SPECIFICATIONS
AND
CONTRACT DOCUMENTS
FOR

RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS

FUNDING BY LOUISIANA WATERSHED PROJECTS GRANT PROGRAM:
LOCAL AND REGIONAL ROUND 2
LWI PROJECT NO. 48MTR27701

LOUISIANA WATERSHED INITIATIVE

LOUISIANA Office of COMMUNITY DEVELOPMENT

WORKING TOGETHER FOR SUSTAINABILITY AND RESILIENCE (WWW.WATERSHED.LA.GOV) > ADMINISTERED THRU >> COMMUNITY DEVELOPMENT BLOCK GRANT—MITIGATION (CDBG-MIT) FUNDS

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

100% FINAL PLAN SUBMITTAL
ST. JOHN THE BAPTIST PARISH, OWNER
BID NO. 2026.12
APRIL 16, 2026

STATE OF LOUISIANA
JITENDRA C. SHAH
License No. 19551
PROFESSIONAL ENGINEER
CIVIL ENGINEERING
04-16-2026

MEYER ENGINEERS, LTD.
ENGINEER AND ARCHITECT
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A/E Project No. 24-1130-0023

ST. JOHN THE BAPTIST PARISH
PURCHASING & PROCUREMENT DEPARTMENT
1811 W. Airline Highway
LaPlace, LA 70068

INVITATION TO BID
RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS

Bid No. 2026.12 **Closing Date: June 22, 2026 at 9:45 AM, Local Time**

Bids shall be addressed to the St. John the Baptist Parish Purchasing and Procurement. Bid envelopes shall be sealed, display the name, address, and Louisiana State Contractor's License Number of the bidder, and be clearly marked on the outside of the envelope **"BID NO. 2026.12 RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS".** Any bids received after the specified time and date will not be considered. The sealed bids will be publicly opened and read aloud at 10:00 A.M. Local Time, June 22, 2026, in the St. John the Baptist Parish Government Complex Council Chambers, 1811 W. Airline Highway, LaPlace, LA 70068.

A Mandatory Pre-Bid Conference will be held for Reserve Relief Homewood Pump Station Replacement and Drainage Improvements at St. John the Baptist Parish Council Chambers located at 1811 W. Airline Highway, Laplace, LA 70068, on June 9, 2026, at 10:00 A.M. Site visit will occur immediately following the mandatory pre-bid meeting at the site referenced above.

Questions and comments regarding this Bid must be submitted in writing to St. John the Baptist Parish, Purchasing & Procurement Department, ATTN: Peter Montz, 1811 West Airline Highway, LaPlace, LA 70068 or via e-mail to p.montz@Stjohn-la.gov no later than 10:00 A.M. local time on June 12, 2026.

Attention of Bidders is called particularly to the requirements for conditions of employment to be observed and minimum wage rates to be paid under the Contract (Davis-Bacon Act), Section 3 (Low Income Resident Participation) of the Housing and Urban Development Act of 1968, Section 109 (Non-Discrimination) of the Housing and Community Development Act of 1974, Section 503 (Non-Discrimination Against Employees with Disabilities) and Section 504 (Non-Discrimination Against Individuals with Disabilities) of the Rehabilitation Act of 1973, Segregated Facilities, and all applicable laws and regulations of the Federal Government and State of Louisiana and bonding and insurance requirements.

Small businesses, minority businesses, women's business enterprises, veteran-owned businesses, labor surplus are firms and/or Section 3 businesses are encouraged to participate.

St. John the Baptist Parish is an equal opportunity employer.

Any person with disabilities requiring Special Accommodation must contact the St. John the Baptist Parish Council Office at (985) 652-9569 no later than seven (7) days prior to bid opening.

Successful bidder must have an active Unique Entity ID (UEI), as verified on www.sam.gov, prior to award of contract.

Publish: May 20, 2026, May 27, 2026, June 3, 2026
L'Observateur
St. John the Baptist Parish Web Page
Central Bidding

BIDDERS INFORMATION FORM

Bidder Information Form

Date:_____

Name of Bid:_____

Company Name:_____

AUTHORIZED SIGNITURE:_____

E-Mail Address:_____

Mailing Address:_____

City:_____**State:**_____**Zip:**_____

Business Phone:_____

Primary Contact Person:_____

Primary Contact Cell Phone:_____

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Bidders Information

RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS

BACKGROUND

The project includes the installation for the pump station replacement and drainage improvements at Homewood Pump Station located in St. John Parish. The Parish wishes to hereby Invite Bids from firms interested in and qualified to fulfill this emergency restoration need. The successful bidder will be issued an award letter and a purchase order.

This project consists of furnishing all supervision, labor, equipment, materials, and other resources necessary to complete Reserve Relief Homewood Pump Station Replacement and Drainage Improvements. **CONTRACTORS SHALL HOLD A LOUISIANA CONTRACTORS LICENSE IN HEAVY CONSTRUCTION.**

The BID package includes the following:

1. Public Works Bid Form
2. Bid Bond
3. Corporate Resolution or Certificate of Authority
4. Past Criminal Convictions Attestation*
5. Non-Solicitation and Unemployment Affidavit*
6. Certificate Regarding Debarment*
7. E-Verify Affidavit*
8. Certification Regarding Unpaid Worker's Compensation Insurance*
9. Prohibition of Contracts with Companies that Discriminate Against Firearm and Ammunition Industries*

***These documents are due prior to executing an agreement with St. John the Baptist Parish. They are not required to be submitted with the BID. Note: Items 4, 5, 7, 8 and 9 are included in the CDBG Compliance Provisions for Construction Contracts Section 01030.**

GENERAL TERMS AND CONDITIONS

1.0 BID Process

1.1 This BID is subject to all applicable state and local laws, including the Louisiana Code of Governmental Ethics.

1.2 BID package, associated documents and addenda may be obtained from the Department of Purchasing and Procurement at 1811 W. Airline Hwy., LaPlace, LA 70068 or by downloading from the Parish's website at www.sjbparish.com or Central Bidding at www.centralbidding.com. Electronic BIDS will be accepted only on www.centralbidding.com.

1.3 Written addenda to the BID may be issued to provide clarification, corrections, or to answer questions. It is the Company's responsibility to periodically check either Parish website, or Central Bidding for addenda that may be issued to implement changes or clarifications to the BID, prior to due date. **Checking the Parish website is HIGHLY recommended.**

1.4 Questions and comments regarding this BID must be submitted in writing to St. John the Baptist Parish, Purchasing & Procurement Department, **ATTN: Peter Montz, 1811 West Airline Highway, LaPlace, LA 70068 or via e-mail to p.montz@stjohn-la.gov no later than 10:00 A.M. Local Time June 12, 2026.**

2.0 Submission of BID

2.1 Electronic BIDS shall be accepted only on www.centralbidding.com and/or Paper BIDs shall be addressed to St. John the Baptist Parish and delivered to the receptionist located in the St. John the Baptist Parish Government Complex, 1811 West Airline Hwy., LaPlace, LA no later than **9:45 A.M. local time on June 22, 2026.**

2.2 BID package must be submitted in a sealed envelope or package clearly marked with the Bidder's name and address, and **"RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS".**

2.3 The Parish will not be responsible for submissions forwarded through the U.S. Postal Service or any delivery service if lost in transit at any time before submission opening, or if hand-delivered to the incorrect location.

2.4 BIDs submitted by facsimile (FAX) or e-mail will not be accepted. Any BID received after **9:45 A.M. local time** on **June 22, 2026,** will be deemed unresponsive and will be returned to Company unopened.

2.5 The bids are due on or before the exact closing date and time. Bids received after the exact closing date and time will NOT be considered. If hand delivering, please allow enough time for travel and parking to submit by the closing date and time. The response (including copies) must be submitted in a sealed envelope or package clearly marked with the Bidder's name, address and Louisiana State Contractor's Number, and "Reserve Relief Homewood Pump Station Replacement and Drainage Improvements". In the case of an electronic bid proposal, a contractor may submit an authentic digital signature on the electronic bid proposal accompanied by the contractor's license number.

2.6 Per LA R.S. 38:2212(B)(2), the bidding documents shall require only the following to be submitted by a bidder on a public works project:

- 2.6.1 Completed Louisiana Uniform Bid Form
- 2.6.2 Bid Security or Bid Bond
- 2.6.3 Acknowledgement of Addenda
- 2.6.4 Base Bid
- 2.6.5 Alternates
- 2.6.6 Signature of Bidder
- 2.6.7 Name, Title and Address of Bidder
- 2.6.8 Name of Firm or Joint Venture
- 2.6.9 Corporate Resolution or written evidence of the authority of the person signing the bid
- 2.6.10 Louisiana Contractor's License Number (must also be on the sealed envelope or package)

If the Parish adds any additional requirements for information, unless mandated by State or Federal requirements, they shall be part of the ten day documents submittal package.

3.0 Pre-BID Conference

A Mandatory Pre-Bid Conference will be held at St. John the Baptist Parish Department of Public Works located at 1811 W. Airline Highway, Laplace, LA 70068 on **June 9, 2026 at 10:00 A.M.** Site visits will occur immediately following the mandatory pre-bid meeting at the site referenced above.

4.0 Opening

BIDs will be opened publicly at **10:00 A.M. local time on June 22, 2026,** in the St. John the Baptist Parish Government Building, 1811 W. Airline Highway, LaPlace, LA 70068.

5.0 Public Disclosure

It is understood and agreed upon by the Company in submitting a BID that the Parish has the right to withhold all information regarding this procurement until after contract award, including but not limited to the number received; competitive technical information; competitive price information; and the Parish's evaluation concerns about competing BIDs. Information releasable after award is subject to the disclosure requirements of the Louisiana Public Records Act. Company specifically waives any claims against Parish related to the disclosure of any materials if made under a public records request.

6.0 Parish Commitment

6.1 Parish shall have the right to reject or accept any BID or offer at its sole discretion.

6.2 The Parish reserves the right to terminate this BID at any time prior to contract execution.

6.3 No prior, current, or post-award verbal conversation or agreement(s) with any officer, agent, or employee of the Parish shall affect or modify any terms or obligations of this BID, or any contract resulting from this procurement.

6.4 The Parish reserves the right to revise any part of the BID by issuing an addendum to the BID at any time in accordance with relevant Louisiana Revised Statutes. Issuance of this BID in no way constitutes a commitment by the Parish to award a contract. The Parish reserves the right to accept or reject, in whole or part, all BIDs submitted, and/or cancel this announcement if it is determined to be in the Parish's best interest. All materials submitted in response to this announcement become the property of the Parish, and selection or rejection of a submittal does not affect this right.

7.0 Late, Modified, or Withdrawn BIDs

7.1 Any BID received after the exact time specified for receipt will not be accepted or opened.

7.2 No modification of a BID will be accepted.

7.3 No Company may withdraw his/her BID within forty-five (45) days after the actual date of opening thereof.

8.0 Evaluation and Selection

The Parish Administration will present its recommendation to St. John the Baptist Parish Council for award. This award will be made to the low responsive and responsible Bidder. The Parish also reserves the right to reject any and all BIDs.

9.0 Time of Completion and Liquidated Damages

Bidder must agree to fully complete the project within **700** consecutive calendar days thereafter. Bidder must agree to pay as liquidated damages the sum of **One Thousand Dollars ($1,000)** for each consecutive calendar day thereafter until acceptance as hereinafter provided.

10.0 Insurance

Bidder shall obtain, pay for and keep in force, at its own expense, minimum insurance effective in all localities where Consultant/Company may perform the work hereunder, with such carriers as shall be acceptable to Council:

A. **Statutory Workman's Compensation** covering all state and local requirements and Employer's Liability Insurance covering all persons employed by Consultant/Company in connection with this agreement.

The limits for "A" above shall be not less than:

1. Employer's liability limits of $1,000,000
2. Some contracts may require USL&H or maritime coverage. This should be verified with Insurance Department/Legal Dept.
3. No excluded classes of owners/officers or employees shall be allowed on Council's premises.

WAIVER OF SUBROGATION in favor of St. John the Baptist Parish Council should be indicated on certificate.

B. **Commercial General Liability**:

1. Contractual liability assumed by this agreement.
2. Owner's and Contractor's Protective Liability (if Contractor is a General Contractor) may be required.
3. Personal and advertising liability
4. Completed operations.
5. Medical payments

The limits for "B" above shall not be less than:

1. $2,000,000 each occurrence limit
2. $2,000,000 products/completed operations limit
3. $4,000,000 general aggregate limit
4. $1,000,000 personal and advertising injury limit
5. $50,000 fire damage limit
6. $5,000 medical expense limit (desirable but not mandatory)

St. John the Baptist Parish Council will be NAMED as additional insured and WAIVER OF SUBROGATION in favor of St. John the Baptist Parish Council should be indicated on certificate.

Some contracts may require Protection and Indemnity coverage. This should be verified with Insurance Department/Legal Dept.

C. **Comprehensive Automobile Liability** covering all owned, hired, and other non-owned vehicles of the Company.

The limits for "C" above shall not be less than:

1. $500,000 per occurrence for bodily injury and property damage

This insurance shall include for bodily injury and property damage the following coverages:

1. Any automobiles;
2. Owned automobiles;
3. Hired automobiles;
4. Non-owned automobiles.

St. John the Baptist Parish Council will be NAMED as additional insured and WAIVER OF SUBROGATION in favor of St. John the Baptist Parish Council should be included on certificate.

WAIVER OF SUBROGATION in favor of St. John the Baptist Parish Council shall be included on the Certificate.

OTHER SPECIFIC COVERAGE RELATED TO THE TASK BEING PERFORMED MAY BE REQUIRED.

All required insurance certificates shall be submitted to the Director of Purchasing & Procurement prior to commencement of work. Company shall maintain insurance in full force and effect during the entire period of performance of work. All policies must have a thirty (30) day non-cancellation clause giving the Parish thirty (30) days prior written notice in the event a policy is changed or canceled.

D. **Professional Liability Insurance** covering the Wrongful Acts of those professional firms and individuals performing services for St. John the Baptist Parish. Certain classifications of service providers will be

required to provide evidence of Professional Liability Insurance. Examples of these providers include but are not limited to: Professional Engineers, Architects, Land Surveyors, Attorneys, and IT Consultants.

The limits for "D" above shall not be less than:

1. $1,000,000 CSL

WAIVER OF SUBROGATION in favor of St. John the Baptist Parish Council shall be included on the Certificate.

OTHER SPECIFIC COVERAGE RELATED TO THE TASK BEING PERFORMED MAY BE REQUIRED.

All required insurance certificates shall be submitted to the Director of Purchasing & Procurement prior to commencement of work. Bidder shall maintain insurance in full force and effect during the entire period of performance of work. All policies must have a thirty (30) day non-cancellation clause giving the Parish thirty (30) days prior written notice in the event a policy is changed or canceled.

E: **Builders Risk**: The contractor will acquire builders risk coverage for the full value of the project, or in the case of a renovation, for the full value of the renovation which provides all risk coverage for direct physical loss or damage to buildings/contents or structures during the course of construction. This coverage shall not have a deductible higher than a $5,000 per occurrence. The deductible is the responsibility of the contractor and should be taken into consideration when determining contract price.

F: Owner's and Contractor's Protective Liability Insurance: Refer to General Conditions Section 5.4.1.7.

11.0 Submittals Required After Bid Opening

Failure of the apparent low bidder to provide the following documentation any later than 10 days after the bid is opened shall be cause to declare the apparent low bidder non-responsive and award the bid to the next lowest bidder. (Pursuant to LA RS 38:2212)

- Past Criminal Convictions of Bidders Attestation*
- Non-Solicitation and Unemployment Affidavit *
- E-Verify Affidavit*
- Certification Regarding Debarment, Suspension, Lobbying, and Other Responsibility Matters
- Certification Regarding Unpaid Worker's Compensation Insurance*
- Prohibition of Contracts with Companies that Discriminate Against Firearm and Ammunition Industries*

*NOTE: These documents are included in the CDBG Compliance Provisions for Construction Contracts Section 01030.

12.0 Invoices

Applications for Payment will be processed by St. John the Baptist Parish.

Itemized invoices for payment of these services shall be submitted to the Purchasing and Procurement Director for approval prior to routing to Accounts Payable. Construction invoices shall be submitted using the AIA Application and Certification for Payment AIA G702 and G703 forms unless otherwise determined. St. John the Baptist Parish shall make progress payments on account of the Contract Price on the basis of CONTRACTOR's Applications for Payment as recommended by ENGINEER, as provided below. All such payments will be measured by the schedule of values established.

St. John the Baptist Parish shall retain the following percentages of each progress payment until payment is due under the terms and conditions governing retainage payment:

CONTRACT AMOUNT	RETAINAGE
$0 - $499,999.99	10%
$500,000.00 - Over	5%

Refer to the Contract Documents and provisions under in the General Conditions Article 6 titled "Contractor's Responsibilities" and Article 14 titled "Payments to Contractor and Completion", in addition to any other pertinent provision of the General Conditions, for the requirements associated with the approval of work and completion of all corrective work to the satisfaction of the ENGINEER, submittal and processing of Applications for Payment, and procedures for progress payments and release of final payment, inclusive of CONTRACTOR required deliverables.

13.0 Hold Harmless

To the fullest extent permitted by law, Company shall indemnify, hold harmless, and defend the Parish Council and all of its Agents and Employees, from and against all claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of or resulting from performance of the work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of Company.

14.0 Non-assignability

No Company shall assign any interest in this contract by assignment, transfer, or novation, without prior written consent of the Parish. This provision shall not be construed to prohibit the contractor from assigning his bank, trust company, or other financial institution any money due or to become due from approved contracts without such prior written consent. Notice of any such assignment or transfer shall be furnished promptly to the Parish.

15.0 Exclusions

Pursuant to Louisiana Revised Statute 38:2227, Contractor must certify that he has not been convicted of, or has not entered into a plea of guilty or nolo contendere to public bribery, corrupt influencing, extortion, money laundering or their equivalent Federal crimes. Consultant must further certify that he has not been convicted of, or has not entered into a plea of guilty or nolo contendere to theft, identify theft, theft of a business record, false accounting, issuing worthless checks, bank fraud, forgery; contractors' misapplication of payments, malfeasance in office, or their equivalent Federal crimes within the five (5) years prior to submitting the BID.

16.0 Disclosure

Company must disclose whether it provides services or pays commissions to any employee or elected official of St. John the Baptist Parish. If so, company must disclose to whom services are provided and/or commissions are paid. Both positive and negative responses must be submitted.

17.0 Termination for Cause and Convenience

Bidder acknowledges this contract contains termination provisions including the manner in which termination shall be affected and the basis for settlement. In addition, such provisions shall describe conditions for termination due to fault and for termination due to circumstances outside the bidder's control.

18.0 Severability Clause

If any one or more of the provisions contained in this Agreement shall, for any reasons, be held to be invalid, illegal or unenforceable, in whole or in part, such invalidity, illegality, or unenforceability shall not affect any other provisions of this Agreement, and in such an event, this Agreement shall be construed as if such invalid, illegal, or unenforceable provisions had never been contained herein.

19.0 Venue

This Agreement shall be governed by the laws of the State of Louisiana. Proper venue for any lawsuit arising under the terms of this Agreement shall be the Fortieth Judicial District Court, St. John the Baptist Parish and any appropriate Appellate therefrom. Bidder hereby agrees and consents to personal and/or in rem jurisdiction of the trail and appropriate Appellate courts.

20.0 Discrimination Clause

The Bidder agrees to abide by the requirements of the following as applicable: Title VI of the Civil Rights Act of 1964 and Title VII of the Civil Rights Act of 1964, as amended by the Equal Employment Opportunity Act of 1972, Federal Executive Order 11246 as amended, the Rehabilitation Act of 1973, as amended, the Vietnam Era Veteran's Readjustment Assistance Act of 1974, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, the Fair Housing Act of 1968 as amended, and Bidder agrees to abide by the requirements of the Americans with Disabilities Act of 1990.

21.0 Equal Employment Opportunity

During the performance of this contract, the contractor agrees to abide by 41 C.F.R. Part 60-1.4(b).

22.0 Davis Bacon

~~Not Applicable for FEMA Public Assistance Grants.~~

23.0 Copeland Anti-Kickback Act

~~Not Applicable for FEMA Public Assistance Grants.~~

24.0 Contract Work Hours and Safety Standards Act

The regulation at 29 C.F.R. § 5.5(b) provides contract clause language concerning compliance with the Contract Work Hours and Safety Standards Act.

Compliance with the Contract Work Hours and Safety Standards Act.

(1) *Overtime requirements.* No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) *Violation; liability for unpaid wages; liquidated damages.* In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of $27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.

(3) *Withholding for unpaid wages and liquidated damages.* The PARISH shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the

Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (4) of this section.

25.0 Rights to inventions made under a contract or agreement

~~Not Applicable for FEMA Public Assistance Grants~~

26.0 Clean Air Act

1. The contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq.

2. The contractor agrees to report each violation to the PARISH and understands and agrees that the PARISH will, in turn, report each violation as required to assure notification to the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.

~~3. The contractor agrees to include these requirements in each subcontract exceeding $150,000 financed in whole or in part with Federal assistance provided by FEMA.~~

27.0 Federal Water Pollution Control Act

1. The contractor agrees to comply with all applicable standards, orders, or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq.

~~2. The contractor agrees to report each violation to the PARISH and understands and agrees that the PARISH will, in turn, report each violation as required to assure notification to the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.~~

~~3. The contractor agrees to include these requirements in each subcontract exceeding $150,000 financed in whole or in part with Federal assistance provided by FEMA.~~

28.0 Suspension and Debarment

(1) This contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such, the contractor is required to verify that none of the contractor's principals (defined at 2 C.F.R. § 180.995) or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935).

(2) The contractor must comply with 2 C.F.R. pt. 180, subpart C and2 C.F.R. pt. 3000, subpart C, and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.

(3) This certification is a material representation of fact relied upon by the parish. If it is later determined that the contractor did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to the PARISH, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

(4) The bidder or proposer agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in

its lower tier covered transactions. a. Standard. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds.

