels with required values.

C. Coordinate tests with tests for transfer switches and run them concurrently.

D. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

E. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

F. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

G. Remove and replace malfunctioning units and retest as specified above.

H. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

I. 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.

3.2 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION

SECTION 16410

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Nonfusible switches.

2. Molded-case circuit breakers (MCCBs).

3. Enclosures.

1.02 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.03 SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated.

B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

C. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.

D. Field quality-control reports.

E. Operation and maintenance data.

1.04 QUALITY ASSURANCE

A. 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.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 MOLDED-CASE CIRCUIT BREAKERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.

3. Siemens Energy & Automation, Inc.

4. Square D; a brand of Schneider Electric.

B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.

C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

D. Features and Accessories:

1. Standard frame sizes, trip ratings, and number of poles.

2. Lugs: Suitable for number, size, trip ratings, and conductor material.

3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.

4. Auxiliary Contacts: One SPDT switch with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.

5. Alarm Switch: One NO contact that operates only when circuit breaker has tripped.

2.02 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Outdoor Locations: NEMA 250, Type 4X.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

C. Comply with NECA 1.

3.02 IDENTIFICATION

A. Comply with requirements in Division 16 Section "Electrical Identification."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.

2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.2 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.

2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION

SECTION 16415

TRANSFER SWITCHES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes automatic transfer switches rated 600 V and less. Generator manufacturer shall furnish automatic transfer switch. Rating of the transfer switch shall be coordinated with generator rating and main circuit breaker. Transfer switch shall be contactor type.

1.02 SUBMITTALS

A. Product Data: Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified. Wiring diagrams shall identify external operational and required alarm contacts.

C. Field quality-control test reports.

D. Operation and maintenance data.

1.03 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NEMA ICS 1.

C. Comply with NFPA 70.

D. Comply with NFPA 99.

E. Comply with NFPA 110.

F. Comply with UL 1008 unless requirements of these Specifications are stricter.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Contactor Transfer Switches:

a. AC Data Systems, Inc.
b. Caterpillar; Engine Div.
c. Emerson; ASCO Power Technologies, LP.
d. Generac Power Systems, Inc.
e. GE Zenith Controls.
f. Kohler Power Systems; Generator Division.
g. Onan/Cummins Power Generation; Industrial Business Group.
h. Russelectric, Inc.
i. Spectrum Detroit Diesel.

2.02 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

A. 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.

B. Tested Fault-Current Closing and Withstand 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.

1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.

C. Solid-State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.

D. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

E. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid mechanically and electrically interlocked in both directions.

F. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.

1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are not acceptable.

2. Switch Action: Double throw; mechanically held in both directions.

3. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units, rated 225 A and higher, shall have separate arcing contacts.

G. Neutral Terminal: Solid and fully rated, unless otherwise indicated.

H. Oversize Neutral: Ampacity and switch rating of neutral path through units indicated for oversize neutral shall be double the nominal rating of circuit in which switch is installed.

I. Enclosures: General-purpose NEMA 250, Type 4X, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.03 AUTOMATIC TRANSFER SWITCHES

A. Comply with Level 1 equipment according to NFPA 110.

B. Switching Arrangement: Double-throw type, incapable of pauses or intermediate position stops during normal functioning, unless otherwise indicated.

C. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval is adjustable from 1 to 30 seconds.

D. In-Phase Monitor: Factory-wired, internal relay controls transfer so it occurs only when the two sources are synchronized in phase.

E. Motor Disconnect and Timing Relay: Controls designate starters so they disconnect motors before transfer and reconnect them selectively at an adjustable time interval after transfer. Time delay for reconnecting individual motor loads is adjustable between 1 and 60 seconds, and settings are as indicated.

F. Programmed Neutral Switch Position: Switch operator has a programmed neutral position arranged to provide a midpoint between the two working switch positions, with an intentional, time-controlled pause at midpoint during transfer.

G. Automatic Transfer-Switch Features:

1. Undervoltage Sensing for Each Phase of Normal 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 is adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.

2. Adjustable Time Delay: For override of normal-source voltage sensing to delay transfer and engine start signals. Adjustable from zero to six seconds, and factory set for one second.

3. 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.

4. Time Delay for Retransfer to Normal Source: Adjustable from 0 to 30 minutes, and factory set for 10 minutes to automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.

5. Test Switch: Simulate normal-source failure.

6. Switch-Position Pilot Lights: Indicate source to which load is connected.

7. 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."