29.0 Procurement of Recovered Materials

i. In the performance of this contract, the Contractor shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired—
1. Competitively within a timeframe providing for compliance with the contract performance schedule.
2. Meeting contract performance requirements; or
3. At a reasonable price.
ii. Information about this requirement, along with the list of EPA- designated items, is available at EPA's Comprehensive Procurement Guidelines web site, https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program.
iii. The Contractor also agrees to comply with all other applicable requirements of Section 6002 of the Solid Waste Disposal Act."

30.0 Access to Records

The Contractor agrees to provide the Parish, ~~the FEMA Administrator~~, the Comptroller General of the United States, or any of their authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions. The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.
~~The Contractor agrees to provide the FEMA Administrator or his authorized representatives access to construction or other work sites pertaining to the work being completed under the contract. In compliance with the Disaster Recovery Act of 2018, the Parish and the Contractor acknowledge and agree that no language in this contract is intended to prohibit audits or internal reviews by the FEMA Administrator or the Comptroller General of the United States~~

~~**31.0 DHS Seal, Logo and Flags**~~

~~The contractor shall not use the DHS seal(s), logos, crests, or reproductions of flags or likenesses of DHS agency officials without specific FEMA pre-approval.~~

32.0 Changes

No additional changes, enhancements, or modifications to any contract resulting from this BID shall be made without the prior approval of PARISH. Any modifications to the provisions of this contract shall be in writing, signed by all parties and approved the required authorities.

Changes to the contract include any change in compensation; beginning/ ending date of the contract; scope of work; and/or Contractor change through the Assignment of Contract process. Any such changes, once approved, will result in the issuance of an amendment to the contract. Change Orders shall be submitted using the Change Order AIA G701 form unless otherwise determined.

~~**33.0 Compliance with Federal Law, Regulations, and Executive Orders**~~

~~This is an acknowledgement that FEMA financial assistance will be used to fund all or a portion of the contract. The Contractor will comply with all applicable Federal law, regulations, executive orders, FEMA policies, procedures, and directives.~~

34.0 No Obligation by Federal Government

The Federal Government is not a party to this contract and is not subject to any obligations or liabilities to the non-Federal entity, contractor, or any other party pertaining to any matter resulting from the contract.

35.0 Program Fraud and False or Fraudulent Statements or Related Acts

The Contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to the Contractor's actions pertaining to this contract.

36.0 Substantial Completion

Substantial Completion shall be granted once the Parish, or its designated design consultant, identifies the project to be at the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. It is the responsibility of the Contractor to notify the Parish, and its designated design consultant, when the Contractor is of the opinion the project is substantially complete. Once determined the Work is identified as substantially complete a Certificate of Substantial Completion AIA G704 will be issued.

37.0 Tax Exempt

Pursuant to Louisiana Revised Statute 47:301(8)(c) the St. John the Baptist Parish Government, being a political subdivision, is exempted from sales tax levied by the State. The successful bidder will be issued a Louisiana Department of Revenue form R-1020, designating the Contractor as an agent for St. John the Baptist Parish for the exemption of sales tax.

CORPORATE RESOLUTION

(Corporations must use and submit their form)

1. The named signatory is the same individual authorized to sign pursuant to the contract language in the appearance clause.

2. An officer listed on the Corporation's Secretary of State listing has certified the Corporate Resolution.

3. The corporate resolution shall not be more than one year old.

4. The company properly grants authority to a named individual to sign on behalf of the company (authority granted by a corporation is granted through its board of directors).

5. Document shall be submitted with the submittal.

CERTIFICATE OF AUTHORITY

(LLC must use and submit their form)

1. The named signatory is the same individual authorized to sign pursuant to the contract language in the appearance clause.

2. An officer listed on the LLC's Secretary of State listing has certified the Certificate of Authority.

3. The Certificate of Authority shall not be more than one year old.

4. The Certificate of Authority is notarized.

5. The company properly grants authority to a named individual to sign on behalf of the company.

6. Document shall be submitted with the submittal.

Certification Regarding

Debarment, Suspension, and Other Responsibility Matters Primary Covered Transactions

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 13 CFR Part 145. The regulations were published as Part VII of the May 26, 1988 *Federal Register* (pages 19160-19211). Copies of the regulations are available from local offices of the U. S. Small Business Administration.

(1) The prospective primary participant certifies to the best of its knowledge and belief that it and its principals:

(a) Are not presently debarred, suspended, proposed for disbarment, declared ineligible, or
Voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three-year period preceding this application been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(d) Have not within a three-year period preceding this application had one or more public transactions (Federal, State, or local Terminated for cause of default.

(2) Where the Prospective primary participant is unable to certify to any of the statements in this
Certification, such prospective primary participant shall attach an explanation to this submittal.

Business Name:

_____

Date _____ By_____
Name and Title of Authorized Representative

_____
Signature of Authorized Representative

INSTRUCTIONS FOR CERTIFICATION

1. By signing and submitting this submittal, the prospective primary participant is providing the certification set out below.
2. The inability of a person to provide the certification required below will not necessarily result in denial participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the Prospective primary participant to furnish a certification or an explanation shall disqualify such person from participation in this transaction.
3. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.
4. The prospective primary participant shall provide immediate written notice to the department or agency to which this submittal is submitted if at any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
5. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "submittal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. You may contact the department or agency to which this submittal is submitted for assistance in obtaining a copy of those regulations (13 CFR Part 145).
6. The prospective primary participant agrees by submitting this submittal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
7. The prospective primary participant further agrees by submitting this submittal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered transaction, provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
8. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the ineligibility of its principals. Each participant may, but is not required to check the Non-Procurement List
9. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
10. Except for transactions authorized under paragraph 6 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

This form was electronically produced by Elite Federal Forms, Inc.

EXHIBIT A

Additional Information for Bidders

1. The Owner may reject any and all bids for just cause; such actions will be in accordance with Title 38 of the Louisiana Revised Statutes. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No bidder may withdraw a bid within 45 days after the actual date of the opening thereof except as provided by law.

2. Preparation of Bid: Each bid must be submitted on the prescribed form. All blank spaces for bid prices must be filled in, in ink or typewritten, in both words and figures.

3. Subcontractors: The bidder is specifically advised that any person for or other party to whom it is proposed to award a subcontract under this contract must be acceptable to the Owner.

4. Determination of Unit and Extended Prices: In unit price bids, the total amount bid shall be in the sum of the correct extensions of the unit price bid on each item of work multiplied by the approximate quantity of work shown for the respective item. Each extension shall be carried to one hundredth of a dollar, and the last digit in the extension (or cents' place) shall not be rounded off.

5. Erasures: The bid submitted must not contain erasures. Any and all interlineations or other corrections shall be suitably authenticated by affixing in the margin immediately opposite the correction the initials of the person or persons signing the bid.

6. Prices: In the event of a discrepancy between the prices quoted in words and those quoted in figures in the bid, the words shall control. The prices are to include the furnishing of all materials, plant, equipment, tools, and all other facilities, and the performance of all labor and services necessary or proper for the completion of the work except as may be otherwise expressly provided in the contract documents.

7. Qualifications of Bidder: The Owner may make such investigations deemed necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is responsible and is properly qualified to carry out the obligations of the contract and complete the work contemplated therein. Any conditions placed on a submitted bid shall result in rejection of such bid.

8. Bid Security: Each bid must be accompanied by cashier's check or certified check of the bidder, or a bid bond, duly executed by the bidder as principal and having as surety

thereon a surety company approved by the Owner, in the amount of 5 percent of the bid made payable to the Owner. Such cashier's checks, certified checks, or bid bonds will be returned to all except the three lowest bidders within three days after the opening of bids, and the remaining cashier's checks, certified checks, or bid bonds will be returned promptly after the Owner and the accepted bidder have executed the contract, or, if no award has been made within 45 days after the date of the opening of bids, upon demand of the bidder at any time thereafter, so long as he has not been notified of the acceptance of his bid.

Sureties used for obtaining bonds must appear as acceptable on the U.S. Department of the Treasury Circular 570.

9. Liquidated Damages for Failure to Enter into Contract: The successful bidder, upon his failure or refusal to execute and deliver the contract and bonds within 10 days after he receives notice of the acceptance of his bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his bid.

10. Time of Completion and Liquidated Damages: Bidder must agree to fully complete the project within **Seven Hundred (700) consecutive calendar days** thereafter. Bidder must agree to pay as liquidated damages the sum of **One Thousand ($1,000) DOLLARS** for each consecutive calendar day thereafter until acceptance as hereinafter provided.

11. Conditions of Work: Each bidder must inform himself fully of the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve a successful bidder of his obligation to furnish all materials and labor necessary to carry out the provisions of his contract. Insofar as possible the contractor, in carrying out the work, must employ such methods or means as will not cause any interruption of or interference with the work of any other contractor.

12. Addenda and Interpretations: No interpretation of the meaning of the plans, specifications or other pre-bid documents will be made to any bidder orally.

    All questions should be directed to Peter Montz, Director of Purchasing, 985-359-1037 or email: p.montz@stjohn-la.gov Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be emailed to all bidders.

    Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the contract documents.

    QUESTIONS AND COMMENTS MUST BE SUBMITTED NO LATER THAN **10:00 A.M. Local Time, June 12, 2026.**

13. Security for Faithful Performance: Simultaneously with his delivery of the executed contract, the successful bidder shall furnish a surety bond or bonds as security for faithful

performance of this contract and for the payment of all persons performing labor on the project under this contract and furnishing materials in connection with this contract. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner. Only those surety companies currently on the U. S. Department of Treasury Financial Management Services list (Circular 570) of approved bonding companies will be accepted. The agent selling the bond must be currently licensed to do business in Louisiana. This will be verified by the Owner.

The successful bidder will be required to file a performance bond in the full amount (100-percent) of the contract price for the full period of the contract and a payment bond in the full amount (100-percent) of the contract price for the full period of the contract.

14. Power of Attorney: Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

15. Laws and Regulations: The bidder's attention is directed to the fact that all applicable State laws, municipal ordinances and rules and regulations of authorities having jurisdiction over construction of the project shall apply to the contract throughout and will be deemed to be included in the contract the same as written herein in full.

16. Method of Award: The contract, if awarded, will be awarded to the lowest responsive and responsible bidder.

17. Obligation of Bidder: At the time of the opening of bids, each bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the plans and contract documents (including all addenda). The failure or omission of any bidder to examine any form, instrument or document shall in no way relieve any bidder from any obligation with respect to his bid.

18. Hold Harmless: To the fullest extent permitted by law, Company/Consultant shall indemnify, hold harmless, and defend the Parish Council and all of its Agents and Employees, from and against all claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of or resulting from performance of the work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of Company.

19. Non-assignability: No Company/Consultant shall assign any interest in this contract by assignment, transfer, or novation, without prior written consent of the Owner. This provision shall not be construed to prohibit the contractor from assigning his bank, trust company, or other financial institution any money due or to become due from approved contracts without such prior written consent. Notice of any such assignment or transfer shall be furnished promptly to the Parish.

20. Exclusions: Pursuant to Louisiana Revised Statute 38:2227, Company must certify that he has not been convicted of or has not entered into a plea of guilty or nolo contendere to public bribery, corrupt influencing, extortion, money laundering or their equivalent Federal crimes. Consultant must further certify that he has not been convicted of or has not entered into a plea of guilty or nolo contendere to theft, identify theft, theft of a business record, false accounting, issuing worthless checks, bank fraud, forgery, contractors' misapplication of payments, malfeasance in office, or their equivalent Federal crimes within the five (5) years prior to submitting the proposal.

21. Disclosure: Company/Consultant must disclose whether it provides services or pays commissions to any employee or elected official of St. John the Baptist Parish. If so, company must disclose to whom services are provided and/or commissions are paid. Both positive and negative responses must be submitted.

22. E-Verify Program: Pursuant to Louisiana Revised Statute 38:2212.10, contractor must certify that it and each individual, firm or corporation associated with it and engaged in the physical performance of services in the State of Louisiana, under a contract with St. John the Baptist Parish has registered with, is participating in, and shall continue to participate in a federal work authorization program designated as such under the Illegal Immigration Reform and Immigrant Responsibility Act of 1996, as amended, which is operated by the United States Department of Homeland Security, known as the "E-Verify" program. Contractor must verify the legal status of all existing and new employees in the State of Louisiana by attesting herein that each is a citizen of the United States or legal aliens as defined by now effective immigration laws of the United States of America.

23. Invoices / Applications for Payments:
Applications for Payment will be processed by St. John the Baptist Parish.

Itemized invoices for payment of these services shall be submitted to the Purchasing and Procurement Director for approval prior to routing to Accounts Payable. Construction invoices shall be submitted using the AIA Application and Certification for Payment AIA G702 and G703 forms unless otherwise determined.

St. John the Baptist Parish shall make progress payments on account of the Contract Price on the basis of CONTRACTOR's Applications for Payment as recommended by ENGINEER, as provided below. All such payments will be measured by the schedule of values established.

St. John the Baptist Parish shall retain the following percentages of each progress payment until payment is due under the terms and conditions governing retainage payment:

CONTRACT AMOUNT	RETAINAGE
$0 - $499,999.99	10%
$500,000.00 - Over	5%

Refer to the Contract Documents and provisions under in the General Conditions Article 6 titled "Contractor's Responsibilities" and Article 14 titled "Payments to Contractor and Completion", in addition to any other pertinent provision of the General Conditions, for the requirements associated with the approval of work and completion of all corrective work to the satisfaction of the ENGINEER, submittal and processing of Applications for Payment, and procedures for progress payments and release of final payment, inclusive of CONTRACTOR required deliverables.

24. Insurance: Bidder shall obtain, pay for, and keep in force, at its own expense, minimum insurance effective in all localities where Consultant/Company may perform the work hereunder, with such carriers as shall be acceptable to Council.

25. Site Visits: Site visit will occur immediately following the mandatory pre-bid conference. Contractors shall make every effort to attend the scheduled site visit to take any measurements and photographs needed to compile their bid. If additional site visits are needed contact Peter Montz (p.montz@stjohn-la.gov)."

BID BOND

FOR

ST. JOHN THE BAPTIST PARISH

Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That_____of_____, as Principal, and_____, as Surety, are held and firmly bound unto the St. John the Baptist Parish (Obligee), in the full and just sum of five (5%) percent of the total amount of this proposal, including all alternates, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater that the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for:

RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

_____	_____
PRINCIPAL (BIDDER)	SURETY
BY: _____	BY: _____
AUTHORIZED OFFICER-OWNER-PARTNER	AGENT OR ATTORNEY-IN-FACT(SEAL)

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: St. John the Baptist Parish
1811 W. Airline Highway
LaPlace, LA 70068

(Owner to provide name and address of owner)

BID FOR: Reserve Relief Homewood Pump Station Replacement and Drainage Improvements
Bid No.
A/E Project No. 24-1130-0023

(Owner to provide name of project and other identifying information)

The undersigned bidder hereby declares and represents that she/he; a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: MEYER ENGINEERS, LTD. and dated: APRIL 16, 2026.

(Owner to provide name of entity preparing bidding documents.)

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA:** (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) _____.

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid" * but not alternates) the sum of:

_____ Dollars ($ _____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

N/A Dollars ($ N/A)

Alternate No. 2 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

N/A Dollars ($ N/A)

Alternate No. 3 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

N/A Dollars ($ N/A)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

_____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

** If someone other than a corporate officer signs for the Bidder/Contractor, a copy of a corporate resolution or other signature authorization shall be required for submission of bid. Failure to include a copy of the appropriate signature authorization, if required, may result in the rejection of the bid unless bidder has complied with La. R.S. 38:2212(B)5.

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA RS 38:2218.A is attached to and made a part of this bid.

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

TO: **ST. JOHN THE BAPTIST PARISH**
1811 W. AIRLINE HIGHWAY
LAPLACE, LA 70068
(Owner to provide name and address of owner)

BID FOR: **RESERVE RELIEF HOMEWOOD PUMP STATION**
REPLACEMENT AND DRAINAGE IMPROVEMENTS
BID NO.
A/E PROJECT NO. 24-1130-0023
(*Owner to provide name of project and other identifying*

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents, and described as unit prices. Amounts shall be stated in figures and only in figures.

DESCRIPTION:	✓ BASE BID OR □ ALT.#___	CLEARING AND GRUBBING		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
201-01-00100	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	REMOVAL OF STRUCTURES AND OBSTRUCTIONS		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
202-01-00100	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	REMOVAL OF EXISTING PUMP STATION		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
202-01-00200	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	REMOVAL OF CONCRETE CATCH BASINS AND INLETS		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
202-02-06060	16	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	REMOVAL OF COMBINATION CURB AND GUTTER		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
202-02-06080	200	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	REMOVAL OF PIPE (STORM DRAIN) (VARIOUS SIZES)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
202-02-32140	1,900	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	REMOVAL OF PORTLAND CEMENT CONCRETE PAVEMENT (VARIABLE THICKNESS)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
202-02-32500	65	SY		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	GENERAL EXCAVATION (NET SECTION)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
203-01-00100	11,000	CY		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	EMBANKMENT (NET SECTION)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
203-03-00100	500	CY		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	GEOTEXTILE FABRIC		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
203-08-00100	2,000	SY		
DESCRIPTION:	✓ BASE BID OR □ ALT.#	CLEAN/REGRADE EXISTING DITCH		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
203-10-00100	1,100	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	TEMPORARY EROSION CONTROL		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
204-01-00100	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#	CLASS II BASE COURSE		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
302-01-00100	235	CY		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

TO: **ST. JOHN THE BAPTIST PARISH**
1811 W. AIRLINE HIGHWAY
LAPLACE, LA 70068
(Owner to provide name and address of owner)

BID FOR: **RESERVE RELIEF HOMEWOOD PUMP STATION**
REPLACEMENT AND DRAINAGE IMPROVEMENTS
BID NO.
A/E PROJECT NO. 24-1130-0023
(Owner to provide name of project and other identifying

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DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	TRAFFIC MAINTENANCE AGGREGATE (VEHICULAR MEASURE)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
402-01-00100	500	CY		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	ASPHALTIC CONCRETE (WEARING COURSE) (2")		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
502-01-00100	1,155	TON		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	SAW CUTTING ASPHALTIC CONCRETE PAVEMENT		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
502-05-00001	500	IN-LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	COLD PLANING ASPHALT PAVEMENT		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
509-01-00100	10,130	SY		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	PAVEMENT PATCHING (15" MINIMUM THICKNESS)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
510-01-00255	600	SY		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	PORTLAND CEMENT CONCRETE PAVEMENT (8" THICK)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
601-01-00100	165	SY		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	SAW CUTTING PORTLAND CEMENT CONCRETE PAVEMENT		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
601-16-00010	290	IN-LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	FULL DEPTH PATCHING OF JOINTED CONCRETE PAVEMENT (9" THICK)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
602-05-03160	975	SY		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	STORM DRAIN PIPE (24" RCP)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
701-03-01041	22	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	STORM DRAIN PIPE (30" RCP)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
701-03-01061	120	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.#	STORM DRAIN PIPE (36" RCP)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
701-03-01081	128	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	STORM DRAIN PIPE (24" RCPA)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
701-04-01040	100	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.#	STORM DRAIN PIPE (30" RCPA)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
701-04-01060	240	LF		

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LAPLACE, LA 70068
(Owner to provide name and address of owner)

BID FOR: **RESERVE RELIEF HOMEWOOD PUMP STATION**
REPLACEMENT AND DRAINAGE IMPROVEMENTS
BID NO.
A/E PROJECT NO. 24-1130-0023
(Owner to provide name of project and other identifying

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DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	STORM DRAIN PIPE (36" RCPA)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
701-04-01080	240	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	STORM DRAIN PIPE ARCH (48" EQUIV. RCPA)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
701-04-01120	140	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	CLEANING EXISTING STORM DRAINAGE PIPE		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
701-14-00100	370	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	CATCH BASIN		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
702-03-00010A	1	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	CATCH BASIN (VERTICAL)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
702-03-00010B	10	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	TEE INLET		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
702-03-00010C	2	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	24' ROLLING CHAIN LINK GATE		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
705-04-00100	1	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	CHAIN LINK FENCE (6-FOOT HEIGHT)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
705-06-00100	660	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	6-FOOT DOUBLE GATES FOR CHAIN LINK FENCE (6-FOOT HEIGHT)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
705-08-02040	2	EACH		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	INCIDENTAL CONCRETE PAVING (6" THICK)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
706-03-03500	300	SY		
DESCRIPTION:	✓ BASE BID OR □ ALT.#	CONCRETE CURB (BARRIER OR MOUNTABLE)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
707-01-00100	90	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	RIPRAP (55 LB. 24" THICK)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
711-01-04020	520	SY		
DESCRIPTION:	✓ BASE BID OR □ ALT.#	RIPRAP (130 LB. 24" THICK)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
711-01-05000	420	SY		

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UNIT PRICE FORM

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BID FOR: **RESERVE RELIEF HOMEWOOD PUMP STATION**
REPLACEMENT AND DRAINAGE IMPROVEMENTS
BID NO.
A/E PROJECT NO. 24-1130-0023
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DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	TEMPORARY SIGNS AND BARRICADES		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
713-01-00100	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	SLAB SODDING		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
714-01-00100	5,000	SY		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	EROSION CONTROL SYSTEM		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
720-01-00100	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	PROJECT SITE LABORATORY (EQUIPPED)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
722-02-00100	1	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	GRANULAR MATERIAL (NET SECTION)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
723-01-00100	500	CY		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	MOBILIZATION AND DEMOBILIZATION		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
727-01-00100	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	42" STEEL CASING (0.625" WALL THICKNESS) (JACK OR BORE) (CN RAILROAD CROSSING)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
728-01-00001	200	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	60" STEEL CASING (0.844" WALL THICKNESS) (JACK OR BORE) (CPKC RAILROAD CROSSING)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
728-01-00002	50	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	DEAD END ROAD INSTALLATION		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
729-19-00100	1	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	REFLECTORIZED RAISED PAVEMENT MARKERS		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
731-02-00100	150	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.#	PLASTIC PAVEMENT STRIPING (4" WIDTH) (THERMOPLASTIC 90 MIL)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
732-01-01000	4,400	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.# ___	PLASTIC PAVEMENT STRIPING (6" WIDTH) (THERMOPLASTIC 90 MIL)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
732-01-01020	100	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.#	PLASTIC PAVEMENT STRIPING (8" WIDTH) (THERMOPLASTIC 90 MIL)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
732-01-01040	100	LF		

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BID FOR: **RESERVE RELIEF HOMEWOOD PUMP STATION**
REPLACEMENT AND DRAINAGE IMPROVEMENTS
BID NO.
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DESCRIPTION:	✓ BASE BID OR □ ALT.#___	PLASTIC PAVEMENT STRIPING (BROKEN LINE) (4" WIDTH) (THERMOPLASTIC 90 MIL)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
732-03-02000	1.0	MILE		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	PLASTIC PAVEMENT LEGENDS AND SYMBOLS (ARROW-TURN)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
732-04-01080	2	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	HYDRO-SEEDING		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
739-01-00100	2	ACRE		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	CONSTRUCTION LAYOUT		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
740-01-00100	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	PERMANENT SHEETING (STEEL)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
802-02-00100	24,120	SF		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	TEMPORARY SHEETING (STEEL)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
802-03-00100	9,600	SF		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	PRECAST CONCRETE PILES (14")		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
804-01-00200	6,756	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	PRECAST CONCRETE TEST PILES (14")		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
804-05-00200	1	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	STATIC LOAD TEST (PRECAST CONCRETE PILES) (14")		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
804-09-00200	1	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	CLASS A1 REINFORCED CONCRETE (PUMP STATION SLABS & WALLS)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
805-01-00100	900	CY		
DESCRIPTION:	✓ BASE BID OR □ ALT.#	CLASS A1 CONCRETE (BENT CAP)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
805-01-00300	20	CY		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	CLASS A1 CONCRETE (HEADWALLS)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
805-01-01000	65	CY		
DESCRIPTION:	✓ BASE BID OR □ ALT.#	REINFORCED CONCRETE BOX CULVERTS (4' X 4')		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
805-14-00100	252	LF		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

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DESCRIPTION:	✓ BASE BID OR □ ALT.#___	REINFORCED CONCRETE BOX CULVERTS (5' X 4')		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
805-14-00200	60	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	REINFORCED CONCRETE BOX CULVERTS (10' X 7')		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
805-14-00300	339	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	CONCRETE APPROACH SLABS		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
813-01-00100	960	SF		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	48" DIAMETER WELDED STEEL DISCHARGE PIPE		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-01	3	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	48" DIAMETER STEEL DISCHARGE PIPE - WELDED BEND AT OUTFALL		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-02	3	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	(135 CFS) VERTICAL AXIAL-FLOW DRAINAGE PUMP & APPURTENANCES WITH 250 HP-TEFC HORIZONTAL ELECTRIC MOTOR AND APPURTENANCES		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-03	3	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	COMBINATION AIR-RELEASE/VACUUM-BREAK VALVE & APPURTENANCES		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-04	3	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	GALVANIZED WELDED STEEL PIPE HAND RAIL ASSEMBLIES & APPURTENANCES		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-05A	100	LF		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	GALVANIZED WELDED STEEL STAIRS AND GRATINGS		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-05B	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	MISCELLANEOUS STEEL WORK		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-06-01	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#	HOIST WITH FRAMING AND COVER		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-06-02	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	304/316 STAINLESS STEEL TRASH SCREEN		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-07	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#	DEWATERING OPERATIONS		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-08	1	LS		

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DESCRIPTION:	✓ BASE BID OR □ ALT.#___	PREFAB ELECTRICAL EQUIPMENT BUILDING		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-09	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	EXPLORATORY EXCAVATIONS (0" - 8' DEEP)		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-10	5	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	INSTALLATION OF DIESEL-DRIVEN PRIME EXISTING GENERATOR SET WITH SOUND INSULATION ENCLOSURE AND INTEGRAL SUB-BASE FUEL TANK & SERVICE PLATFORMS		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-11	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	PUMP CONTROL PANEL AND SCADA		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-12	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	VFD DRIVE		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-13	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	ELECTRICAL WORK		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-14	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	ATS		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-15	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	CONDUIT & WIRE		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-16	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	LIGHTING		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-17	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	ENTERGY ALLOWANCE		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-18	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#	GEAR PACKAGE		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-19	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	ENTERGY OVERHEAD POWER LINE RELOCATION		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-20	1	LS		
DESCRIPTION:	✓ BASE BID OR □ ALT.#	JUNCTION BOX (27' - 8" X 10' - 4")		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-21	1	EA		
DESCRIPTION:	✓ BASE BID OR □ ALT.#___	CIPP LINER FOR 72" CMP AT CPKC RAILROAD		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
NS-22	50	LF		

Wording for "DESCRIPTION" to be provided by the Owner.
All quantities are estimated. The contractor will be paid based upon actual quantities as verified by the Owner.

AGREEMENT

THIS AGREEMENT, made this_____day of _____2026, by and between **St. John the Baptist Parish, LA** herein called "Owner," acting herein through its Parish President, Jaclyn Hotard, and_____Parish of_____, and State of_____, herein after called "Contractor."

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the OWNER, the CONTRACTOR hereby agrees with the OWNER to commence and complete the construction described as follows:

RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS

Hereinafter called the project, for the sum of_____Dollars ($_____) and all extra work in connection therewith, under the terms as stated in the specifications and at his/her (its/their) own proper cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said project in accordance with the specifications and contract documents.

Contractor hereby agrees to commence work under this contract on the date on the Purchase Order and to fully complete the project within **Seven Hundred (700)** consecutive calendar days thereafter. The Contractor further agrees to pay, as Liquidated Damages, the sum of **One Thousand Dollars ($1,000)** for each consecutive calendar day thereafter as hereinafter provided for herein.

~~The Contractor hereby agrees to perform work under this contract in accordance with the contract terms for FEMA Public Assistance Grant Funded or Assisted Projects for a non-federal entity (State agency or agency of a political subdivision of the State), which is attached as part of this agreement.~~

The OWNER agrees to pay the CONTRACTOR in current funds for the performance of the contract, subject to additions and deductions.

St. John the Baptist Parish shall retain the following percentages of each progress payment until payment is due under the terms and conditions governing retainage payment:

CONTRACT AMOUNT	RETAINAGE
$0 - $499,999.99	10%
$500,000.00 - Over	5%

IN WITNESS WHEREOF, the parties to these presents have executed this contract in three (3) counterparts, each of which shall be deemed an original, in the year and day first above mentioned.

_____

(Owner)

By_____

_____

(Title)

_____

(Contractor)

By_____

_____

(Title)

_____

(Address and Zip Code)

NOTE: Secretary of the Owner should attest. If Contractor is a corporation, Secretary should attest.

FORM OF PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____, a _____,
(Name of Contractor)

hereinafter called "Principal", and _____, State
(Surety)

of _____, hereinafter called the "Surety", are held and firmly bound unto

_____, of _____,
(Owner) (City and State)

hereinafter called "Owner", in the penal sum of _____
Dollars ($) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a

certain contract with the Owner, dated the _____ day of _____,

20__, a copy of which is hereto attached and made a part hereof for the construction of:

RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the Owner, with or without notice to the Surety, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the Owner from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any default in connection with the construction of such work, and all insurance premiums on said work, whether by sub-contractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in _____counterparts, each one of which shall be deemed an original, this the _____day of _____, 20__.

FORM OF PERFORMANCE BOND (continued)

WITNESSES:

_____
(Principal)

_____ _____

_____ Title: _____

_____
(Surety)

_____ By: _____
(Attorney-in-fact)

_____ _____
(Address)

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is Partnership, all partners should executed bond.

FORM OF LABOR AND MATERIALS PAYMENT BOND

KNOW ALL MEN BY THESE PRESENT: that

_____
(Name of Contractor)

_____
(Address of Contractor)

a _____hereinafter called Principal,

and _____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, all held and firmly bound unto the Parish of Jefferson hereinafter called Owner, in the penal sum of _____ Dollar ($) in lawful money of the United States, for the payment of which sum well and truly be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the Owner, dated the _____day of _____, 20__, a copy of which is hereto attached and made a part hereof for the construction of:

RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such work, and all insurance premiums on said work, and for all labor, performed in such work whether by subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for the value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder or to the specifications accompanying the same shall in anywise affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the specifications.

PROVIDED, FURTHER, that no final settlement between Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in _____counterparts, each of which shall be deemed an original, this ____day of _____, 20__.

FORM OF LABOR AND MATERIALS PAYMENT BOND (continued)

ATTEST:

_____ _____
Principal
BY:_____

ADDRESS:_____

(SEAL)

_____

_____
Witness as to Principal

_____
Address

ATTEST:

_____ _____
Surety
BY:_____

ADDRESS:_____

(SEAL)

_____

_____

_____
Address

NOTE: DATE OF BOND must not be prior to date of Contract:

1. Correct Name of Contractor
2. A Corporation, A Partnership, or an Individual
3. Correct Name of Surety

CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chap. 38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

_____

Signature of Contractor's Authorized Official

_____

Name and Title of Contractor's Authorized Official

_____

Date

GENERAL CONDITIONS

ARTICLE 1 - Definitions

Wherever used in these General Conditions or in the other Contract Documents, the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

Acceptance, Final Acceptance - The formal action by ENGINEER accepting the Work, or a specified part of the work thereof, as being complete in all respects, or the action by ENGINEER to place the equipment/facilities in operation for continuous utilization for their intended purposes.

Agreement - Refers to the written document signed by the OWNER and CONTRACTOR that is the legal instrument binding the parties to the work. The terms "Agreement" and "Contract" are synonymous.

Application for Payment - The form furnished by CONTRACTOR and approved by ENGINEER for requesting progress payments and an affidavit of CONTRACTOR and its Subcontractors that progress payments theretofore received from OWNER on account of the work have been applied by CONTRACTOR and its Subcontractors to discharge in full all of CONTRACTOR'S and its Subcontractors' obligations stated in the prior Application for Payment, and that the accuracy of the progress reported in the Application for Payment to have been completed by CONTRACTOR or its Subcontractors has been verified by CONTRACTOR. The application for Payment should include all supporting documentation as required by the Contract Documents.

Bid - Refer to definition of Proposal Document in Instructions to Bidders.

Bonds - Bid, performance and payment bonds and other instruments of security.

Change Order - A written order to CONTRACTOR in accordance with the Louisiana Bid Law and approved by OWNER authorizing an alteration, deviation, addition, deletion, and/or revision in the Work, or an adjustment in the Contract Price and/or the Contract Time.

Contract Documents - Those documents itemized herein and as may be further itemized in the Supplementary Conditions. The Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post-bid documentation submitted), the bonds, the General Conditions, the Technical Provisions, the Drawings as the same are more specifically identified in this Agreement, together with all Modifications issued after the execution of this Agreement shall be part of the Contract Documents.

Contract Price - The moneys payable by OWNER to CONTRACTOR under the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.9.1 in the case of Unit Price Work).

Contract Time - The number of days (computed as provided in paragraph 17.2) or the date stated in the Agreement for the completion of the Work.

CONTRACTOR - A person, firm or corporation with whom OWNER has entered into the Agreement for the Work designated under the Contract Documents. The term "CONTRACTOR" shall also mean CONTRACTOR or its authorized representative.

Correction Period - The time during which CONTRACTOR must repair defective work or remove defective work from the site and replace it with non-defective work, all at no cost to the OWNER, pursuant to Paragraph 13.12 of the General Conditions.

Day - A calendar day of twenty-four hours measured from midnight to the next midnight.

Defective - An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents or does not meet the requirements of any inspection, test, referenced standard or approval referred to in the Contract Documents, or 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 14.8 or 14.10).

Drawings - The drawings which show the character and scope of the Work to be performed and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents. The terms "Drawing" and "Plan" are synonymous, and wherever used in the Contract Documents it should be interpreted according to the definition of "Drawings".

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.

ENGINEER - The individual, firm or corporation named as ENGINEER in the Supplementary Conditions, who will have the rights and authority assigned to the ENGINEER in the Contract Documents. The term "ENGINEER" means the ENGINEER or its authorized representative. The terms "ENGINEER", "DESIGN ENGINEER", "ARCHITECT" and "ENGINEER/ARCHITECT" are synonymous, and wherever used in the Contract Documents they should be interpreted according to the definition of "ENGINEER".

Field Order - A written order issued by ENGINEER to CONTRACTOR on or after the effective date of the agreement requiring a minor change in work not requiring an adjustment in the Contract Price or Contract Time.

General Requirements – refers to these General Conditions. The terms "General Requirements" and "General Conditions" are synonymous.

Laws and Regulations; Laws or Regulations - Laws, rules, regulations, ordinances, codes and/or orders.

Notice of a Proposed Change - A written document issued on or after the effective date of the agreement initiated by a) OWNER requesting that CONTRACTOR figure the potential effect on Contract Price or time of the proposed change described in the Notice, if the proposed change is to be ordered, or b) CONTRACTOR to notify OWNER that in the CONTRACTOR'S opinion a change has been requested in a Field Order, or pursuant to ENGINEER'S approval of a shop drawings, or a written interpretation or clarification (pursuant to paragraph 9.4). A Notice of a Proposed Change shall not constitute an order to change the work, as no change shall be considered ordered until an appropriate change order, or Work Directive Change is executed by OWNER.

Notice of Award - The written notice by OWNER to the apparent successful Bidder stating that upon compliance by the apparent successful Bidder with the conditions precedent enumerated therein, within the time specified, OWNER will sign and deliver the Agreement.

Notice to Proceed - A written notice given by OWNER to CONTRACTOR (with a copy to ENGINEER) fixing the date on which the Contract Time will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR'S obligation under the Contract Documents.

OWNER – St. John the Baptist Parish Government (SJBPG) which includes all Parish Departments, its elected and appointed officials, Agencies, Councils, Boards and Commissions, Districts, their officers, agents, servants and employees, including volunteers.

Operation, Initiation of - A point in time when OWNER initiates use of the entire work under the project for the purposes that it was planned, designed and built, setting forth commencement of the correction period.

Partial Utilization - Placing a portion of the Work in service for the purpose for which it is intended (or a related purpose) before reaching Substantial Completion for all the Work.

Project - The total construction of which the Work to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

Shop Drawings - All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for CONTRACTOR to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a Supplier and submitted to CONTRACTOR to illustrate material or equipment for some portion of the Work.

Specifications - Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

Subcontractor - An individual, partnership, corporation, joint venture, or other combination thereof who has a contract with Contractor to perform any part of the work at the site. The term "Subcontractor" shall also mean any individual, partnership, corporation, joint venture, or other combination thereof who has a contract with another Subcontractor to perform any part of the work at the site.

Substantial Completion - The finishing of the Work, or a specified part of the Work, in accordance with the Contract Documents, to the extent that Owner can use or occupy all or the specified part of the Work for the use for which it is intended without any concurrent Work at the site except as required to complete Punch List items with cumulative value under one percent (1%) of the Contract Price. Prerequisites for Substantial Completion include: (a) all systems have been successfully tested and demonstrated by the CONTRACTOR for their intended use, and (b) the Owner receiving all occupancy certifications and approvals from those State and local Public Entities with jurisdiction.

Supplementary Conditions - Section following General Conditions which amends or supplements the General Conditions and is a part of the Contract Documents and is located in the Book of Contract Documents.

Supplier - A manufacturer, fabricator, supplier, distributor, material man or vendor.

Testing, Pre-operational - All field inspections, installation checks, water tests, performance tests, and necessary corrections required of CONTRACTOR to demonstrate that individual components of the work have been properly erected and found to operate in accordance with the Contract Documents, so that they can be utilized continuously for their intended purposes.

Testing, Start-up - A pre-defined trial period required for achieving Substantial Completion during which CONTRACTOR is to operate the work, or a part specified thereof, under actual and simulated operating conditions and performing as defined in the Contract Documents, for the purposes of a) making such minor adjustments and changes as may be found necessary to comply with the requirements of the Contract Documents, and b) to comply with the final test requirements outlined in the Contract Documents.

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

Prices: Project to be paid on a lump sum basis.

Work - Any and all obligations, duties, responsibilities, labor, materials, equipment, temporary facilities, and incidentals, and the furnishing thereof necessary to complete the construction assigned to, or undertaken by CONTRACTOR, pursuant to the Contract Documents. Also, the completed construction or parts thereof required to be provided under the Contract Documents, including all materials, equipment, and supplies incorporated or to be incorporated in the construction.

Work Directive Change - A written directive to CONTRACTOR, issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER, ordering an addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in paragraph 4.2 or 4.3 or to emergencies under paragraph 6.20. A Work Directive Change may not change the Contract Price or the Contract Time, but is evidence that the parties expect that the change directed or documented by a Work Directive Change will be incorporated in a subsequently issued Change Order following successful negotiations by the parties as to its effect, if any, on the Contract Price or Contract Time as provided in paragraph 10.2.

ARTICLE 2 - Preliminary Matters

2.1 DELIVERY OF BONDS: When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish in accordance with paragraph 5.1.

2.2 COPIES OF DOCUMENTS: OWNER shall furnish to CONTRACTOR up to five copies (unless otherwise provided in the Supplementary Conditions) of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

2.3 COMMENCEMENT OF CONTRACT TIME; NOTICE TO PROCEED: A Notice to Proceed may be given at any time within thirty days after the effective date of the agreement. However, upon mutual written consent by both parties, the notice to proceed may be extended. The Contract Time will commence at the time specified in such notice to proceed or, if no notice is given, thirty days following the Effective Date of the Agreement.

2.4 STARTING THE PROJECT: CONTRACTOR shall start to perform the Work on the date when the Contract Time commences to run, but no Work shall be done at the site prior to the date on which the Contract Time commences to run, except with the written consent of OWNER.

2.5 BEFORE STARTING CONSTRUCTION: Before undertaking each part of the Work, CONTRACTOR shall (a) study and compare the Contract Documents with each other and against manufacturers, representations, (b) verify dimensions and field measurements, (c) coordinate requirements of dependent Work (location, dimensions, access, fit, completeness, class, codes, etc.), and (d) notify ENGINEER in writing of any conflict, error, omission or deviation from manufacturers' recommendations discovered. CONTRACTOR shall be responsible for any delay and all costs resulting from performing any Work before obtaining a written clarification or interpretation from ENGINEER, if CONTRACTOR had actual knowledge, or should have reasonably known that any such Work (a) involves a conflict, error or omission, or (b) is subject to specific method of installation, performance or test procedure or result which is contrary to the recommendation of the corresponding manufacturer. **Contractor shall also be responsible for locating all property lines and right-of-way lines prior to beginning construction.**

2.6 SCHEDULE SUBMITTALS: Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit four copies of the following schedules to ENGINEER for review:

2.6.1 An estimated progress schedule indicating the starting and completion dates of the various stages of the Work in accordance with the Contract Documents.

2.6.2 A preliminary schedule of Shop Drawing submissions.

2.6.3 A preliminary schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work which will be confirmed in writing by CONTRACTOR at the time of submission. The Schedule of Values will be organized along the Divisions, and sub-divisions, of the Technical Specifications.

2.7 INSURANCE CERTIFICATES: Before any Work at the site is started, CONTRACTOR shall deliver to OWNER, with a copy of ENGINEER, certificates (and other evidence of insurance requested by OWNER) which CONTRACTOR is required to purchase and maintain in accordance with paragraphs 5.4, 5.5, and 5.6. Certificates of Insurance must be accompanied by a letter from the Contractor's Insurance Agent certifying that the insurance being provided meets the limits and requirements of the specifications. An explanation of any abbreviations used on the certificates must also be provided.

2.8 PRE-CONSTRUCTION CONFERENCE: Within twenty days after the effective date of the Agreement, but before CONTRACTOR starts the Work at the site, a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to discuss the schedules referred to in paragraph 2.6, to discuss procedures for handling Shop Drawings and other submittals and for processing Applications for Payment, and to establish a working understanding among the parties as to the Work.

2.9 FINALIZING SCHEDULES: At least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to finalize the schedules submitted in accordance with paragraph 2.6. The finalized progress schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within the Contract Time, but such acceptance will neither impose on ENGINEER responsibility for the progress or scheduling of the Work nor relieve CONTRACTOR from full responsibility therefore. The finalized schedule of Shop Drawing submissions will be acceptable to ENGINEER as providing a workable arrangement for processing the submissions. The finalized schedule of values will be acceptable to ENGINEER as to form and substance.

ARTICLE 3 - Contract Documents; Intent, Amending, Re-use

3.1 INTENT: The Contract Documents comprise the entire Agreement between OWNER and CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

3.2 FUNCTIONALLY COMPLETE PROJECT: 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 Work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result will be supplied whether or not specifically called for. When words which have a well known technical or trade meaning are used to describe Work, materials or equipment such words shall be interpreted in accordance with such meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or be implication,

shall mean the latest standard specifications, 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), even though reference may be specifically made to an earlier standard. However, no provision of any referenced standard specifications, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR or ENGINEER, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to ENGINEER, or any of ENGINEER'S consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of subparagraph 9.13.3 or 9.13.4. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided for in paragraph 9.4. In the event of any conflict between any of these standard specifications, manuals, or codes and any Divisions of the Book of Technical Specifications, the latter requirements shall be binding on Contractor. In the event that two or more standard specifications, manuals, or codes conflict with one another, the requirement ultimately enforced shall be binding on CONTRACTOR. In this event it will be considered that the higher cost requirement has been considered in the CONTRACTOR'S Bid Proposal and the CONTRACTOR further agrees and acknowledges that compliance with this condition shall not warrant an increase in Contract Price nor Contract Time.

3.3 CONFLICT IN CONTRACT DOCUMENTS: If, during the performance of the Work, CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, CONTRACTOR shall so report to ENGINEER in writing at once and before proceeding with the Work affected thereby shall obtain a written interpretation or clarification from ENGINEER; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof. Until interpretation, clarification or instruction is obtained from ENGINEER, any work done by CONTRACTOR (or Subcontractors) after the discovery of such a conflict, error, or discrepancy, which is directly or indirectly affected by same, will be at his own risk and he shall bear all cost arising therefrom.

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

3.4.1 A Change Order (pursuant to paragraph 10.4), or

As indicated in paragraphs 11.2 and 12.1, Contract Price and Contract Time may only be changed by a Change Order.