8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac. One shall be used for notification that transfer switch is connected to the generator.

9. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.

10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.

11. Engine Shutdown Contacts: Instantaneous; shall initiate shutdown sequence at remote engine-generator controls after retransfer of load to normal source.

12. 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.

13. 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 are adjustable from 10 to 30 minutes. Factory settings are 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 not available.

2.04 SOURCE QUALITY CONTROL

A. Factory test and inspect components, assembled switches, and associated equipment. 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.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Design each fastener and support to carry load indicated by seismic requirements and according to seismic-restraint details.

B. Identify components according to Division 16 Section "Electrical Identification."

C. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

3.02 CONNECTIONS

A. Ground equipment according to Division 16 Section "Grounding and Bonding."

B. Connect wiring according to Division 16 Section "Conductors and Cables."

3.03 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

B. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installation, including connections, and to assist in testing.

2. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.

3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

    a. Check for electrical continuity of circuits and for short circuits.
    b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
    c. Verify that manual transfer warnings are properly placed.
    d. Perform manual transfer operation.

5. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.

    a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
    b. Simulate loss of phase-to-ground voltage for each phase of normal source.
    c. Verify time-delay settings.
    d. Verify pickup and dropout voltages by data readout or inspection of control settings.
    e. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for 1 pole deviating by more than 50 percent from other poles.
    f. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

C. Coordinate tests with tests of generator and run them concurrently.

D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

E. Remove and replace malfunctioning units and retest as specified above.

F. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.

1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.

2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

3. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.04 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment as specified below. Refer to Division 1 Section "Demonstration and Training."

B. Coordinate this training with that for generator equipment.

END OF SECTION

SECTION 16420

ENCLOSED CONTROLLERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes the following enclosed controllers rated 600 V and less:

1. Full-voltage manual.

2. Full-voltage magnetic.

3. Multispeed.

1.02 DEFINITIONS

A. CPT: Control power transformer.

B. MCCB: Molded-case circuit breaker.

C. MCP: Motor circuit protector.

D. N.C.: Normally closed.

E. N.O.: Normally open.

F. OCPD: Overcurrent protective device.

1.03 SUBMITTALS

A. Product Data: For each type of enclosed controller.

B. Shop Drawings: For each enclosed controller. Include dimensioned plans, elevations, sections, details, and required clearances and service spaces around controller enclosures.

1. Wiring Diagrams: For power, signal, and control wiring.

C. Field quality-control reports.

D. Operation and maintenance data.

1.04 QUALITY ASSURANCE

A. 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.

B. Comply with NFPA 70.

C. IEEE Compliance: Fabricate and test enclosed controllers according to IEEE 344 to withstand seismic forces defined in Division 16 Section "Vibration and Seismic Controls for Electrical Systems."

PART 2 - PRODUCTS

2.01 FULL-VOLTAGE CONTROLLERS

A. General Requirements for Full-Voltage Controllers: Comply with NEMA ICS 2, general purpose, Class A.

B. Motor-Starting Switches: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off or on.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
c. Rockwell Automation, Inc.; Allen-Bradley brand.
d. Siemens Energy & Automation, Inc.
e. Square D; a brand of Schneider Electric.

2. Configuration: Nonreversing.

3. Surface mounting.

4. Pilot light.

C. Fractional Horsepower Manual Controllers: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off, on, or tripped.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
c. Rockwell Automation, Inc.; Allen-Bradley brand.

d. Siemens Energy & Automation, Inc.
e. Square D; a brand of Schneider Electric.

2. Configuration: Nonreversing.

3. Overload Relays: Inverse-time-current characteristics; NEMA ICS 2, Class 10 tripping characteristics; heaters matched to nameplate full-load current of actual protected motor; external reset push button.

4. Surface mounting.

5. Pilot light.

D. Integral Horsepower Manual Controllers: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off, on, or tripped.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
c. Rockwell Automation, Inc.; Allen-Bradley brand.
d. Siemens Energy & Automation, Inc.
e. Square D; a brand of Schneider Electric.

2. Configuration: Nonreversing.

3. Overload Relays: Inverse-time-current characteristics; NEMA ICS 2, Class 10 tripping characteristics; heaters and sensors in each phase, matched to nameplate full-load current of actual protected motor and having appropriate adjustment for duty cycle; external reset push button.