3.5 WORK DIRECTIVE CHANGE: In addition, the requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by a Work Directive Change required by one or more of the following actions:

3.5.1 A Field Order (pursuant to paragraph 9.5 and 10.7)

3.5.2 ENGINEER'S approval of a Shop Drawing or sample (pursuant to paragraphs 6.24), or

3.5.3 ENGINEER'S written interpretation or clarifications (pursuant to paragraph 9.4)

3.6 RE-USE OF DOCUMENTS: Neither CONTRACTOR nor any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER shall have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER; and they shall not re-use any of them on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaptation by ENGINEER.

3.7 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS:

3.7.1 All figures and dimensions on the drawings and specifications shall be carefully checked by CONTRACTOR, who shall note all conflicts, errors, or discrepancies. CONTRACTOR will be held responsible for any conflict, error, or discrepancy not discovered before the work is executed, unless contractor could not have reasonably known about the conflict, error, or discrepancy. CONTRACTOR shall promptly notify ENGINEER in writing of any discrepancies, errors, or omissions discovered in review of the Contract Documents. ENGINEER will promptly investigate the matter and respond to CONTRACTOR.

3.7.2 In all cases, figured dimensions shall govern over scaled dimensions, but work not dimensioned shall be as directed, and work not particularly shown, identified, sized, or located shall be the same as similar parts that are shown or specified. Further, detail drawings shall govern over general drawings, larger scale details take precedence over smaller scale drawings, change order drawings govern over contract drawings, and contract drawings over shop drawings. Specifications shall govern as to products, execution and workmanship, and drawings shall govern as to locations, dimensions, or quantities to be furnished. Further, in all cases where specifications, notes or details in two drawings conflict, the more restrictive requirement as to quantities, product, execution, workmanship, or performance shall be binding on CONTRACTOR, unless otherwise directed by OWNER.

3.7.3 After the Agreement date, CONTRACTOR shall be furnished with a maximum number of five (5) sets of Plans, Specifications and Addenda in addition to those CONTRACTORS purchased during the bid period. Additional Specifications or Drawings requested by CONTRACTOR will be provided in complete sets and at the expense of CONTRACTOR.

ARTICLE 4 - Availability of Lands; Physical Conditions Reference Points (NOT USED)

ARTICLE 5 - Bonds and Insurance

5.0 ST. JOHN THE BAPTIST PARISH GOVERNMENT, DEFINED.

For the purposes of this Article, the terms "St. John the Baptist Parish Government," "SJBP," and "OWNER" shall include, but may not be limited to, all of the following entities and persons: the St. John the Baptist Parish Government (a political subdivision of the State of Louisiana); the St. John the Baptist Parish Council (the governing body of St. John the Baptist Parish); their elected and appointed officials, all parish departments, districts, agencies, councils, boards, and commissions, officers, agents, servants, employees and volunteers; and the elected and appointed officials, departments, officers, agents, servants, employees and volunteers of those departments, districts, agencies, councils, boards, and commissions.

5.1 PERFORMANCE AND OTHER BONDS

5.1.1 Unless otherwise provided for in the Louisiana Public Bid Law, 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 CONTRACTOR'S obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date of final payment, except as otherwise provided by Law or Regulation or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds when required by the Supplementary Conditions. All Bonds shall be in the forms prescribed by Law or Regulation or by the Contract Documents and 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 Audit Staff Bureau of Accounts, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority.

Any bond prescribed by the contract documents shall be written by a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the federal Register, or by a Louisiana domiciled insurance company currently possessing a rating of no less than A- in the latest printing of the A.M. Best's Key Rating Guide, to write individual bonds up to the percent of policyholders' surplus as shown in the A.M. Best's Key Rating Guide.

In addition, any surety bond written for a public works project shall be written by a surety or insurance company that is currently licensed and approved to do business in the state of Louisiana.

For any public works project, no surety or insurance company shall write a bond which is in excess of the amount indicated as approved by the U.S. Department of the Treasury Financial Management Service list or by a Louisiana domiciled insurance company with an A- rating by A.M. Best up to a limit of ten percent of policyholders' surplus as shown by A.M. Best; companies authorized by this Paragraph who are not on the treasury list shall not write a bond when the penalty exceeds fifteen percent of its capital and surplus, such capital and surplus in the amount by which the company's assets exceed its liabilities as reflected by the most recent financial statements filed by the company with the Department of Insurance.

5.1.2 If the Surety on any Bond or any insurance company providing any insurance overages furnished by CONTRACTOR is declared bankrupt, 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 this Article, CONTRACTOR shall within five (5) days thereafter, substitute another Bond and Surety and/or insurance company, both of which shall be acceptable to OWNER. The OWNER reserves the right to mandate the cessation of all work on the Project until the receipt of evidence of acceptable replacement Bonds and/or insurance.

5.1.3 If, at any time during the Contract Period, the CONTRACTOR fails to provide satisfactory evidence of all Bond and insurance requirements or fails to take all corrective action required by the OWNER, the OWNER reserves the right to mandate the cessation of all work on the Project until receipt of acceptable evidence of Bonds and insurance and/or corrective action undertaken.

5.2 INDEMNIFICATION AGREEMENT

To the fullest extent permitted by law, the CONTRACTOR shall protect, defend, indemnify, save and hold harmless the OWNER from and against any and all claims, demands, expense, losses, suits, costs, actions, fines, penalties, and liability, whether actual or alleged, arising out of or resulting from injury, sickness, disease or death to any person or the damage, loss, expense or destruction of any property, including loss of use resulting therefrom, which may occur, be caused by, or in any way result from any actual or alleged act, omission, negligence, misconduct, or strict liability of CONTRACTOR, its agents, its sub-contractors, partners, servants, officers, employees, volunteers, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, related to the performance or non-performance of the contract herein entered into, including any and all costs, fines, penalties, expense and/or attorney fees, including but not limited to expert witness fees, incurred by the OWNER as a result of any such claims, demands, losses and/or causes of action including any costs associated with the enforcement of this indemnity provision except those arising out of the sole negligence of OWNER. This indemnification does not apply to any strict liability of the St. John the Baptist Parish Government. The CONTRACTOR shall investigate, adjust, settle, contest to resolution, resist claims, handle, respond to, provide defense for and defend any such claims, demands, proceedings, judgments, or suits at its sole expense related thereto, even if such claim, proceeding, judgment, demand or suit is groundless, false or fraudulent.

5.3 POLICIES AND CERTIFICATES

All policies and certificates of insurance of the Contractor/Subcontractor shall contain the following clauses:

5.3.1 The Contractor/ Subcontractor's insurer will have no right of recovery or subrogation against the OWNER it being the intention of the parties that the insurance policies so affected shall protect both parties and shall be primary coverage for any and all losses covered by the below described insurance. Contractor's insurers shall waive all rights against the Owner

5.3.2 The OWNER shall be named as an additional insured as respects to liability arising out of activities performed by or on behalf of the Contractor: products and completed operations of the Contractor, premises owned, occupied or used by Contractor. The Commercial General Liability Policy shall include ISO Forms CG 20 10 or its equivalent.

5.3.3 The insurance companies issuing the policy or policies shall have no recourse against the OWNER for payment of any premiums or for assessments under any form of policy.

5.3.4 Any and all deductibles and/or self insured retentions in the below described insurance policies shall be assumed and be for the account of, and shall be borne solely by the Contractor/Subcontractor and at his sole expense without any right of reimbursement from the OWNER, and shall not exceed $10,000 per policy.

5.4 INSURANCE

The Contractor/Subcontractor, prior to commencing work, shall provide at his own expense, proof to the OWNER of the following insurance coverages required by the contract. Insurance is to be placed with insurance companies authorized to do business and approved in the State of Louisiana with an A.M. Best's rating of no less than A-:VI. This requirement will be waived for workers' compensation coverage only for those contractors whose workers' compensation coverage is placed with companies who participate in the State of Louisiana Workers' Compensation Assigned Risk Pool or the Louisiana Workers' Compensation Corporation. Policies are to be on an Occurrence basis, Claims Made policies are not acceptable. Contractor shall provide an "All-Risk" Builder's Risk Insurance Policy covering all perils typically found and which shall include coverage for wind damage and flood.

5.4.1 All notices will name the Contractor/Subcontractor and identify the contract number. Insurance coverage specified in the GENERAL CONDITIONS is to be provided by the Contractor with the following minimum limits:

5.4.1.1 Workers' Compensation-Statutory in compliance with the Compensation Law of the State of Louisiana. Employer's liability to be $1,000,000. Alternate Employer Endorsement in favor of OWNER; Waiver of Subrogation in favor of OWNER; and Thirty (30) days prior written notice of cancellation, non-renewal, and adverse material change to OWNER. The OWNER and the Contractor mutually agree that it is their intention to recognize the OWNER as the statutory employer of the contractor's employees (whether direct employees or statutory employees of the contractor) when any of the contractor's employees are doing work and/or providing service under this agreement.

5.4.1.2 Commercial General Liability Insurance: See Invitation for Bid Section 10.0 Insurance. This insurance shall include products/completed operations, contractual liability, personal injury, and without written prior approval of the OWNER, the Commercial General Liability coverages shall not exclude any standardized coverage included in the basic form or limit any coverages for this project in any way that would prohibit or limit the reporting of any claim, suit and the subsequent defense and indemnity that would normally be

provided by the policy. The Certificate of Insurance shall indicate which of the seven (7) coverage requirements below are not included in the policy, if any:

1. Premises - Operations;
2. Broad Form Contractual Liability;
3. Products and Completed Operations;
4. Use of Contractors and Subcontractors;
5. Personal Injury;
6. Broad Form Property Damage;
7. Explosion, Collapse, and Underground (XCU) Coverage

Note: On the certification of insurance, under the description of operations, the following wording is required: THE AGGREGATE LOSS LIMIT APPLIES TO EACH PROJECT, or a copy of ISO form CG2503 (Ed. 11-85) shall be submitted.

Waiver of Subrogation to cover both oral and written contracts in favor of the OWNER and Thirty (30) days notice of cancellation, non-renewal or material change. If unable to provide and grant 30 days notice of cancellation, this should be brought to the attention of the Risk Management Department for approval.

5.4.1.3 Business Automobile Liability Insurance with a combined single limit of $500,000 per occurrence for bodily injury and property damage. This insurance shall include for bodily injury and property damage the following coverages:

1. Any automobiles;
2. Owned automobiles;
3. Hired automobiles;
4. Non-owned automobiles.

5.4.1.4 An Umbrella Policy may be used to meet minimum requirements.

5.4.1.5 All property losses shall be made payable to and adjusted with OWNER.

5.4.1.6 All policies of insurance shall be approved by contracting OWNER prior to the inception of any work.

5.4.1.7 (OMITTED)

5.4.1.8 If, at any time any of the said policies shall be or become unsatisfactory to OWNER, as to form or substance, or if a company issuing any such policy shall be or become unsatisfactory to OWNER, the Contractor/Subcontractor shall promptly obtain a new policy, submit the same to OWNER for approval and submit a certificate thereof as herein above provided. Upon failure of the Contractor/Subcontractor to furnish, deliver and maintain such insurance as above provided, this contract, at the election of OWNER, may be forthwith declared suspended, discontinued or terminated. Failure of the Contractor/Subcontractor to take out and/or to maintain any required insurance shall not relieve the Contractor/Subcontractor from any liability under the contract, nor shall the insurance requirements be construed to conflict with obligations of the Contractor/Subcontractor concerning indemnification.

5.4.2 Thirty (30) days prior notice of cancellation shall be given to OWNER by registered mail, return receipt requested, on all of the required coverage provided to OWNER in the event of cancellation, non-renewal and/or any changes by insurers with regard to limits, terms or conditions (material changes). All notices will name the Contractor/Subcontractor and identify the contract number.

5.5 INFORMATION TO BIDDERS

RISKS AND INDEMNIFICATIONS ASSUMED BY THE CONTRACTOR. Neither the acceptance the completed work nor payment therefore shall release the Contractor/Subcontractor from his obligations from the insurance requirements or indemnification agreement.

5.5.1 Additional insurance may be required on an individual basis for extra hazardous contracts and specific service agreements. If such additional insurance is required for a specific contract, that requirement will be described in the "Special Conditions" section of the contract specifications.

5.5.1.1 The contractor will acquire builders risk coverage for the full value of the project, or in the case of a renovation, for the full value of the renovation which provides all risk coverage for direct physical loss or damage to buildings/contents or structures during the course of construction. This coverage shall not have a deductible higher than a $5,000 per occurrence. The deductible is the responsibility of the contractor, and should be taken into consideration when determining contract price.

5.5.2 If any of the insurance requirements are not complied with at their renewal dates, payments to the Contractor/Subcontractor will be withheld until those requirements have been met, or at the option of OWNER, OWNER may pay the Renewal Premium and withhold such payments from any monies due the Contractor/Subcontractor. However, under no circumstances shall OWNER be responsible for the payment or provision of fees to any Broker, Wholesaler, Agent or Producer involved in the placement or renewal of the policy(ies) in question.

5.5.2.1 The contractor shall purchase and maintain boiler and machinery insurance or additional property insurance as may be required by Laws and Regulations which will include the interest of OWNER, Contractor, Subcontractor, Architect and Architect's Consultants (or ENGINEER and Engineer's Consultants) in the work all of whom shall be listed as insured or additional insured parties.

5.5.3 All policies and certificates of insurance SHALL BE APPROVED BY OWNER PRIOR TO THE INITIATION OF ANY WORK. If OWNER has any objection to the coverage afforded by or any other provisions of the insurance required to be purchased and maintained by the Contractor in accordance with the insurance requirements for the work on the basis of non-conformance with the Contract Documents, OWNER shall notify the Contractor in writing within fifteen (15) days after receipt of the certificates. The Contractor shall provide a written response to OWNER with objections within ten (10) days from the date of the letter request.

5.5.4 Other coverage may be required by OWNER based on specific needs. If such other coverage is required for this contact, that coverage will be described in the "Special Conditions" of the contract specifications.

5.5.6 Contractors Pollution coverage with minimum limits of $1,000,000.00 naming OWNER as an Additional Insured due to the nature of work being performed.

5.5.7 SUBCONTRACTORS - Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates for each subcontractor. All coverage for subcontractors shall be subject to all of the requirements stated herein for the Contractor.

5.5.8 CERTIFICATE OF INSURANCE AND INDEMNIFICATION AGREEMENT - Contractor shall furnish OWNER with certificates of insurance effecting coverage required. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. THESE CERTIFICATES ARE TO BE RECEIVED AND APPROVED BY OWNER BEFORE WORK COMMENCES, AND THEREAFTER UPON RENEWAL OR

REPLACEMENT OF EACH REQUIRED COVERAGE. OWNER reserves the right to require complete, certified copies of all required insurance policies at any time and upon request.

5.5.9 INSURANCE REQUIREMENTS FOR CONTRACTORS - Contractors shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees or subcontractors. The cost of such insurance shall be included in the bid.

5.6 MINIMUM SCOPE OF INSURANCE

Coverage shall be at least as broad as:

5.6.1 COVERAGE:

5.6.1.1 Insurance Services Office Commercial General Liability coverage ("occurrence form CG 00 01"). "Claims Made" form is unacceptable. The "occurrence form" shall not have "sunset clause".

5.6.1.2 Insurance Services Office form number CA0001 covering Automobile Liability. The policy shall provide coverage for any auto or owned, hired, and non-owned coverage. If an automobile is to be utilized in the execution of this contract, and the vendor/contractor does not own a vehicle, then proof of hired and non-owned coverage is sufficient.

5.6.1.3 Workers' Compensation insurance as required by the Labor Code of the State of Louisiana, including Employers Liability insurance.

5.6.2 MINIMUM LIMITS OF INSURANCE: Contractor shall maintain limits no less than:

5.6.2.1 Commercial General Liability: See Invitation for Bid Section 10.0 Insurance for coverage terms and limits.

5.6.2.2 Automobile Liability: $500,000 combined single limit per accident, for bodily injury and property damage.

5.6.2.3 Workers' Compensation and Employers Liability: Workers' Compensation limits as required by the Labor Code of the State of Louisiana (Statutory Benefits). Employers Liability limit is to be $1,000,000.

5.6.3 DEDUCTIBLES AND SELF-INSURED RETENTIONS - Any deductibles or self-insured retentions must be declared to and approved by OWNER. At the option of the OWNER either: The insurer shall reduce or eliminate such deductibles or self-insured retentions as respects OWNER; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

5.6.4 OTHER INSURANCE PROVISIONS: The policies are to contain, or be endorsed to contain, the following provisions:

5.6.4.1 General Liability and Automobile Liability Coverages

a) OWNER is to be added as "additional insured" as respects liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor, premises owned, occupied or used by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded

to OWNER. It is understood that the business auto policy under "Who is an insured" automatically provides liability coverage in favor of OWNER.

b) Any failure to comply with reporting provisions of the policy shall not affect coverage provided to OWNER.

c) The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

5.6.4.2 Workers' compensation and Employer's Liability Coverage - The insurer shall agree to waive all rights of subrogation against OWNER for losses arising from work performed by the Contractor for OWNER.

5.6.4.3 All Coverages - Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, non-renewed, voided, canceled thirty (30) days prior written notice by certified mail, return receipt requested to OWNER.

5.6.5 ACCEPTABILITY OF INSURERS - Insurance is to be placed with insurers with A.M. BEST'S RATING OF NO LESS THAN A-:VI. This requirement will be waived for workers' compensation coverage only for those contractors whose workers' compensation coverage is placed with companies who participate in the State of Louisiana Workers' Compensation Corporation Assigned Risk Pool or Louisiana Workers' Compensation Corporation.

5.7 PARTIAL UTILIZATION - PROPERTY INSURANCE

If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, such use or occupancy may be accomplished in accordance with paragraph 14.10; provided that no such use or occupancy shall commence before the insurers providing the property insurance have acknowledged notice thereof and in writing effected the 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 allowed to lapse on account of any such partial use of occupancy.

5.8 PRIMARY COVERAGE

OWNER and CONTRACTOR intend that any policies provided in response to paragraphs 5.4.1.2, 5.5.1.1, and 5.5.2.1 shall protect all of the parties insured and provide primary coverage for all losses and damages caused by the perils covered thereby. Accordingly, all such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurer shall have no rights of recovery against any of the parties named as insured or additional insured, and if the insurers require separate waiver forms to be signed by ENGINEER, engineer's consultant or subcontractor, CONTRACTOR will obtain the same.

ARTICLE 6 - Contractor's Responsibilities

6.1 SUPERVISION: CONTRACTOR shall supervise 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, but CONTRACTOR shall not be responsible for the negligence of others in the design of construction which is indicated in and required by the Contract Documents. CONTRACTOR shall be responsible to see that the finished Work complies accurately with the Contract Documents.

6.2 CONTRACTOR'S SUPERINTENDENT:

6.2.1 CONTRACTOR shall keep on the Work at all times during its progress 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 the superintendent shall be as binding as if given to CONTRACTOR. If OWNER, at any time objects to the superintendent, CONTRACTOR shall provide a replacement superintendent at no increase in Contract Price or Contract Time.

6.2.2 The Superintendent shall, as a minimum, be required to be present at a monthly meeting of the Owner in order to address any applicable questions which may arise during construction of the project and to submit request for consideration and approval of any and all applications for payment. It shall be the Contractor's responsibility to ascertain and verify the time, date and location of said meeting. In the event the Superintendent fails to attend the said meeting, Owner may at his option refrain from approving any outstanding applications for payment until the requirements of this provision are fully complied with.

6.3 WORK HOURS: 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.

6.3.1 Except in connection with the safety or protection of persons or the work or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work under the project site shall be performed during normal working hours, and CONTRACTOR will not permit overtime Work or the performance of Work on Saturday, Sunday, legal holidays observed by the OWNER, or December 25th through January 1st of each year, without OWNER'S written consent given after prior written notice to ENGINEER.

6.3.2 Normal working hours shall be defined as CONTRACTOR'S normal eight-hour working period occurring between the hours set forth at the pre-construction conference, or if none are set forth, beginning at 7:00 a.m. and ending at 5:00 p.m., exclusive of Saturdays, Sundays, or legal holidays. Work during other than normal working hours may be scheduled as a regular procedure by CONTRACTOR if he first obtains written permission from OWNER. OWNER shall be entitled to recover costs for overtime inspection related to work done during other than normal working hours.

6.3.3 If CONTRACTOR, after reviewing the Contract Documents, and for his convenience and at no increase in Contract Price, feels that scheduled work during other than normal work hours will be required to complete the work within the Contract Time, CONTRACTOR shall submit a proposed schedule for said work with the construction schedule as described in Paragraph 2.6 of the General Conditions. This schedule will be reviewed for acceptance by OWNER and discussed at the pre-construction conference as described in Paragraph 2.8 of the General Conditions. If the schedule is accepted by OWNER, OWNER will not seek to recover costs for overtime inspection. OWNER'S approval of CONTRACTOR'S schedule will not be considered a basis for a change in the Contract Price. Changes in Contract Price will be resolved in accordance with Article 11 of the General Conditions.

6.3.4 If at any time subsequent to the submission of the construction schedule, an event within the control of CONTRACTOR occurs which, in the opinion of CONTRACTOR, requires him to request approval to schedule Work during other than normal working hours, for his convenience and at no increase in Contract Price, he shall submit at least three (3) working days in advance of overtime period proposed a revised schedule to ENGINEER. If OWNER accepts the schedule, CONTRACTOR will be notified in writing.

6.3.5 If the work performed during other than normal working hours is not scheduled in accordance with the procedures described above, or if CONTRACTOR'S schedule is not accepted by OWNER, OWNER will invoice CONTRACTOR for the costs of overtime inspection which will include but may not be limited

to costs for engineering, administrative expenses and other related costs. In the event CONTRACTOR fails to pay such costs within 30 days after receipt of an invoice from OWNER, the unpaid amount will be deducted from CONTRACTOR'S pay estimates and charged to the Contract.

6.3.6 CONTRACTOR shall light the parts of the work performed during other than normal working hours as required to comply with the Municipality or Agency with jurisdiction.

6.4 MATERIALS, EQUIPMENT AND LABOR: CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water and sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

6.5 MATERIALS AND EQUIPMENT:

6.5.1 All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provision of any such instructions will be effective to assign to ENGINEER, or any of engineer's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of subparagraphs 9.13.3 or 9.13.4.

6.5.1.1 Manufacturer's warranty for all material, products and equipment to be furnished by the CONTRACTOR and to be incorporated into the completed work shall be furnished to the OWNER through the CONTRACTOR.

6.5.1.2 The manufacturer of all materials, products and equipment shall furnish complete information as to any special conditions, or restriction to be applied in the use of these items. Should the manner or method of installation, specified performance or test results as set forth in these specifications be contrary to the manufacturer's recommendations for use of the product, the manufacturer shall at once notify the CONTRACTOR who shall forward same to the ENGINEER for appropriate action. Lack of such notification shall be certification by the CONTRACTOR that specification requirements will be met by the material, products and equipment under project conditions.

6.5.1.3 Data submitted on all equipment shall include complete maintenance instructions and parts lists in sufficient detail to facilitate ordering replacements.

6.5.2 Any equipment proposed for installation by the CONTRACTOR shall meet the intent and provisions of the specifications. All equipment shall be equal in performance to that specified. Performance shall mean equal in quality of construction and materials, efficiency, ease of maintenance, reliability and ability to meet the design parameters on which the specifications are based. Service over the life of the equipment is another factor on which the specification is based and the CONTRACTOR shall provide a written assurance that local service and a manufacturers' representative are currently available to provide service.

6.5.3 It shall be the responsibility of the CONTRACTOR to make certain that any equipment included in his bid meets the above- listed requirements. The CONTRACTOR shall submit to the ENGINEER a list of similar installations by the manufacturer of all major items of equipment to enable ENGINEER to determine their compliance with these drawings and specifications in regard to performance, design, arrangement and capacity. ENGINEER's out-of- pocket expenses to investigate and inspect similar installations of major items of equipment shall be paid by the CONTRACTOR.

6.6 ADJUSTING PROGRESS SCHEDULE: CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.6.1) adjustments in the progress schedule to reflect the impact thereon of new developments; these will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

6.7 SUBSTITUTES OR "OR-EQUAL" ITEMS:

6.7.1 CONTRACTOR is to furnish only material and equipment named or specified in the Contract Documents except where the Contract specifically allows for substitutions after the Contract award. Provisions to submit proposals for substitute and "Or Equal" materials and equipment before Bid opening are included in the Instructions to Bidders.

6.7.2 If an item of material or equipment named or specified in the Contract Documents is unavailable after Contract award, CONTRACTOR shall provide prompt written notice to the ENGINEER, and with such notice propose a substitute item with sufficient data to allow ENGINEER's review to determine if the proposed substitute has the essential characteristics of the item named or specified and desired. Any such request for substitution shall be made in sufficient time (including time for ENGINEER's review of the request, OWNER's issuance of a Change Order or Work Directive Change, shop drawing submittal and review, fabrication and delivery of the item, etc.) in advance of the scheduled time for installation of the item to avoid delay to the work. Any cost savings resulting from such substitution shall be credited to the OWNER in a Change Order. Any increased costs resulting from the substitution shall be borne by the CONTRACTOR and the unavailability of the item shall not entitle the CONTRACTOR to an extension of Contract time, unless CONTRACTOR can establish that due to no fault of CONTRACTOR, CONTRACTOR's subcontractors or Suppliers, it was not possible to determine availability of the item before the Contract was awarded.

6.7.3 If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to ENGINEER, if CONTRACTOR submits sufficient information to allow ENGINEER to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in paragraph 6.7.1 as applied by ENGINEER.

6.7.4 ENGINEER will be allowed a reasonable time within which to evaluate each proposed substitute. ENGINEER will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without ENGINEER'S prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing.

6.8 CONCERNING SUBCONTRACTORS, SUPPLIERS AND OTHERS:

6.8.1 CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to OWNER and ENGINEER as indicated in paragraph 6.8.2), whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection as to their responsibility. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

6.8.2 A Subcontractor or other person or organization identified in CONTRACTOR'S Bid and not objected to in writing by OWNER prior to the execution of the Agreement will be deemed acceptable to OWNER. All other Subcontractors shall be deemed to have been accepted if OWNER does not deliver a written objection thereto within 45 days after CONTRACTOR'S written identification of such Subcontractors. However, if, in accordance with the Louisiana Public Bid Law, OWNER has reasonable objection as to the responsibility of any Subcontractor whether identified in the Bid or subsequently, CONTRACTOR shall submit an acceptable substitute without entitlement to any change in the Contract Price. After acceptance

by OWNER of any particular Subcontractor, CONTRACTOR shall make no substitution without written approval of OWNER. No acceptance by OWNER of any such Subcontractor, supplier, or other person or organization shall constitute a waiver of any right of OWNER to reject defective work.

6.9 RESPONSIBILITY OF CONTRACTOR FOR SUBCONTRACTORS AND SUPPLIERS:

6.9.1 CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR'S own acts and omissions. Nothing in the Contract Documents shall create any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any Subcontractor, Supplier or other person or organization except as may otherwise be required by Laws and Regulations.

6.9.2 The CONTRACTOR shall coordinate the Work of Subcontractors to avoid conflicts and to assure clearances. Shop drawings of various trades shall be compared by CONTRACTOR before submittal to the ENGINEER for approval, to ascertain that the installation proposed does not conflict with the structured support or space requirement. The CONTRACTOR shall have full responsibility for satisfactory coordination and completion of all subcontract items.

6.9.3 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. The Divisions of the Specifications are complementary, and anything mentioned or shown in a Division of the Specifications or in a Specific Trade Drawing shall be of like effect as if shown in all Divisions of the Specifications and in all Drawings.

6.9.4 All Work performed for CONTRACTOR by a Subcontractor will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER and contains waiver provisions as required by paragraph 5.8. CONTRACTOR shall pay each Subcontractor a just share of any insurance moneys received by CONTRACTOR on account of losses under policies issued pursuant to paragraphs 5.4.1.2 and 5.5.2.1.

6.10 PATENT FEES AND ROYALTIES: (NOT USED)

6.11 PERMITS: Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses including appropriate NPDES/LPDES permits. 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, CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

6.12 LAWS AND REGULATIONS:

6.12.1 CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work including appropriate NPDES/LDPES regulations. 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.

6.12.2 If CONTRACTOR observes that the Specifications or Drawings are at variance with any Laws or Regulations, CONTRACTOR shall give ENGINEER prompt written notice thereof, and any necessary changes will be authorized by one of the methods indicated in paragraph 3.4. If CONTRACTOR performs

any Work knowing or having reason to know that it is contrary to such Laws or Regulations, and without such notice to ENGINEER, CONTRACTOR shall bear all costs arising therefrom; however, it shall not be CONTRACTOR'S primary responsibility to make certain that the Specifications and Drawings are in accordance with such Laws and Regulations.

6.13 TAXES: 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.

6.14 USE OF PREMISES: CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises 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 land or areas contiguous thereto, resulting from the performance of the Work. Should any claim be made against OWNER or ENGINEER by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim by arbitration or by law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold OWNER and ENGINEER harmless from and against all claims, damages, losses and expenses (including, but not limited to, fees of engineers, architects, attorneys and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any such other party against OWNER or ENGINEER to the extent based on a claim arising out of CONTRACTOR'S performance of the Work.

6.15 CLEANING PREMISES: During the progress of the Work, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the work CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by OWNER. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

6.16 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.

6.17 RECORD DOCUMENTS: CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Directive Changes, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all changes made during the 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.

6.18 SAFETY AND PROTECTION: CONTRACTOR shall be 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:

6.18.1 All employees on the Work and other persons and organizations who may be affected thereby;

6.18.2 All the Work and materials and equipment to be incorporated whether in storage on or off the site.

6.18.3 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.

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for the safety of persons or property or to protect them 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 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. All damage, injury or loss to any property referred to in paragraph 6.18.2 or 6.18.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish 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 anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR). CONTRACTOR'S duties and responsibilities for the safety and 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 14.13 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.19 SAFETY REPRESENTATIVE: CONTRACTOR shall designate a responsible representative at the site whose duty shall be the prevention of accidents. This person shall be CONTRACTOR'S superintendent unless otherwise designated in writing by CONTRACTOR to OWNER.

6.20 EMERGENCIES: In emergencies affecting the safety or protection of persons, the Work, or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from ENGINEER or OWNER, is obligated to act to prevent threatened damage, injury or loss. CONTRACTOR shall give ENGINEER prompt written notice if any significant changes in the Work or variations from the Contract Documents have been caused thereby. If ENGINEER determines that a change in the Contract Documents is required because of the action taken in response to an emergency, a Work Directive Change or Change Order will be issued to document the consequences of the changes or variations.

6.21 SHOP DRAWINGS: After checking and verifying all field measurements, CONTRACTOR shall submit to ENGINEER for review and approval in accordance with the accepted schedule of Shop Drawing submissions (see paragraph 2.9), five copies of all Shop Drawings, unless otherwise indicated in the Supplemental Conditions, which will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission. All submissions will be identified as ENGINEER may require. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specific performance and design criteria, materials and similar data to enable ENGINEER to review the information as required.

6.22 SAMPLES: CONTRACTOR shall also submit to ENGINEER for review and acceptance with such promptness as to cause no delay in Work, all samples required by the Contract Documents. All samples will have been checked by and accompanied by a specific written indication that CONTRACTOR has satisfied CONTRACTOR'S responsibilities under the Contract Documents with respect to the review of the submission and will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended.

6.23 SHOP DRAWINGS AND SAMPLES SUBMISSION REQUIREMENTS:

6.23.1 Before submission of each Shop Drawing or sample, CONTRACTOR shall have determined and verified all quantities, dimensions, specific performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each Shop Drawing or

sample with other Shop Drawings and samples and with the requirements of the Work and the Contract Documents.

6.23.2 At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each Shop Drawing submitted to ENGINEER for review and acceptance of each such variation.

6.24 ENGINEER'S REVIEW OF SHOP DRAWINGS AND SAMPLES:

6.24.1 ENGINEER will review and approve with reasonable promptness Shop Drawings and samples, but ENGINEER'S review and approval will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, sequences, techniques or procedures of construction 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. CONTRACTOR shall make any 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.

6.24.2 After his first review and comments on the Shop Drawings and samples the ENGINEER will either give his approval in accordance with the provisions of paragraphs 6.24.1, or request changes and corrections as noted. The CONTRACTOR shall then make changes and corrections noted and return them to the ENGINEER. If the Shop Drawings and samples are then acceptable, the ENGINEER will return them to the CONTRACTOR, as approved. However, if further revisions are required, ENGINEER'S cost and expenses of further review shall be paid by the CONTRACTOR.

6.24.3 ENGINEER's review and approval of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER'S attention to such variation at the time of submission as required by paragraph 6.23.2 and ENGINEER has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of paragraph 6.23.1 and 6.23.2.

6.24.4 Where a Shop Drawing or sample is required by the Specifications, any related Work performed prior to ENGINEER'S review and approval of the pertinent submission will be the sole expense and responsibility of CONTRACTOR.

6.25 CONTINUING THE WORK: 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 15.5 or as CONTRACTOR and OWNER may otherwise agree in writing.

6.26 INDEMNIFICATION:

6.26.1 To the fullest extent permitted by law, the CONTRACTOR shall protect, defend, indemnify, save and hold harmless the OWNER, including all Parish Departments, its elected and appointed officials, Agencies, Councils, Boards and Commissions, Districts, their officers, agents, servants and employees, including volunteers, from and against any and all claims, demands, expense, losses, suits, costs, actions, fines, penalties, actions, and liability, whether actual or alleged, arising out of or resulting from injury, sickness, disease or death to any person or the damage, loss, expense or destruction of any property, including loss of use resulting therefrom, which may occur, be caused by, or in any way resulting from any

actual or alleged act, omission, negligence, misconduct, or strict liability of CONTRACTOR, its agents, its sub-contractors, partners, servants, officers employees, volunteers, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, related to the performance or non-performance of the contract herein entered into, including any and all costs, fines, penalties, expense and/or attorney fees, including but not limited to expert witness fees, incurred by the OWNER, all Parish Departments, its elected and appointed officials, Agencies, Councils, Districts, Boards and Commissions, their officers, agents, servants and employees, including volunteers, as a result of any such claims, demands and/or causes of action except those arising out of the.... sole .....negligence of the OWNER, all Parish Departments, its elected and appointed officials, Districts, Agencies, Councils Boards and Commissions, their officers, agents servants and employees, including volunteers. The CONTRACTOR shall investigate, adjust, settle, contest to resolution, resist claims, handle, respond to, provide defense for and defend any such claims, demands, proceedings, judgments, or suits at its sole expense related thereto, even if such claim, proceeding, judgment, demand or suite is groundless, false or fraudulent.

6.26.2 In any and all claims against OWNER or ENGINEER or any of their consultants, agents or employees by any employee of CONTRACTOR, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, the indemnification obligation under this paragraph 6.26 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 or other person or organization under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

6.26.3 The obligations of CONTRACTOR under this paragraph 6.26 shall not extend to the liability of ENGINEER, his agents or employees arising out of the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or Specifications.

6.27 PROJECT MEETINGS: CONTRACTOR, along with appropriate Subcontractors, shall attend project meetings requested by OWNER for the purpose of discussing and resolving matters concerning the various elements of the work.

6.28 CONTRACTOR shall perform all work under this Agreement as an independent contractor and shall not be considered as an agent, employee, or servant of OWNER, nor shall CONTRACTOR'S subcontractors, employee's agents or servants, be considered to be agents, employees, or servants of OWNER.

6.29 QUALITY CONTROL:

6.29.1 CONTRACTOR shall establish a quality control system, narrative in style, to perform sufficient supervision, inspection and testing of all items of work including that of his Subcontractors to insure conformance to applicable Specifications and Drawings with respect to the material, workmanship, construction, finish, functional performance and identification. CONTRACTOR'S quality control system will specifically include the surveillance of the tests required in the technical provisions of the Specifications. A person shall be placed in charge of the CONTRACTOR'S quality control system and that person shall be other than the CONTRACTOR'S superintendent.

6.29.2 CONTRACTOR'S quality control will specifically include the checking, approval and coordination of all Shop Drawings, the ascertaining of the compliance of all items with specification requirements and the tests required in the technical provisions of the specifications, a procedure for preparing non-conformance reports, and completing a Daily Quality Control Report.

6.29.3 CONTRACTOR has the sole responsibility for compliance of the construction with the requirements of the Drawings and Specifications and the quality control system shall be such that this compliance is assured.

6.29.4 The quality control person shall, in the presence of the OWNER'S, check all contractor established elevations, the location of all underground pipelines and electrical conduits before covering begins, all reinforcing steel before pouring concrete, and any other item which cannot be located and inspected when work is complete. Data obtained shall be recorded by the quality control person on the record documents.

6.29.5 Within ten days after the date of the Agreement, CONTRACTOR shall furnish ENGINEER a quality control plan which shall include the name and experience record of the person in charge, procedures, instructions and reports to be used.

6.29.6 The form of Quality Control Daily Report is shown in Exhibit "B". This form shall be completed by the CONTRACTOR and each sub-contractor. This daily report shall include complete information as to personnel and equipment being utilized on the project along with a summary of work activities, (i.e., footage of various pipe laid, piles driven, equipment installed etc.) for each days work. These daily reports shall be included with CONTRACTOR'S monthly application for payment. The application for payment will be considered incomplete and will not be processed without inclusion of the Quality Control Daily Reports.

ARTICLE 7 - Other Work

7.1 RELATED WORK AT SITE: OWNER may perform other work related to the Project at the site by OWNER'S own forces, have other work performed by utility owners or let other direct contracts which shall contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to CONTRACTOR prior to starting any such other work.

7.2 ACCESS TO THE SITE: CONTRACTOR shall afford each utility owner and other contractor who is a party to such a direct contract (or OWNER, if OWNER is performing the additional work with OWNER'S employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the Work with theirs. CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and 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.

7.3 ACCEPTANCE OF THE WORK OF OTHERS: If any part of CONTRACTOR'S Work depends for proper execution or results upon the work of any such other CONTRACTOR or utility owner (or OWNER), CONTRACTOR shall inspect and promptly report to ENGINEER in writing any delays, defects or deficiencies in such work that render it unsuitable for such proper execution and results. CONTRACTOR'S failure so to report shall constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR'S Work except for latent or non-apparent defects and deficiencies in the other work.

7.4 COORDINATION:

7.4.1 Whenever Work to be performed by CONTRACTOR is dependent upon the work of other parties, CONTRACTOR shall coordinate that Work with the dependent work to the same extent that CONTRACTOR is required to coordinate dependent Subcontractor Work. Installation of Work by CONTRACTOR, directly or through a Subcontractor, in any given area, shall constitute acceptance by CONTRACTOR (including the Subcontractor) of all previously placed dependent work.

7.4.2 If OWNER contracts with other parties for other work, ENGINEER will have the authority and responsibility for coordinating activities of CONTRACTOR and those parties, unless another person or organization with specific authority and responsibility for coordination of the CONTRACTOR and those other parties is expressly designated in the Supplementary Conditions or at the pre-construction conference.

7.4.3 If OWNER contracts with other parties for other work, CONTRACTOR shall be responsible for cooperating with ENGINEER fully in the coordination of CONTRACTOR's Submittals with dependent Submittals of those other parties whose work in any way relates or depends upon the Work, or visa versa. When submitted to ENGINEER any such coordinated Submittal of CONTRACTOR shall identify by specific notation, within or attached to that Submittal, each and every item of interface with the other work.

7.5 MUTUAL DUTIES AND RESPONSIBILITIES:

7.5.1 If CONTRACTOR causes damage to the work or property of others, or if a claim arising out of CONTRACTOR's execution of Work is made by another party against CONTRACTOR, OWNER, or ENGINEER, CONTRACTOR shall promptly attempt to settle with that party by agreement or otherwise resolve the claim. CONTRACTOR shall defend, indemnify and hold harmless OWNER, ENGINEER and others as provided in paragraph 5.2, from and against all claims arising out of or resulting from damage by CONTRACTOR to the work or property of others or from CONTRACTOR's execution of the Work.

7.5.2 If another party causes damage to Work or property of CONTRACTOR, or if the performance of other work results in any claim by CONTRACTOR, CONTRACTOR shall promptly attempt to settle with that party by agreement or otherwise resolve the claim. CONTRACTOR shall not begin any action against OWNER or ENGINEER, their consultants, agents or any of their directors, officers, shareholders, agents or employees, or others indemnified as provided in paragraph 5.0, or permit any action against them to be maintained in CONTRACTOR's name or for CONTRACTOR's benefit before any court or tribunal, which action seeks to impose any liability or recover any damages from OWNER or ENGINEER for such claim.

7.5.3 Except as excluded in paragraph 7.5.4, if any party performing other work causes suspension of Work resulting in unreasonable delay under the circumstances, and if, upon a request from CONTRACTOR, OWNER concludes that any such delay requires a change in Contract Price or Contract Time, OWNER shall, pursuant to Articles 10 through 12, authorize such a change in Contract Price or Contract Time, or both.

7.5.4 If a party performing other work is granted an extension in a contract time only (based on unreasonable delay under circumstances not caused in whole or in part by acts or omissions of that party, OWNER, ENGINEER or OWNER's representative on that other work), and if, upon a request from CONTRACTOR, OWNER concludes that the extension granted to the other work requires a change in a coterminous Contract Time in the Contract Documents, OWNER shall authorize the necessary change in Contract Time only.

7.6 CONTRACTOR'S RESPONSIBILITY FOR OWNER COSTS: If CONTRACTOR becomes involved in settling or otherwise resolving claims with other persons performing other work arising out of events covered under paragraphs 7.5.1 or 7.5.2, or because of any other similar controversy, including damage to the Work or other work or a dispute about responsibility for clean-up or any other issue, neither OWNER, ENGINEER, nor any of their consultants, agents nor any of their directors, officers, stockholders nor employees will be involved in any way in such actions (except if subpoenaed). If OWNER incurs costs contrary to the provisions of this Article, CONTRACTOR shall reimburse those costs to the OWNER.

ARTICLE 8 - Owner's Responsibilities

8.1 Written communications from OWNER to CONTRACTOR will generally be issued through ENGINEER. If the need arises to issue written communication directly, a copy will be issued concurrently to ENGINEER. Written communications from CONTRACTOR to OWNER shall be issued to ENGINEER (and include two (2) copies for OWNER); from Subcontractor or Suppliers shall be issued through CONTRACTOR.

8.2 In case of termination of the employment of ENGINEER, OWNER shall appoint another ENGINEER whose status under the Contract Documents shall be that of the former ENGINEER. Any dispute in connection with such appointment shall be subject to the provisions of Article 16.

8.3 OWNER shall furnish the data required of OWNER under the Contract Documents promptly and shall make payments to CONTRACTOR promptly after they are due as provided in paragraphs 14.4 and 14.13.

8.4 OWNER'S duties in respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to OWNER'S identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions at the site and in existing structures which have been utilized by ENGINEER in preparing the Drawings and Specifications.

8.5 OWNER is obligated to execute Change Orders, either unilateral or negotiated, in OWNER's sole discretion, covering necessary changes in the work.

8.6 OWNER'S responsibility in respect to certain inspections, tests and approvals is set forth in paragraph 13.4.

8.7 In connection with OWNER'S right to stop Work or suspend Work, see paragraphs 13.10 and 15.1. Paragraph 15.2 deals with OWNER'S right to terminate services of CONTRACTOR under certain circumstances.

ARTICLE 9 - Engineer's Status during Construction

9.1 OWNER'S REPRESENTATIVE: The OWNER will provide an OWNER'S representative during the construction period. The duties and responsibilities and the limitations of authority of OWNER'S representative during construction are set forth in the Contract Documents and shall not be extended without written consent of OWNER.

9.2 VISITS TO SITE: In addition to the OWNER's representative, ENGINEER will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. Neither the OWNER's representative nor the ENGINEER will be required to make exhaustive or continuous on-site inspections 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 to the Contract Documents. On the basis of such visits and on-site observations as an experienced and qualified design professional, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defects and deficiencies in the Work.