4. Surface mounting.

5. Pilot light.

E. Magnetic Controllers: Full voltage, across the line, electrically held.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
c. Rockwell Automation, Inc.; Allen-Bradley brand.
d. Siemens Energy & Automation, Inc.
e. Square D; a brand of Schneider Electric.

2. Configuration: Nonreversing.

3. Contactor Coils: Pressure-encapsulated type.

   a. Operating Voltage: Depending on contactor NEMA size and line-voltage rating, manufacturer's standard matching control power or line voltage.

4. Power Contacts: Totally enclosed, double-break, silver-cadmium oxide; assembled to allow inspection and replacement without disturbing line or load wiring.

5. Control Circuits: 24 or 120-V ac, coordinated with control components; obtained from integral CPT, with primary and secondary fuses, with CPT of sufficient capacity to operate integral devices and remotely located pilot, indicating, and control devices.

6. Melting Alloy Overload Relays:

   a. Inverse-time-current characteristic.
   b. Class 10 tripping characteristic.
   c. Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.

7. Bimetallic Overload Relays:

   a. Inverse-time-current characteristic.
   b. Class 10 tripping characteristic.
   c. Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.

8. Solid-State Overload Relay:

   a. Switch or dial selectable for motor running overload protection.
   b. Sensors in each phase.
   c. Class 10 tripping characteristic selected to protect motor against voltage and current unbalance and single phasing.

9. External overload reset push button.

F. Combination Magnetic Controller: Factory-assembled combination of magnetic controller, OCPD, and disconnecting means.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
   b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
   c. Rockwell Automation, Inc.; Allen-Bradley brand.

d. Siemens Energy & Automation, Inc.
e. Square D; a brand of Schneider Electric.

2. Fusible Disconnecting Means:

a. NEMA KS 1, heavy-duty, horsepower-rated, fusible switch with clips or bolt pads to accommodate Class J fuses.
b. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
c. Auxiliary Contacts: N.O./N.C., arranged to activate before switch blades open.

3. Nonfusible Disconnecting Means:

a. NEMA KS 1, heavy-duty, horsepower-rated, nonfusible switch.
b. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
c. Auxiliary Contacts: N.O./N.C., arranged to activate before switch blades open.

4. MCP Disconnecting Means:

a. UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents, instantaneous-only circuit breaker with front-mounted, field-adjustable, short-circuit trip coordinated with motor locked-rotor amperes.
b. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
c. Auxiliary contacts "a" and "b" arranged to activate with MCP handle.

5. MCCB Disconnecting Means:

a. UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents; thermal-magnetic MCCB, with inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits.
b. Front-mounted, adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
c. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
d. Auxiliary contacts "a" and "b" arranged to activate with MCCB handle.

2.02 ENCLOSURES

A. Enclosed Controllers: NEMA ICS 6, to comply with environmental conditions at installed location.

1. Outdoor Locations: Type 4X.

2.03 ACCESSORIES

A. Push Buttons, Pilot Lights, and Selector Switches: NEMA ICS 5; heavy-duty type; factory installed in controller enclosure cover unless otherwise indicated.

B. Control Relays: Auxiliary and adjustable time-delay relays.

C. Phase-Failure, Phase-Reversal, and Undervoltage and Overvoltage Relays: Solid-state sensing circuit with isolated output contacts for hard-wired connections. Provide adjustable undervoltage, overvoltage, and time-delay settings.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Wall-Mounted Controllers: Install enclosed controllers on walls with tops at uniform height, and with disconnect operating handles not higher than 79 inches above finished floor, unless otherwise indicated, and by bolting units to wall or mounting on lightweight structural-steel channels bolted to wall. For controllers not at walls, provide freestanding racks complying with Division 16 Section "Hangers and Supports for Electrical Systems."

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

C. Install fuses in each fusible-switch enclosed controller.

D. Install fuses in control circuits if not factory installed.

E. Install heaters in thermal overload relays. Select heaters based on actual nameplate full-load amperes after motors have been installed.

F. Comply with NECA 1.

3.02 IDENTIFICATION

A. Identify enclosed controllers, components, and control wiring. Comply with requirements for identification specified in Division 16 Section "Electrical Identification."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.

2. Label each enclosure with engraved nameplate.

3. Label each enclosure-mounted control and pilot device.

3.03 CONTROL WIRING INSTALLATION

A. Install wiring between enclosed controllers and remote devices and facility's central control system/panel. Comply with requirements in Division 16 Section "Control-Voltage Electrical Power Cables."