9.4 CLARIFICATIONS AND INTERPRETATIONS: ENGINEER will issue with reasonable promptness such written clarification of interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If CONTRACTOR believes that a written clarification or interpretation justifies an increase in the Contract Price or Contract Time, CONTRACTOR may make a claim therefore as provided in Article 11 or Article 12 of the General Conditions.

9.5 AUTHORIZED VARIATIONS IN WORK:

9.5.1 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 Time and are consistent with the overall intent of 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 CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefore as provided in Article 11 or 12.

9.5.2 ENGINEER shall prepare change orders at OWNER'S request, and when required by the contract documents, ENGINEER shall set the price and/or time adjustments he deems reasonable.

9.6 REJECTING DEFECTIVE WORK: ENGINEER, based on its observations, reports of resident engineer(s) will have authority to disapprove or reject Work at any time during the construction of the Work, which does not conform to the Contract Documents. ENGINEER will also have authority to require special inspection or testing of the work as provided in Paragraph 13.9, whether or not the Work is fabricated, installed, or completed. When CONTRACTOR has been notified by ENGINEER of disapproval or rejection of non-conforming Work, CONTRACTOR shall take immediate action to correct same.

9.7 SHOP DRAWINGS: In connection with ENGINEER'S responsibility for Shop Drawings and samples, see paragraphs 6.21 through 6.25, inclusive.

9.8 CHANGE ORDERS: In connection with ENGINEER'S responsibilities for Change Orders, see Articles 10, 11 and 12.

9.9 PAYMENTS: In connection with ENGINEER'S responsibilities in respect of Applications for Payment, etc., see Article 14.

9.10 DETERMINATIONS FOR UNIT PRICES: ENGINEER will determine the actual quantities and classifications of unit price work performed by CONTRACTOR. Engineer will review with CONTRACTOR ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application of Payment or otherwise). ENGINEER's written decision will be final and binding on CONTRACTOR, unless within ten days after the date of any such decision, CONTRACTOR delivers to the ENGINEER and OWNER written notice of intention to appeal the ENGINEER's decision.

9.11 DECISIONS ON DISPUTES: ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Time will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph, which ENGINEER will render in writing within a reasonable time. Written notice of each such claim, dispute and other matter shall be delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than thirty days) after the occurrence of the event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within sixty days of after such occurrence unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim.

9.12 When functioning as interpreter and judge under paragraphs 9.10 and 9.11, 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. The rendering of a decision by ENGINEER pursuant to paragraph 9.10 and 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.16) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter.

9.13 LIMITATIONS ON ENGINEER'S RESPONSIBILITIES:

9.13.1 Neither ENGINEER'S authority to act under this Article 9 or elsewhere in the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization performing any of the Work, or to any surety for any of them.

9.13.2 Whenever in the Contract Documents the terms "as ordered", "as directed", "as required", "as allowed", "as approved", or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used to describe requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.13.3 or 9.13.4.

9.13.3 ENGINEER will not be responsible for CONTRACTOR'S means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and ENGINEER will not be responsible for CONTRACTOR'S failure to perform or furnish the Work in accordance with the Contract Documents.

9.13.4 ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

ARTICLE 10 - Changes in the Work

Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions or revisions in the Work; these will be authorized by a Change Order, Field Order, or a Work Directive Change. 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).
10.1 CHANGE ORDERS: Change Orders shall be submitted using the Change Order AIA G701 form unless otherwise determined. Change orders may be issued by OWNER in one of the following manners:

10.1.1 Bilateral change order: Type of order issued to CONTRACTOR when OWNER and CONTRACTOR have agreed on the price and time adjustment made necessary by the particular change order.

10.1.2 Unilateral change order: Type of order issued to CONTRACTOR when OWNER and CONTRACTOR cannot agree on the price and/or time adjustment necessitated by the particular change order, within the scope of the project. The OWNER will issue the unilateral change order setting forth such price and/or time adjustments that ENGINEER shall deem reasonable. Any dispute in connection with the issuance of a unilateral change order shall be subject to the provisions of paragraph 9.11 and Article 16.

10.2 CHANGE ORDER CLAIM: If OWNER and CONTRACTOR are unable to agree as to the extent, if any, of an increase or decrease in the Contract Price or an extension or shortening of the Contract Time that should be allowed as a result of a Work Directive Change or Change Order, a claim may be made therefore as provided in Article 11 or Article 12.

10.3 CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in paragraphs 3.4 and 3.5, except in the case of an

emergency as provided in paragraph 6.20 and except in the case of uncovering Work as provided in paragraph 13.9.

10.4 OWNER and CONTRACTOR shall execute appropriate Change Orders covering:

10.4.1 Changes in the Work which are ordered by OWNER pursuant to Article 10, are required because of acceptance of defective Work under paragraph 13.13 or correcting defective Work under paragraph 13.14 or are agreed to by the parties;

10.4.2 Changes in the Contract Price or Contract Time which are agreed to by the parties; and

10.4.3 Changes in the Contract Price or Contract Time which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11; 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 6.25.

10.5 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 Time) 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, and the amount of each applicable Bond will be adjusted accordingly.

10.6 WRITTEN PROPOSALS: At any time ENGINEER may request a quotation from CONTRACTOR for a proposed change in the Work. Within 15 calendar days after receipt of a Notice of a Proposed Change, unless otherwise indicated in the Notice, CONTRACTOR shall submit a written and detailed proposal for an increase or decrease in the Contract Price or Contract Time corresponding to the proposed change. The proposal shall include an itemized estimate of all costs and time for performance that will result directly or indirectly from the proposed change. Unless otherwise directed, itemized estimates shall be in accordance with the requirements of Articles 11 and 12 and in sufficient detail to reasonably permit an analysis by ENGINEER of all material, labor, equipment, subcontract, and overhead costs and fees and shall cover all aspects of the work involved in the change, whether such was deleted, added, changed, or impacted. Any amount claimed for subcontracts shall be similarly supported. Itemized schedule adjustments shall be in sufficient detail to permit an analysis of impact. Notwithstanding the request for quotation, CONTRACTOR shall carry on the Work and maintain the progress schedule. Delays in the submittal of the written and detailed quotation will not constitute a basis for an increase in contract time.

10.7 FIELD ORDER: ENGINEER may authorize minor changes in the Work not involving an adjustment in the Contract Price or the Contract Time, which are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order or in the approval of a shop drawing or sample, and shall be binding on CONTRACTOR. CONTRACTOR shall proceed with the performance of the changes in the Work so authorized by ENGINEER unless CONTRACTOR believes that such Field Order or approved shop drawing or sample entitles him to a change in the Contract Price or Time, or both, in which case CONTRACTOR shall give ENGINEER a written Notice of a Proposed Change thereof along with supporting documentation within 3 days of receipt of the Field Order or the approved shop drawing or sample and prior to commencing work. CONTRACTOR shall document the basis for the change in Contract Price or Time in accordance with paragraph 10.6 and the requirements of Article 11 and Article 12. Request for a Change Order to adjust Contract Price or Time arising out of a Field Order or an approved shop drawing will not be considered without the attachment thereto of a copy of the referenced Field Order or approved shop drawing. No claim by CONTRACTOR will be allowed if The Notice of a Proposed Change is submitted after Work on the Field Order or the approved shop drawing or sample has commenced, or after Final Payment under this Agreement.

10.8 CONTRACTOR'S ACCEPTANCE OF A CHANGE ORDER: The increase or decrease in Contract Price or Contract Time, or both stated in a Change Order signed by CONTRACTOR shall unequivocally comprise the total price and/or time adjustment due or owed for the Work or changes defined in the Change Order. By executing a Change Order, CONTRACTOR acknowledges and agrees that the stipulated increases or decreases in Contract Price and/or time represent full compensation for all increases or decreases in the cost of or the time required to perform the entire Work under the contract arising directly or indirectly from the change, including the costs and delays associated with the interruption of schedules, extended overheads, delay, loss of momentum, acceleration to overcome delays and loss of momentum, and cumulative impacts or ripple effect on all other non-affected work under this contract. Such signing of a Change Order constitutes full and mutual accord and satisfaction for the adjustment in Contract Price or time as a result of increases or decreases in costs and time of performance caused directly and indirectly from the change, subject to the current scope of the Work as set forth in the Contract Documents. Acceptance of this waiver constitutes an agreement between OWNER and CONTRACTOR that the Change Order represents an equitable adjustment to the Contract, and that CONTRACTOR will waive all rights to file a claim on the Change Order after it is properly executed by OWNER and CONTRACTOR

10.9 If upon the review of any proposal or claim submitted by CONTRACTOR, ENGINEER or OWNER determines that an adjustment or that no adjustment in Contract Price or Contract Time is justified under the Contract documents, that determination shall be final and binding on CONTRACTOR unless CONTRACTOR files a subsequent written notice of claim in the form of a Notice of Proposed Change in accordance with Articles 11 and 12, referencing the disputed determination, and CONTRACTOR furnishes any additional supporting data requested by ENGINEER or OWNER.

ARTICLE 11 - Change of Contract Price

11.1 The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at his expense without change in the Contract Price.

11.2 The Contract Price may only be changed by a Change Order CONTRACTOR shall notify ENGINEER by means of a Written Notice of a Proposed Change within fifteen days, or earlier if so required elsewhere in the Contract Documents, of the occurrence of an event which CONTRACTOR believes entitles him to a change in the Contact Price. Supporting data shall be delivered within fifteen days of such notice or within thirty days of such occurrence, whichever is later, unless OWNER allows an additional period of time to ascertain accurate cost data. CONTRACTOR must prove that additional costs were necessarily incurred which meet the criteria set forth in Paragraph 10.4, despite CONTRACTOR'S reasonable, prudent, and diligent efforts to prevent such costs. Failure of CONTRACTOR to comply with the time requirements for written Notice of a Proposed Change or for submittal of supporting data shall be considered to be a waiver by CONTRACTOR of any claim for an addition to the Contract Price.

11.3 The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

11.3.1 LUMP SUM PRICES INCLUDED IN THE CONTRACT: Where the Work involved is covered by lump sum prices included in the Proposal Documents, Schedule of Contract Items and Unit Price; the Contract Price shall be adjusted by the lump sum prices.

11.3.4 NEGOTIATED LUMP SUM: If the Contract Price is adjusted on the basis of an agreed to Lump Sum, and the costs are estimated in accordance with this Article 11.

11.3.5 COST OF THE WORK: If OWNER and CONTRACTOR cannot agree that any of the methods described in 11.3.1, 11.3.2, 11.3.3 or 11.3.4 above are appropriate for the proposed work, OWNER may direct CONTRACTOR to proceed on the basis of actual costs in accordance with Article 11.

11.3.6 UNILATERAL CHANGE ORDER: If OWNER and CONTRACTOR cannot agree on the price and/or time adjustment necessitated by the particular proposed change order, the OWNER may issue a unilateral change order setting forth such price and/or time adjustments that ENGINEER shall deem reasonable.

11.4 COST OF THE WORK: The term Cost of the Work means the sum of all costs necessarily incurred and paid by the CONTRACTOR in the proper performance of the Work. 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 11.5:

11.4.1 The Cost of the Work involved includes payroll costs for CONTRACTOR's craft labor, including foremen, assigned to the site and engaged in furnishing and incorporating materials or equipment in the Work involved. Labor work hours shall not exceed current "Means open Shop Building Construction Cost data" applicable to the work involved. Payroll costs shall include wages and may include those labor burdens expressly certified in advance by a duly authorized financial representative of CONTRACTOR and so approved by OWNER, Examples of labor burdens include social security, unemployment taxes, worker's compensation, health and retirement benefits, vacation and holiday pay. When determining actual payroll costs under paragraph 11.3.5: (a) contemporaneously, daily time sheets certified by CONTRACTOR and verified by ENGINEER along with certified payroll records shall be valid records; (b) after-the-fact daily time sheets shall be valid only if they expressly correlate to the Work involved, and if recorded at that time and used for payroll.

11.4.2 The Cost of the Work involved includes payments by CONTRACTOR to Suppliers for material and equipment used in the Work involved, including transportation, storage and necessary Suppliers' field services. All trade discounts, rebates and refunds and all returns from sale of surplus items shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained. If required by OWNER, CONTRACTOR shall obtain bids for designated materials or equipment and nominate at least two (2) Suppliers for selection by OWNER. When determining actual Supplier costs, invoices segregating items associated with the Work involved shall be the record upon which to base actual costs.

11.4.3 The Cost of the work involved includes payments made by the CONTRACTOR to Subcontractor for the Work involved performed by the Subcontractor. The methods for calculating Subcontractors' costs shall be the same as for CONTRACTOR costs, except that the term Subcontractor shall replace the term "CONTRACTOR", context permitting. If OWNER requires, CONTRACTOR shall obtain detailed competitive sub-bids and nominate at least two (2) Subcontractors for the performance of any work involved for selection by OWNER.

11.4.3.1 All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

11.4.4 Construction Equipment Costs: The Cost of the work involved includes costs for individual construction equipment with replacement value in excess of $1,000,000. Transportation, loading and unloading, installation, dismantling and removal costs shall be allowed only if prior consent is obtained from ENGINEER, and if equipment is, or was, transported to the site solely for the Work involved. Shipping costs will be allowed if the equipment requires the use of a carrier, and provided the travel distance does not exceed that for equipment in St. John the Baptist Parish. When multiple attachments are used, only the highest cost attachment shall be recoverable. Equipment costs shall cease when the equipment is no longer needed for the Work involved. Payroll costs for labor operating the equipment are as specified in paragraph 11.4.1. Equipment costs shall be computed using the same accounting and estimating rules and prices, whether related to added or deleted Work.

11.4.4.1 When determining actual construction equipment costs under paragraph 11.3.5: (a) contemporaneously, daily logs of the equipment, operators and actual usage, verified by ENGINEER,

shall be the valid records; (b) after-the-fact, such daily records shall be valid only if developed when the Work involved was performed and used for accounting purposes.

11.4.4.2 Rented or owned equipment at the site, idled solely by actions of OWNER or ENGINEER, shall be paid at the rates for rented equipment, or based on fifty percent (50%) of the rates for owned equipment, respectively, provided that the idle period exceeds that normally experienced for such equipment and occurs during normal working hours.

11.4.4.3 Rented or Leased Construction Equipment: Construction equipment rented or leased from third parties shall be priced using either the specific rates negotiated between OWNER and CONTRACTOR (based on the actual rental or lease agreements), or in the event that no agreement is reached, using those rates listed in the Rental Rate "Blue Book" published by Dataquest, Inc. for the region covering the New Orleans metropolitan area and applicable to the equipment (model number and year), but in no event shall the rate exceed those issued by local equipment rental companies within St. John the Baptist Parish. The equipment rate for second or third shift Work shall not exceed fifty percent (50%) of the base rate. Operating costs shall not exceed the hourly operation rate in the Blue Book. Hourly rates for equipment previously in use on the work for at least a month shall be based on the monthly rate divided by 176 hours. Equipment previously in use for only one week or not previously in use at the site shall not be invoiced to OWNER at rates higher than the following schedule of equipment use and payment category: applicable to equipment listed in the Rental Rate "Blue Book"

Less than 8 hours	Hourly Rate
1 day but less than 7 days	Daily Rate
1 week but less than 30 days	Weekly Rate
30 days or more (when in use)	Monthly Rate

11.4.4.4 Owned Construction Equipment: Construction equipment Owned by CONTRACTOR, or rented or leased from lessors associated with or owned by CONTRACTOR, shall be priced using either the specific rates negotiated between OWNER and CONTRACTOR (based on rates consistent with CONTRACTOR's normal accounting practices), or in the event that no agreement is reached, using the rates listed in the "Contractor's Equipment Cost Guide" published by Dataquest, Inc. for the region covering the New Orleans metropolitan area, but in no event shall the equipment ownership costs exceed rental rates of local equipment rental companies within St. John the Baptist Parish and operating costs shall not exceed the hourly operation rate in the Blue Book. For multiple shifts, rates shall not exceed the shift Work adjustments recommended in the "Contractor's Equipment Cost Guide".

11.4.5 Supplemental costs including the following:

11.4.5.1 The proportion of necessary transportation, travel and subsistence expenses of CONTRACTOR'S employees incurred in discharge of duties connected with the Work.

11.4.5.2 Costs of field supplies and purchase costs (less market value if not consumed) of tools individually valued at less than $1,000 that are not owned by the workers, if CONTRACTOR provides an itemized list of the field supplies and tools required for the performance of the Work involved; however, no such costs shall be allowed over 4% of the labor costs under paragraph 11.4.1, excluding burdens, unless CONTRACTOR furnishes detailed data sufficient to allow verification that a higher percentage is appropriate for the work involved.

11.4.5.3 Sales, consumer, use or similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

11.4.5.4 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.

11.4.5.5 Losses and damages (and related expenses), not compensated by insurance or otherwise, to the Work or otherwise sustained by CONTRACTOR in connection with the performance and furnishing of the Work, provided they 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. If, however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraph 11.6.2.

11.4.5.6 The costs of utilities, fuel and sanitary facilities at the site.

11.4.5.7 Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

11.4.5.8 Cost of premiums for additional Bonds and insurance required because of changes in the Work.

11.5 The term Cost of the Work shall not include any of the following:

11.5.1 Payroll costs and other compensation of CONTRACTOR'S officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, lawyers, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in his principal or a branch office for general administration of the Work, all of which are to be considered administrative costs covered by the Contractor's Fee.

11.5.2 Expenses of CONTRACTOR'S principal and branch offices other than CONTRACTOR'S office at the site.
11.5.3 Any part of CONTRACTOR'S capital expenses, including interest on CONTRACTOR'S capital employed for the Work and charges against CONTRACTOR for delinquent payments.

11.5.4 Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 11.4.4.9 above).

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

11.5.6 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

11.5.7 Attorney's Fees and/or Court Costs.

11.5.8 Costs or fees of consultants retained or utilized by CONTRACTOR, or his agents, for the purpose of making or filing a claim against OWNER, pursuing litigation or defending any claim and/or dispute.

11.5.9 CONTRACTOR shall not be allowed to include as part of the Cost of the Work involved any construction equipment or supplemental costs that cannot be shown to increase on account of, or are not directly attributable to, the performance of the Work involved. Payroll costs for the full-time resident superintendent included within the requirements of paragraph 6.2.1 are but one example of such costs.

11.6 CONTRACTOR'S FEE: The CONTRACTOR'S fee allowed to CONTRACTOR for overhead and profit shall be determined by negotiations. The objective of negotiations shall be the exercise of sound business judgment including a fair and reasonable profit based on assumptions of risk, exposure to weather, size of the change, percent of subcontracted work, equipment requirements, and time of performance. In no case, however, shall the fee for overhead and profit exceed the following percentages of the various portions of the Cost of the Work:

11.6.1 For costs incurred under paragraphs 11.4.1 and 11.4.2, the CONTRACTOR'S fee shall not exceed 15%;

11.6.2 For costs incurred under paragraph 11.4.3, and for work performed by a CONTRACTOR'S Subcontractor, the CONTRACTOR'S fee shall not exceed 10% and the Subcontractor's fee shall not exceed 15%; for costs incurred under paragraph 11.4.3, and Work performed by a Subcontractor's Subcontractor, the CONTRACTOR'S and the Subcontractor's fee shall not exceed 5% and 5%, and the Subcontractor's fee shall not exceed 15%.

11.6.3 No fee shall be payable on the basis of costs itemized under paragraphs 11.4.4 and 11.5.

11.6.4 The amount of credit to be allowed by CONTRACTOR to OWNER for any such a change which results in a net decrease in cost will be the amount of the actual net decrease plus a deduction in CONTRACTOR'S fee in accordance with the following:

11.6.5 When both additions and credits are involved in one change, and the additions exceed the credits, the adjustment in CONTRACTOR'S fee shall be computed on the amount by which the additions exceed the credits, except that no adjustments shall be allowed on the costs developed in accordance with paragraph 11.3.1;

11.6.6 When both additions and credits are involved in one change, and the credits exceed the additions, CONTRACTOR will be allowed to retain fee on the amount by which the credits exceed the additions, except that no adjustment shall be allowed on the costs developed in accordance with paragraph 11.3.1 or 11.3.2.

11.7 Whenever the cost of any Work is to be determined pursuant to paragraph 11.4 or 11.5, CONTRACTOR will submit in form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

11.8 Bidders shall submit the included Louisiana Uniform Public Work Bid Form with bid. Each bid item or alternate item shall be it's own "Lump Sum" price. Upon receipt of contract, the Contractor shall provide an itemized Schedule of Values for each building for insurance~~/FEMA funding~~ purposes.

11.9 UNIT PRICE WORK: (NOT USED)

ARTICLE 12: Change of Contract Time

12.1 The Contract Time may only be changed by a Change Order. Any claim or request for an extension in the Contract Time shall be based on a written Notice of a Proposed Change delivered to ENGINEER within seven days, or earlier if so required in the Contract Documents, of the occurrence of the event giving rise to the request or claim. Supporting data as to the extent of the request or claim shall be delivered within fifteen days of such Notice, or within twenty-two days of the event giving rise to the occurrence, whichever is later, unless ENGINEER allows an additional period of time to ascertain more accurate data. CONTRACTOR must prove that extensions to the Contract Time have materialized which meet the combined criteria set forth in paragraph 12.2 below and Official Progress Schedules of the General Requirements, despite CONTRACTOR'S reasonable, prudent, and diligent efforts to prevent or overcome such delays. Failure of CONTRACTOR to comply with the time requirements for written Notice or for

submittal of supporting data shall be considered to be a waiver by CONTRACTOR of any claim for an extension in the Contract Time.

12.2 The Contract Time will be extended in an amount equal to the time lost due to delays beyond the control and without the fault of CONTRACTOR, and which CONTRACTOR could not have guarded against, if a claim is made therefore as provided in Paragraph 12.1 and is substantiated to the satisfaction of OWNER. Such delays may include, but not limited too, unusually severe weather, sink holes, archaeological finds, acts of God, acts of the public enemy, acts of OWNER in either its sovereign or contractual capacity, furnishing of lands, right-of-way or easements by OWNER, acts of another CONTRACTOR in the performance of a Contract with OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, or delays of Subcontractors of Suppliers at any tier arising from causes other than normal weather beyond the control and without the fault or negligence of both CONTRACTOR and such Subcontractors and Suppliers; and further provided that

12.2.1 The Contract Time is extended only to the extent that the delay is unreasonable under the Contract, which is the extent the delays set forth in paragraph 12.2 above exceed the Total Float Time available in the Official Schedule and extend completion of the Work, or specified part of the work, beyond the corresponding Contract Time.

12.3 If upon evaluation of CONTRACTOR's analysis, OWNER justifies an extension in Contract Time under paragraph 12.1 through 12.3 for delay not caused in whole or in part by acts or omissions within the control of OWNER or ENGINEER, the OWNER shall authorize the necessary change in Contract Time only.

12.4 COMPENSABLE DELAY:

12.4.1 Unless otherwise excluded in the Contract Documents, an extension in Contract Time may be combined with an increase in Contract Price to the extent the delay was not concurrent with CONTRACTOR delay, was caused in whole or in part by acts or omissions within the control of OWNER or ENGINEER and is due to one of the following: Underground Facilities that are not shown (i.e., previously unknown); an emergency; objection, for OWNER's convince, to a Subcontractor, historic resources, uncovering of work not found to be defective under paragraph 13.9; delay under paragraph 7.5.3 or any other suspension of Work; changes in the Work; differing site conditions; and variation in quantities.

12.4.2 Changes in Contract Price for extensions in Contract Time may include increase in the Cost of the Work, as provided in Article 11, related to the extension in Contract Time, but shall exclude costs that are unaffected or do not relate to the extension in Contract Time, such as: (a) operating costs of construction equipment assigned to the Work on a continuous basis but primarily used in the furnishing and incorporating of materials/equipment into the Work, (b) operating costs and owned/rental costs of construction equipment used solely in the furnishing and incorporating of materials/equipment into the Work (crane used for specific lifts, concrete pump used for specific pours, etc.), and fully paid site facilities, tools, etc.

12.4.3 If a delay meeting the conditions of paragraph 12.4.1 delays Substantial completion of the Work beyond the Contract Time for Substantial Completion, OWNER shall negotiate with CONTRACTOR the reimbursement of an amount to cover administrative costs (under paragraphs 11.5.1 through 11.5.4) that will be or were unabsorbed prior to the expiration date of that contract Time. Reimbursement shall be based on the lesser of (a) five percent (5%) times that portion of the Contract Price remaining un-billed, less retainage, prior to the expiration of that Contract Time, or (b) the product of that un-billed portion of the Contract Price times the (company wide) ratio of CONTRACTOR's administrative costs to billings, or (c) that amount derived by an application of the Eichleay formula.

12.4.4 CONTRACTOR shall not recover from OWNER (a) acceleration costs incurred to overcome delays which warrant extensions in Contract Time but exclude changes in Contract Price, (b) escalation costs for

any part of the Work not delayed beyond the Late Dates in the Official Schedule, or (c) delay costs not expressly allowed in this Article.

ARTICLE 13 - Warranty and Guarantee; Tests and Inspections: Correction, Removal or Acceptance of Defective Work

13.1 WARRANTY AND GUARANTEE: CONTRACTOR warrants and guarantees to OWNER and ENGINEER that all Work will be in accordance with the Contract Documents and will not be defective. Prompt notice of observed defects shall be given to CONTRACTOR. All defective Work, whether or not in place, may be rejected, corrected or accepted as provided in this Article 13.

13.1.1 The obligations of CONTRACTOR under this Paragraph 13.1 shall be in addition to and not in limitation of any obligation imposed upon him by special guarantees required by the Contract Documents or otherwise prescribed by law.

13.1.2 In special circumstances where a particular item of equipment or part of the Work reaches Substantial Completion upon successful performance of Pre-operational Testing, and notwithstanding anything in the Contract Documents to the contrary, CONTRACTOR shall maintain the particular item of equipment or part of the Work in good order and in proper working condition during the period between Substantial Completion and Initiation of Operation, and for such maintenance CONTRACTOR shall receive no adjustment to the Contract Price.

13.1.3 The warranty or guarantee provided by CONTRACTOR under Paragraph 13.1 of the General Conditions shall remain in full effect throughout the period from the date of Initiation of Operation of the entire work to the end of the Correction Period (as that term is defined in these General Conditions.

13.2 ACCESS TO WORK: ENGINEER and ENGINEER's representatives, other representatives of OWNER, testing agencies and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspection and testing. CONTRACTOR shall provide proper and safe conditions for such access.

~~**13.3** NOTICE OF TESTS AND INSPECTIONS: CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests or approvals.~~

~~**13.4** TESTS AND INSPECTIONS: If any laws or regulations of any public body having jurisdiction requires any Work (or part thereof) to specifically be inspected, tested or approved, CONTRACTOR shall assume full responsibility therefore, pay all costs in connection therewith and furnish ENGINEER the required certificates of inspection, testing or approval. CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with OWNER'S or ENGINEER's acceptance of a Supplier of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for approval to CONTRACTOR'S purchase thereof for incorporation in the work.~~

~~13.4.1 All construction testing and certifications required under the Specifications shall be performed by Certified Technicians from an Independent Testing Laboratory. The CONTRACTOR shall propose a private testing laboratory in writing to the ENGINEER, together with a copy of the instruction provisions of his proposed sub-agreement, so that the ENGINEER may determine the proper instructions are included in compliance with the specification. Upon approval by the ENGINEER, the CONTRACTOR shall cooperate the with testing laboratory by furnishing material for testing, space for storage and transportation of the samples as necessary. Compensation for testing and certification shall be included within price bid for associated items of work. No separated measurement or additional compensation shall be allowed.~~

~~13.4.2 The Testing Laboratory shall submit to the ENGINEER three (3) typed copies and to the CONTRACTOR one (1) typed copy, of all applicable test data, certifications and reports as required. All~~

~~required test data and material certifications for each respective item of work must be submitted to the ENGINEER prior to application for payment. Any applications not accompanied by required test data and/or certifications shall be recommended for payment at an amount not to exceed 50% of contract until cost of required test data and certifications are submitted and subsequently approved.~~

~~13.4.3 Upon completion of the project and prior to substantial completion, the testing laboratory shall address a letter to the OWNER in which the laboratory shall certify that all testing and certification requirements of the specification have been satisfactorily met.~~

~~13.4.4 The CONTRACTOR is cautioned to provide termination provisions in its sub-agreement with the testing laboratory. In the event that the testing services prove not up to recognized standards, the ENGINEER reserves the right to withdraw his approval and require another laboratory be furnished by the CONTRACTOR at no increase in Contract Price.~~

~~**13.5** All inspections, tests or approvals other than those required by laws or regulations of any public body having jurisdiction shall be performed by organizations acceptable to OWNER and CONTRACTOR (or by ENGINEER if so specified).~~

~~**13.6** If any Work (including the work of others) that is to be inspected, tested or approved is covered without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation. Such uncovering 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.~~
~~**13.7** Neither observations by ENGINEER nor inspections, tests or approvals by others shall relieve CONTRACTOR from CONTRACTOR'S obligations to perform the Work in accordance with the Contract Documents.~~

13.8 UNCOVERING WORK: 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.

13.9 PAYMENT FOR UNCOVERING WORK: 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. If it is found that such work is defective, CONTRACTOR shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing, and of satisfactory reconstruction, (including but not limited to fees and charges of Engineers, Architects, Attorneys and other professionals), 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, may make a claim therefore as provided in Article 11. If, however, such Work is not found to be defective, CONTRACTOR shall be allowed an increase in the Contract Price of an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12.

13.10 OWNER MAY STOP THE WORK: If the Work is defective, or CONTRACTOR fails to supply sufficient skilled workmen or suitable materials or equipment, or fails to furnish or 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 or any other party. In the event the OWNER stops the work pursuant to this paragraph 13.10, CONTRACTOR shall not be entitled to delay damages, including without limitation, demands for extended job site overhead, home office overhead, cumulative impacts,

loss of productivity and efficiency, learning curve impacts, equipment down time and/or interest penalties, occasioned directly or indirectly by the stop work order.

13.11 CORRECTION OR REMOVAL OF DEFECTIVE WORK: If required by ENGINEER, CONTRACTOR shall promptly, as directed, either correct all defective Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by ENGINEER, remove it from the site and replace it with non-defective Work. CONTRACTOR shall bear all direct, indirect and consequential costs of such correction or removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals, and court costs) made necessary thereby. CONTRACTOR shall not be entitled to time extension of the Contract Time for correction or removal of defective work.

13.12 ONE YEAR CORRECTION PERIOD: If within the period from the date of Substantial Completion of a particular item of equipment or a designated part of the work to one year after the date of Initiation of Operation for the Project, the particular item of equipment or designated part of the work is found to be defective, CONTRACTOR shall promptly, without an adjustment in Contract Price and in accordance with ENGINEER'S written instructions, either correct such defective Work, or if it has been rejected by ENGINEER, remove it from the site and replace it with non-defective work. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or the rejected Work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement, (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) will be paid by CONTRACTOR.

13.12.1 Subject to the conditions set forth in paragraphs 13.1.2 and 13.1.3 and the adjustments described in Subparagraphs 13.12.2, below, the Correction Period shall be one year.

13.12.2 Unless another date is indicated in the Contract Documents the date the Work is Substantially Complete shall be the date for Initiation of Operation to occur. However, OWNER may at its sole option advance or delay the date for Initiation of Operation, and CONTRACTOR'S obligations to extend warranties and guarantees in accordance with paragraph 13.1.2 and 13.1.3 or to maintain the Work in accordance with paragraph 13.1.2 until then shall remain absolute. Applicable Change Orders shall be executed by the parties to adjust the Contract Price, as appropriate.

13.12.3 CONTRACTOR'S responsibilities under the paragraph 13.12, including sub-paragraphs, are in addition to, not in lieu of, all other obligations imposed by these contract documents, or imposed by applicable State laws.

13.13 ACCEPTANCE OF DEFECTIVE WORK: If, instead of requiring correction or removal and replacement of defective Work, OWNER (and, prior to ENGINEER'S recommendations of final payment, also ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall bear all direct, indirect and consequential 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 to include but not be limited to fees and charges of engineers, architects, attorneys and other professionals). 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, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefore as provided in Article 11. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

13.14 OWNER MAY CORRECT DEFECTIVE WORK: If CONTRACTOR fails within a reasonable time after written notice of ENGINEER to proceed to correct and to correct defective Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.11, 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 and remedy any such deficiency. In exercising the

rights and remedies under this paragraph OWNER shall proceed expeditiously. To the extent necessary to complete corrective and 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 such access to the site as may be necessary to enable OWNER to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of OWNER in exercising such rights and remedies shall be charged against CONTRACTOR in an amount approved as to reasonableness by ENGINEER, and a Change Order shall 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, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefore as provided in Article 11. Such direct, indirect and consequential costs will include but not be limited to fees and charges of engineers, architects, attorneys and other professionals, all court and arbitration costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR'S defective Work. CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by OWNER of OWNER'S rights and remedies hereunder.

ARTICLE 14 - Payments to Contractor and Completion

14.1 SCHEDULE OF VALUES: The schedule of values established as provided in paragraph 2.9 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.

14.2 APPLICATION FOR PROGRESS PAYMENT: At least fifty-five days before each progress payment falls due (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 and also as ENGINEER may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by such data, satisfactory to OWNER, as will establish OWNER'S title to the material and equipment and protect OWNER'S interest therein, including applicable insurance. Only major items of material and equipment to be incorporated in the project will be eligible for payment. These items must be easily accountable by the ENGINEER. Payment for these materials will be invoice prices for the material, submitted with the request for payment, which price shall not exceed the appropriate portion of the contract items in which such materials are to be incorporated. The amount of retainage with respect to progress payments will be as stipulated in the Agreement. Construction invoices shall be submitted using the AIA Application and Certification for Payment AIA G702 and G703 forms unless otherwise determined.

14.2.1 Notwithstanding any other provisions of these contract documents to the contrary, OWNER is under no duty or obligation whatsoever to any Subcontractor, laborer or other party to ensure that payments due and owing by CONTRACTOR to any of them are or will be made. Such parties shall rely only on CONTRACTOR'S surety bonds for remedy of nonpayment by CONTRACTOR.

14.3 CONTRACTOR'S WARRANTY OF TITLE: 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.

14.4 REVIEW OF APPLICATIONS FOR PROGRESS PAYMENT: ENGINEER will, within ten 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 re- submit the Application. Forty-five (45) days after presentation of the Application for Payment with ENGINEER'S recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due and when due will be paid by OWNER to CONTRACTOR.

14.5 ENGINEER'S recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER'S on-site observations of the Work in progress as an experienced and qualified design professional and on ENGINEER'S review of the Application for Payment and the accompanying data and schedules that the Work has progressed to the point indicated; that, to the best of ENGINEER'S knowledge, information and belief, the quality of the Work is 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 9.10, and to any other qualifications stated in the recommendation); and that CONTRACTOR is entitled to payment of the amount recommended. However, by recommending any such payment ENGINEER will not thereby be deemed to have represented that exhaustive or continuous on-site inspections have been made to check the quality or quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents or that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or OWNER to withhold payment to CONTRACTOR.

14.6 ENGINEER'S recommendation of final payment will constitute an additional representation by ENGINEER to OWNER that the conditions precedent to CONTRACTOR'S being entitled to final payment as set forth in paragraph 14.13 have been fulfilled.

14.7 ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER'S opinion, it would be incorrect to make such representations to OWNER. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify and such payment previously recommended, to such extent as may be necessary in ENGINEER'S opinion to protect OWNER from loss because:

14.7.1 the Work is defective, or completed Work has been damaged requiring correction or replacement,

14.7.2 the Contract Price has been reduced by Change Order,

14.7.3 OWNER has been required to correct defective Work or complete Work in accordance with paragraph 13.14, or

14.7.4 of ENGINEER'S actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.9 inclusive.

14.7.5 OWNER may refuse to make payment of the full amount recommended by ENGINEER because claims have been made against OWNER, or OWNER has claims against CONTRACTOR including but not limited to liquidated damages for anticipated or actual late completion, on account of CONTRACTOR'S performance or furnishing of the Work, or Liens have been filed in connection with the Work or there are other items entitling OWNER to a set-off against the amount recommended, but OWNER must give CONTRACTOR prompt written notice (with a copy to ENGINEER) stating the reasons for such action.

14.8 SUBSTANTIAL COMPLETION: 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. Within a reasonable time thereafter, OWNER, CONTRACTOR and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify

CONTRACTOR in writing giving the reason therefore. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and 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 he may 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 twenty-eight days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating his reasons. If after consideration of OWNER'S objections, ENGINEER considers the WORK substantially complete, ENGINEER will within said twenty-eight days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be complete or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. 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, maintenance, heat, utilities, insurance and warranties. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER 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. Once determined the Work is identified as substantially complete a Certificate of Substantial Completion AIA G704 will be issued.

14.9 EXCLUSION OF CONTRACTOR FROM SITE: OWNER shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

14.10 PARTIAL UTILIZATION: Use by OWNER of any finished 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 without significant interference with CONTRACTOR'S performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following:

14.10.1 OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees, CONTRACTOR will certify to OWNER and ENGINEER that said part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. 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. 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 therefore. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraphs 14.8 and 14.9 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.

14.10.2 OWNER may at any time request CONTRACTOR in writing to permit OWNER to take over operation of any such part of the Work although it is not substantially complete. A copy of such request will be sent to ENGINEER and within a reasonable time thereafter OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of the items remaining to be completed or corrected thereon before final payment. If CONTRACTOR does not object in writing to OWNER and ENGINEER that such part of the Work is not ready for separate operation by OWNER, ENGINEER will finalize the list of items to be completed or corrected and will deliver such list to OWNER and CONTRACTOR together with a written

recommendation as to the division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, utilities, insurance, warranties and guarantees for that part of the Work which will become binding upon OWNER and CONTRACTOR at the time when OWNER takes over such operation (unless they shall have otherwise agreed in writing and so informed ENGINEER). During such operation and prior to Substantial Completion of such part of the Work OWNER, shall allow CONTRACTOR reasonable access to complete or correct items on said list and to complete other related Work.

14.10.3 No occupancy or separate operation of part of the Work will be accomplished prior to compliance with the requirements of paragraph 5.7 in respect of property insurance.

14.11 LIEN PERIOD: Within twenty-one (21) days of the receipt of the definitive Certificate of Substantial Completion from ENGINEER, OWNER shall adopt and record a Resolution of Acceptance with the Recorder of Mortgages of the Parish in which the Agreement has been recorded. The recording of this Resolution of Acceptance shall commence a lien period of not less than forty-five (45) consecutive calendar days, during which period the retainage will be withheld by OWNER. After the said lien period, CONTRACTOR shall be responsible for obtaining from the Recorder of Mortgages a Certificate that the Agreement at the end of said forty-five day period, is clear of all liens, privileges, judgments or encumbrances of any nature whatsoever, which certificate he shall submit with his application for final payment to ENGINEER.

14.12 FINAL INSPECTION: Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing of the particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies.

14.13 FINAL APPLICATION FOR PAYMENT: After CONTRACTOR has completed all such corrections to the satisfaction of the ENGINEER, and delivered four (4) sets of all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in paragraph 6.17) and other documents, all as required by the Contract Documents, and after ENGINEER has indicated that the Work is acceptable (subject to the provisions of paragraph 14.17), CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to OWNER) of all Liens arising out of or filed in connection with the Work. In lieu thereof and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full; an affidavit of CONTRACTOR that the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and that 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; and consent of the surety, if any, to final payment. If any Subcontractor or Supplier fails to furnish a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

14.13.1 Notwithstanding any provision of the Contract Documents to the contrary, OWNER shall not be deemed to have accepted the work or to have waived claims against CONTRACTOR as provided in Paragraph 14.16 until (i) Initiation of Operation and (ii) payment of all remaining amount of the Contract Price.

14.13.2 As a condition to payment of all remaining portions of the Contract Price of the Unit Price Agreement, CONTRACTOR shall perform all Startup Testing and shall notify ENGINEER that the work is ready for final inspection. Such Startup Testing and notice to ENGINEER may be accomplished only after CONTRACTOR delivers written notice of the expected date of Initiation of Operation.

14.13.3 The requirements and provisions of Paragraphs 14.11, 14.12, and 14.13 of the General Conditions shall apply to payment of the remaining Contract Price pursuant to the *Unit Price Agreement, as well to final payment under the Unit Price Agreement.*

14.14 FINAL PAYMENT AND ACCEPTANCE: If, on the basis of ENGINEER'S observation of the Work during construction and final inspection, and ENGINEER'S review of the final Application for Payment and accompanying documentation - all as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR'S other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the Final Application for Payment, indicate in writing ENGINEER'S recommendation of payment and present the Application to OWNER for payment. Thereupon ENGINEER will give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.17. Otherwise, ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and re-submit the Application. Thirty days after presentation to OWNER of the Application and accompanying documentation, in appropriate form and substance, and with ENGINEER'S recommendation and notice of acceptability, the amount recommended by ENGINEER will become due and will be paid by OWNER to CONTRACTOR.

14.15 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 and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance 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 5.1, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

14.16 CONTRACTOR'S CONTINUING OBLIGATION: CONTRACTOR'S obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by ENGINEER, nor the issuance of a certificate of Substantial Completion, nor any payment by OWNER to CONTRACTOR under the Contract Documents, nor any use or occupancy of the Work or any part thereof by OWNER, nor any act of acceptance by OWNER nor any failure to do so, nor any review and approval of Shop Drawing or sample submission, nor the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.14, nor any correction of defective Work by OWNER will constitute an acceptance of Work not in accordance with the Contract Documents or a release of CONTRACTOR'S obligation to perform the Work in accordance with the Contract Documents (except as provided in paragraph 14.17).

14.17 WAIVER OF CLAIMS: The making and acceptance of any final payment will constitute:

14.17.1 A waiver of all claims by OWNER against CONTRACTOR, except claims previously made in writing and still unsettled, or claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to paragraph 14.12 or from failure to comply with the Contract Documents or the terms of any special guarantees specified herein; however, it will not constitute a waiver by OWNER of any rights in respect of CONTRACTOR'S continuing obligations under the Contract Documents; and

14.17.2 a waiver of all claims by CONTRACTOR against OWNER other than those previously made in writing and still unsettled.

ARTICLE 15 - Suspension of Work and Termination

15.1 OWNER MAY SUSPEND WORK: OWNER may, at any time and without cause, suspend the Work or any portion thereof by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work shall be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if CONTRACTOR makes an approved claim therefore as provided in Articles 11 and 12. If OWNER stops work under Paragraph 13.10 or suspends CONTRACTOR'S services under paragraph 13.14, or suspends the work or any portion thereof because of CONTRACTOR'S failure to prosecute the Work without endangering persons and property, CONTRACTOR shall be entitled to no extension of Contract Time or increase in Contract Price.

15.2 OWNER MAY TERMINATE: OWNER may terminate CONTRACTOR's services for cause upon the occurrence of any one or more of the following events:

15.2.1 If CONTRACTOR commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if CONTRACTOR takes any equivalent or similar action by filing a petition otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency;

15.2.2 If a petition is filed against CONTRACTOR under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against CONTRACTOR under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

15.2.3 If CONTRACTOR makes a general assignment for the benefit of creditors;

15.2.4 If a trustee, receiver, custodian or agent of CONTRACTOR is appointed under applicable law or under contract, whose appointment or authority to take charge of property of CONTRACTOR is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of CONTRACTOR'S creditors;

15.2.5 If CONTRACTOR admits in writing an inability to pay its debts generally as they become due;

15.2.6 If CONTRACTOR persistently fails 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 2.9 as revised from time to time);

15.2.7 If CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.8 If CONTRACTOR disregards the authority of ENGINEER; or

15.2.9 If CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

In such case, CONTRACTOR shall not be entitled to receive any further payment beyond an amount equal to the value of the Work actually completed and the value of materials and equipment not incorporated in the Work but delivered and suitably stored, less the aggregate of payments previously made. If the direct and indirect costs of completing the Work exceed the unpaid balance of the Contract Price, CONTRACTOR shall pay the difference to OWNER. Such costs incurred by OWNER shall be incorporated in a Change Order, but in finishing the Work, OWNER shall not be required to obtain the lowest figure for the work performed. CONTRACTOR'S obligations to pay the difference between such costs and such unpaid balance shall survive termination of the Agreement.