B. Bundle, train, and support wiring in enclosures.

C. Connect selector switches and other automatic-control selection devices where applicable.

1. Connect selector switches to bypass only those manual- and automatic-control devices that have no safety functions when switch is in manual-control position.

2. Connect selector switches with enclosed-controller circuit in both manual and automatic positions for safety-type control devices such as low- and high-pressure cutouts, high-temperature cutouts, and motor overload protectors.

3.04 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed controller, component, connecting supply, feeder, and control circuit.

2. Test continuity of each circuit.

C. Tests and Inspections:

1. Inspect controllers, wiring, components, connections, and equipment installation. Test and adjust controllers, components, and equipment.

2. Test insulation resistance for each enclosed-controller element, component, connecting motor supply, feeder, and control circuits.

3. Test continuity of each circuit.

4. Verify that voltages at controller locations are within plus or minus 10 percent of motor nameplate rated voltages. If outside this range for any motor, notify Construction Manager before starting the motor(s).

5. Test each motor for proper phase rotation.

6. Perform each electrical test and visual and mechanical inspection stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

7. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

8. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

D. Enclosed controllers will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.05 ADJUSTING

A. Set field-adjustable switches and overload-relay pickup and trip ranges.

B. Adjust the trip settings of MCPs and thermal-magnetic circuit breakers with adjustable instantaneous trip elements. Initially adjust to six times the motor nameplate full-load ampere ratings and attempt to start motors several times, allowing for motor cooldown between starts. If tripping occurs on motor inrush, adjust settings in increments until motors start without tripping. Do not exceed eight times the motor full-load amperes (or 11 times for NEMA Premium Efficient motors if required). Where these maximum settings do not allow starting of a motor, notify Construction Manager before increasing settings.

3.06 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain enclosed controllers.

END OF SECTION

SECTION 16442

PANELBOARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes distribution panelboards and lighting and appliance branch-circuit panelboards.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.

2. Detail enclosure types and details for types other than NEMA 250, Type 1.

3. Detail bus configuration, current, and voltage ratings.

4. Short-circuit current rating of panelboards and overcurrent protective devices. Coordinate with available short circuit current from Utility.

5. Include evidence of NRTL listing for series rating of installed devices.

6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

7. Include wiring diagrams for power, signal, and control wiring.

8. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards.

C. Seismic Qualification Certificates: Submit certification that panelboards, overcurrent protective devices, accessories, and components will withstand seismic forces.

D. Field quality-control reports.

E. Panelboard schedules for installation in panelboards. Panelboard schedules shall match existing. Breaker ratings shall be coordinated with loads actually provided and connected.

F. Operation and maintenance data.

1.03 QUALITY ASSURANCE

A. 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.

B. Comply with NEMA PB 1.

C. Comply with NFPA 70.

1.04 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Division 16 Section "Vibration and Seismic Controls for Electrical Systems."

B. Enclosures: Surface-mounted cabinets.

1. Rated for environmental conditions at installed location.

a. Outdoor Locations: NEMA 250, Type 4X

2. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.

3. Directory Card: Inside panelboard door, mounted in transparent card holder.

C. Incoming Mains Location: Bottom.

D. Phase, Neutral, and Ground Buses: Tin-plated aluminum.

E. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Tin-plated aluminum.

2. Main and Neutral Lugs: Mechanical type.

3. Ground Lugs and Bus Configured Terminators: Mechanical type.

F. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

G. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.02 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.

3. Siemens Energy & Automation, Inc.

4. Square D; a brand of Schneider Electric.

B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

C. Mains: Main lugs only.

D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

E. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.03 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.

3. Siemens Energy & Automation, Inc.

4. Square D; a brand of Schneider Electric.

B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

2. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).

PART 3 - EXECUTION

3.01 INSTALLATION

A. Receive, inspect, handle, store and install panelboards and accessories according to NECA 407.

B. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

C. Install overcurrent protective devices and controllers not already factory installed.

1. Set field-adjustable, circuit-breaker trip ranges.

D. Install filler plates in unused spaces.

E. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

F. Comply with NECA 1.

3.02 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Division 16 Section "Electrical Identification."

B. Create a directory to indicate installed circuit loads and incorporating Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Division 16 Section "Electrical Identification."

D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Division 16 Section "Electrical Identification."

3.03 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.

2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Panelboards will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION

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