15.3 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.

15.4 TERMINATION FOR CONVENIENCE: Upon seven days' written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Agreement.

15.4.1 In any termination for convenience, CONTRACTOR shall be paid for (a) Work completed, in accordance with the Contract Documents, before receipt of the notice of termination, and (b) reasonable termination settlement costs for commitments that have become firm before the termination. CONTRACTOR shall not be paid any anticipated and unrealized supplemental costs, administrative expenses and profit for uncompleted Work. If no agreement can be reached as to reasonable termination costs, OWNER and CONTRACTOR shall follow the provisions in federal regulation FAR 52.249-2, found in 48 CFR Part 52.

15.4.2 Upon termination for convenience, OWNER shall have full power and authority to take possession of the Work, assume any sub-agreements with Subcontractors and Suppliers that OWNER selects, and prosecute the Work to completion by contract or as OWNER may deem expedient.

15.4.3 If after notice of termination of the services of CONTRACTOR for cause, it is determined that CONTRACTOR was not in default, the termination shall be deemed to have been for the convenience of OWNER. In such event, CONTRACTOR may recover from OWNER payment for Work completed and reasonable termination costs as provided in paragraph 15.4.1.

15.5 CONTRACTOR MAY STOP WORK OR TERMINATE: If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or ENGINEER fails to act on any Application for Payment within sixty days after it is submitted, or OWNER fails for sixty days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days' written notice to OWNER and ENGINEER, terminate the Agreement and recover from OWNER payment for all Work executed and any expense sustained plus reasonable termination expenses. In addition and in lieu of terminating the Agreement, if ENGINEER has failed to act on an Application for Payment or OWNER has failed to make any payment as aforesaid, CONTRACTOR may upon seven days' written notice to OWNER and ENGINEER stop the Work until payment of all amounts then due. The provisions of this paragraph shall not relieve CONTRACTOR of his obligations under paragraph 6.29 to carry on the Work in accordance with the progress schedule and without delay during disputes and disagreements with OWNER.

ARTICLE 16 - Dispute Resolution

16.1 Subject to the conditions set forth in subparagraphs 16.2, 16.2.1 and 16.2.2 hereof, all claims, disputes and other matters and questions arising out of or relating to the Contract Documents or the breach thereof, except claims waived by the making and accepting of final payment as provided in Section 14.17, shall be decided by arbitration between the parties. This agreement to arbitrate shall be specifically enforceable under the Louisiana Arbitration Act and the award rendered by the arbitrators shall be final and a judgment may be entered thereon in the State District Court for the Parish of St. John the Baptist, State of Louisiana.

16.2 Any arbitration provided for hereunder will be conducted in accordance with the Construction Arbitration Rules of the American Arbitration Association (AAA), subject to the following:

16.2.1 OWNER shall not be compelled to arbitrate any dispute without its express consent given in writing after demand is made for arbitration.

16.2.2 Arbitration shall be conducted in St. John the Baptist Parish, Louisiana and the laws of the State of Louisiana shall be controlling as to matters of law.

16.3 Subject to any recognized privilege, discovery shall be available to each party to the arbitration as it would be available in the District Court for the Parish of St. John the Baptist under the provisions of the LA Code of Civil Procedure in effect at the time of demand for arbitration. Notices, time periods and other procedural matters shall be governed by the rules that apply in Louisiana District Courts which shall be enforced by the AAA in the same manner as in the Louisiana District Court.

16.4 A pre-hearing conference shall be held not sooner than sixty (60) days after the filing of the answer, at which time a pre- hearing summary shall be filed by each party, setting forth all claims and counterclaims with specificity, all witnesses expected to be called at the hearing, all documents proposed to be introduced, and all items of claimed damages including dollar amounts therefore.

16.5 All discovery and amendments to the pre-hearing summary shall be concluded thirty (30) days prior to the arbitration date. Failure on the part of the CONTRACTOR to provide the foregoing discovery and disclosure shall render any claim supported by witnesses or documents not so disclosed null, void and waived.

16.6 In the event of any arbitration demanded and agreed to by the OWNER, each party shall select an arbitrator and the two so selected shall select a third from a panel proposed by the AAA. In the event that the two cannot agree upon an neutral arbitrator from the AAA list within thirty (30) days, then the third arbitrator shall be designated by the AAA.

16.7 In the event OWNER so elects, CONTRACTOR shall be required to participate in a consolidated arbitration to include the ENGINEER.

16.8 The arbitrators shall render a written decision, with conclusions of law and findings of fact, breaking down the items of any award on the claim or counterclaim in sufficient detail to enable OWNER to seek any grant reimbursement as may be available.

16.9 Notwithstanding anything else in the Contract Documents to the contrary, the CONTRACTOR shall carry on the work and maintain its progress during litigation or any arbitration proceedings, and OWNER shall continue to perform and pay as otherwise required by the Contract Documents.

16.10 In the event OWNER elects not to arbitrate one or more disputes, the dispute or disputes which the OWNER elects not to arbitrate shall be decided under the laws of the State of Louisiana in the 40nd Judicial District Court in and for the Parish of St. John the Baptist, State of Louisiana.

16.11 In the event OWNER is required to defend itself against any claim for delay, the OWNER shall be entitled to recover costs, including without limitation, administrative costs, attorneys' fees and court costs, from the party causing the delay.

ARTICLE 17 - Miscellaneous

17.1 GIVING NOTICE: Whenever any provisions of the Contract Documents requires the giving of written notice, it shall be deemed to have been validly given if 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 if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.2 COMPUTATION OF TIME:

17.2.1 When any period of time is referred to in the Contract Documents by days, it shall 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.

17.2.2 A calendar day of twenty-four hours measured from midnight to the next midnight shall constitute a day.

17.3 UTILIZATION OF LOCAL LABOR (STATE RESIDENTS): Contractor shall make every effort to use local labor to the fullest extent possible.

17.4 GENERAL: Should OWNER or CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 17.3 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

17.5 DUTIES AND OBLIGATIONS: The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.26, 13.1, 13.12, 13.14, 14.3 and 15.2 and all of the rights and remedies available to OWNER and ENGINEER thereunder, are in addition to, and shall not 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, and the provisions of this paragraph shall 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. All representations, warranties and guarantees made in the Contract Documents will survive final payment and termination or completion of this Agreement. Also, the obligation of CONTRACTOR to maintain the Work until Initiation of Operation shall survive final payment and termination and completion of this Agreement.

SECTION 01000

COMMUNITY DEVELOPMENT BLOCK GRANT PROGRAM DISASTER RECOVERY RIDER

[ST. JOHN THE BAPTIST PARISH]
[RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS]

Community Development Block Grant Program Disaster Recovery Rider
&
CDBG Compliance Provisions For Construction Contracts

This Community Development Block Grant Program Rider contains supplementary general conditions for use with procurement contracts and subrecipient agreements that are funded in whole or in part by the U.S. Department of Housing and Urban Development ("HUD") under Title I of the Housing and Community Development Act of 1974 (Pub. L. 93-383) as amended.

For all procurement contracts and subrecipient agreements funded fully or in part by the Community Development Block Grant Disaster Recovery ("CDBG-DR") Program by and between the *[St. John the Baptist Parish]*, State of Louisiana, acting herein by [*Jaclyn Hotard*], [*Parish President*], hereunto duly authorized, and [*contractor*], a [*type of business (partnership, corporation)*] organized under the laws of the State of Louisiana, acting herein by [*name*], [Chief Executive Officer or appointed representative], hereunto duly authorized; this CDBG Rider will serve as a universal addendum to each of those contracts and/or agreements.

This Rider must be signed separately as a stand-alone document, and the terms and provisions outlined herein will be applicable to all contracts and agreements between *[St. John the Baptist Parish]*, and [*Contractor*] in which CDBG-DR grant funds are a funding source.

FEDERAL REGISTER NOTICES

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Federal Register Notices applicable to the use of CDBG-DR Funds for all associated grants are available on the HUD Web site at:
https://www.hudexchange.info/programs/cdbg-dr/cdbg-dr-laws-regulations-and-federal-register-notices/

CDBG COMPLIANCE PROVISIONS

for

CONSTRUCTION CONTRACTS

(These provisions must be included in all construction contracts)

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1. **EQUAL EMPLOYMENT OPPORTUNITY (Equal Opportunity Clause)**
(Applicable to contracts and subcontracts above $10,000)

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, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, sexual orientation, gender identity or national origin. Such action shall include, but not be limited to, the following:

Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

B. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

C. The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

D. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the Contractor's commitment under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

E. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, as amended, and the rules, regulations, and relevant orders of the Secretary of Labor.

F. The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, as amended, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and others.

G. In the event of the Contractor's noncompliance with the non-discrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be cancelled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for

further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

H. The Contractor will include the provisions of the sentence immediately preceding paragraph A and the provisions of paragraphs A through H in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as administering agency may be direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the Contractor may request the United States to enter into such litigation to protect the interest of the United States.

2. STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS

(Applicable to contracts and subcontracts above $10,000)

A. As used in these specifications:

(1) "Covered area" means the geographical area described in the solicitation from which this contract resulted;

(2) "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

(3) "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

(4) "Minority" includes:

(a) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(b) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South America or other Spanish Culture or origin, regardless of race);

(c) Asian and Pacific Islander (all persons having origins in any of the original people of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(d) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

B. When the Contractor, or any subcontractor, at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract, in excess of $10,000, the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

C. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in compliance with the provisions of any such Hometown Plan. Each Contractor or subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

D. The Contractor shall implement the specific affirmative action standards provided in paragraphs G(1) through G(16) of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing contracts in geographical areas where they do not have a federal or federally-assisted construction contract shall apply the minority and female goals established for the geographic area where the contract is being performed. Goals are published periodically in the Federal Register in notice form and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

E. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

F. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

G. The Contractor shall take specific affirmative action to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

(1) Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to

work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

(2) Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organization's responses.

(3) Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.

(4) Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement have not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

(5) Develop on-the-job training opportunities and/or participate in training programs for the area which expressly includes minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under G(2) above.

(6) Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on a bulletin board accessible to all employees at each location where construction work is performed.

(7) Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

(8) Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written

notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

(9) Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

(10) Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

(11) Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

(12) Conduct, at least annually, an inventory and evaluation of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

(13) Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

(14) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

(15) Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitation to minority and female contractor associations and other business associations.

(16) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

H. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (G(1) through G(16)). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under G(1) through G(16) of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation shall not be a defense for the Contractor's non-compliance.

I. A single goal for minorities and a separate single goal for women has been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

J. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any persons because of race, color, religion, sex, or national origin.

K. The Contractor shall not enter into any subcontract with any person or firm debarred from government contracts pursuant to E.O. 11246.

L. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause including suspension, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to E.O. 11246, as amended.

M. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph G of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

N. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the government and to keep records. Records shall at least include for each employee, the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number where assigned, social security number, race, sex, status (e.g., mechanic, apprenticeship trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and location at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, Contractors shall not be required to maintain separate records.

O. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application or requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

3. **NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION**
(Applicable to contracts and subcontract over $10,000)

A. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

B. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation: *(see table below)*

Goals for female participation: 6.9%

These goals are applicable to all the Contractor's construction work (whether or not it is federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographic area located outside of the covered area, it shall apply the goals established for such geographic area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3 (a) and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation 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 the 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 the 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.

MINORITY PARTICIPATION GOALS

PARISH	MIN. GOAL (%)	PARISH	MIN. GOAL (%)	PARISH	MIN. GOAL (%)	PARISH	MIN. GOAL (%)
Acadia	24.1	E. Baton Rouge	26.1	Madison	27.9	St. Landry	24.1
Allen	17.8	East Carroll	27.9	Morehouse	27.9	St. Martin	24.1
Ascension	26.1	East Feliciana	30.4	Natchitoches	29.3	St. Mary	24.1
Assumption	27.7	Evangeline	24.1	Orleans	31.0	St. Tammany	31.0
Avoyelles	29.3	Franklin	27.9	Ouachita	22.8	Tangipahoa	27.7
Beauregard	17.8	Grant	25.7	Plaquemines	27.7	Tensas	27.9
Bienville	29.3	Iberia	24.1	Pointe Coupee	30.4	Terrebonne	27.7
Bossier	29.3	Iberville	30.4	Rapides	25.7	Union	27.9
Caddo	29.3	Jackson	27.9	Red River	29.3	Vermilion	24.1
Calcasieu	19.3	Jefferson	31.0	Richland	27.9	Vernon	17.8
Caldwell	27.9	Jefferson Davis	17.8	Sabine	29.3	Washington	27.7
Cameron	17.8	Lafayette	20.6	St. Bernard	31.0	Webster	29.3
Catahoula	27.9	Lafourche	27.7	St. Charles	27.7	W. Baton Rouge	26.1
Claiborne	29.3	LaSalle	27.9	St. Helena	30.4	West Carroll	27.9
Concordia	30.4	Lincoln	27.9	St. James	27.7	West Feliciana	30.4
De Soto	29.3	Livingston	26.1	St. John the Baptist	27.7	Winn	29.3

C. The 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 the subcontract; estimated starting and completion dates of the sub-contract; and the geographical area in which the contract is to be performed.

D. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is *(insert description of the geographical areas where the contract is to be performed, giving the State, parish, and city, if any)*:

4. CERTIFICATION OF NONSEGREGATED FACILITIES
(Applicable to contracts and subcontracts over $10,000)

By the submission of this bid, the bidder, offeror, applicant or subcontractor certifies that he/she does not maintain or provide for his/her establishments, and that he/she does not permit employees to perform their services at any location, under his/her control, where segregated facilities are maintained. He/she certifies further that he/she will not maintain or provide for employees any segregated facilities at any of his/her establishments, and he/she will not permit employees to perform their services at any location under his/her control where segregated facilities are maintained. The bidder, offeror, applicant or subcontractor agrees that a breach of this certification is a violation of the equal opportunity clause of this contract.

As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employees which are segregated by explicit directive or are, in fact, segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason.

He/she further agrees that (except where he/she has obtained for specific time periods) he/she will obtain identical certification from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the equal opportunity clause; that he/she will retain such certifications in his/her files; and that he/she will forward the following notice to such proposed subcontractors (except where proposed subcontractors have submitted identical certifications for specific time periods).

5. CIVIL RIGHTS

The Contractor shall comply with the provisions of Title VI of the Civil Rights Act of 1964. No person shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance.

6. SECTION 109 OF THE HOUSING AND COMMUNITY DEVELOPMENT ACT OF 1974

The Contractor shall comply with the provisions of Section 109 of the Housing and Community Development Act of 1974. No person in the United States shall on the grounds of race, color, national origin, or sex be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity funded in whole or in part with funds made available under this title. Section 109 further provides that discrimination on the basis of age under the Age

Discrimination Act of 1975 or with respect to an otherwise qualified handicapped individual as provided in Section 504 of the Rehabilitation Act of 1973, as amended, is prohibited.

7. **SECTION 3 OF THE HOUSING AND URBAN DEVELOPMENT ACT OF 1968 - COMPLIANCE IN EMPLOYMENT AND TRAINING**

The work to be performed under this Contract, including services performed under any related subcontract or subrecipient agreement, is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (Section 3), 24 CFR §75, and 85 FR 61562, and any directives, benchmarks and programmatic requirements hereafter issued by HUD or OCD in the implementation of Section 3 requirements.

A. Section 3 requires that to the greatest extent feasible, and consistent with existing Federal, state, and local laws and regulations, recipients of CDBG assistance shall ensure that employment and training opportunities arising in connection with Section 3 projects are provided to Section 3 workers within the metropolitan area (or nonmetropolitan county) in which the project is located.

B. Section 3 also requires that to the greatest extent feasible, and consistent with existing Federal, state, and local laws and regulations, recipients covered by this subpart shall ensure contracts for work awarded in connection with Section 3 projects are provided to business concerns that provide economic opportunities to Section 3 workers residing within the metropolitan area (or nonmetropolitan county) in which the project is located.

C. The parties to this contract agree to comply with HUD's regulations in 24 CFR part 75, which implement Section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 75 regulations.

D. The contractor agrees, to the greatest extent feasible, take steps to achieve the Section 3 benchmarks established by HUD for Section 3 workers and Targeted Section 3 workers. Section 3 benchmarks will consist of the following two ratios: (i) The number of labor hours worked by Section 3 workers divided by the total number of labor hours worked by all workers on a Section 3 project. (ii) The number of labor hours worked by Targeted Section 3 workers as defined in § 75.21(a), divided by the total number of labor hours worked by all workers on a Section 3 project.

E. The contractor agrees to report in a manner prescribed by the Owner, (i) The total number of labor hours worked; (ii) The total number of labor hours worked by Section 3 workers; and (iii) The total number of labor hours worked by Targeted Section 3 workers.

F. If the contractor fails to achieve the HUD Section 3 benchmarks, the contractor must report in a form prescribed by the Owner on the qualitative nature of its activities and those of its subcontractors. Such qualitative efforts may, for example, include but are not limited to the following:

(1) Outreach efforts to generate job applicants who are Targeted Section 3 workers.

(2) Provided training or apprenticeship opportunities.

(3) Provided technical assistance to help Section 3 workers compete for jobs (*e.g.*, resume assistance, coaching).

(4) Provided or connected Section 3 workers with assistance in seeking employment including: drafting resumes, preparing for interviews, and finding job opportunities connecting residents to job placement services.

(5) Held one or more job fairs.

(6) Provided or referred Section 3 workers to services supporting work readiness and retention (*e.g.*, work readiness activities, interview clothing, test fees, transportation, child care).

(7) Provided assistance to apply for/or attend community college, a four-year educational institution, or vocational/technical training.

(8) Assisted Section 3 workers to obtain financial literacy training and/or coaching.

(9) Engaged in outreach efforts to identify and secure bids from Section 3 business concerns.

(10) Provided technical assistance to help Section 3 business concerns understand and bid on contracts.

(11) Divided contracts into smaller jobs to facilitate participation by Section 3 business concerns.

(12) Provided bonding assistance, guaranties, or other efforts to support viable bids from Section 3 business concerns.

(13) Promoted use of business registries designed to create opportunities for disadvantaged and small businesses.

(14) Outreach, engagement, or referrals with the state one-stop system as defined in Section 121(e)(2) of the Workforce Innovation and Opportunity Act.

G. The contractor agrees to include these Section 3 contract provisions in every subcontract subject to compliance with regulations in 24 CFR part 75 and agrees to take appropriate action, as provided in an applicable provision of the subcontract upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 75. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 75.

H. Noncompliance with HUD's regulations in 24 CFR part 75 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

8. <u>SECTION 503 OF THE REHABILITATION ACT OF 1973 (29 USC 793)</u>
(Applicable to contracts and subcontracts over $10,000)

A. The contractor will not discriminate against any employee or applicant for employment because of physical or mental disability in regard to any position for which the employee or applicant for employment is qualified. The contractor agrees to take affirmative action to employ and advance in employment individuals with disabilities, and to treat qualified individuals without discrimination on the basis of their physical or mental disability in all employment practices, including the following:

(1) Recruitment, advertising, and job application procedures;

(2) Hiring, upgrading, promotion, award of tenure, demotion, transfer, layoff, termination, right of return from layoff and rehiring;

(3) Rates of pay or any other form of compensation and changes in compensation;

(4) Job assignments, job classifications, organizational structures, position descriptions, lines of progression, and seniority lists;

(5) Leaves of absence, sick leave, or any other leave;

(6) Fringe benefits available by virtue of employment, whether or not administered by the contractor;

(7) Selection and financial support for training, including apprenticeship, professional meetings, conferences, and other related activities, and selection for leaves of absence to pursue training;

(8) Activities sponsored by the Contractor including social or recreational programs;

(9) Any other term, condition, or privilege of employment.

B. The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

C. In the event of the Contractor's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

D. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, Office of Federal Contract Compliance Programs, provided by or through the contracting officer. Such notices shall state the rights of applicants and employees as well as the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified employees and applicants with disabilities. The contractor must ensure that applicants or employees with disabilities are provided the notice in a form that is accessible and understandable to the individual applicant or employee (e.g., providing Braille or large print versions of the notice, or posting a copy of the notice at a lower height for easy viewing by a person using a wheelchair). With respect to employees who do not work at a physical location of the contractor, a contractor will satisfy its posting obligations by posting such notices in an electronic format, provided that the contractor provides computers, or access to computers, that can access the electronic posting to such employees, or the contractor has actual knowledge that such employees otherwise are able to access the electronically posted notices. Electronic notices for employees must be posted in a conspicuous location and format on the company's intranet or sent by electronic mail to employees. An electronic posting must be used by the contractor to notify job applicants of their rights if the contractor utilizes an electronic application process. Such electronic applicant notice must be conspicuously stored with, or as part of, the electronic application.

E. The Contractor will notify each labor organization or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Rehabilitation Act of 1973, and is committed to take affirmative action to employ and advance in employment, and shall not discriminate against, individuals with physical or mental disabilities.

F. The Contractor will include the provisions of this clause in every subcontract or purchase order of $10,000 or more unless exempted by rules, regulations, or orders of the Secretary issued pursuant to Section 503 of the Act, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Director of the Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance.

G. The contractor must, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment and will not be discriminated against on the basis of disability.

9. SECTION 504 OF THE REHABILITATION ACT OF 1973, AS AMENDED

The Contractor agrees that no otherwise qualified individual with disabilities shall, solely by reason of his disability, be denied the benefits, or be subjected to discrimination including discrimination in employment, any program or activity that receives the benefits from the federal financial assistance.

10. AGE DISCRIMINATION ACT OF 1975

The Contractor shall comply with the provisions of the Age Discrimination Act of 1975. No person in the United States shall, on the basis of age, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under, any program or activity receiving federal financial assistance.

11. CERTIFICATION OF COMPLIANCE WITH AIR AND WATER ACTS
(Applicable to contracts and subcontracts exceeding $150,000)

The Contractor and all subcontractors shall comply with the requirements of the Clean Air Act, as amended, 42 USC 7401 et seq., the Federal Water Pollution Control Act, as amended, 33 USC 1251 et seq. Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA)

In addition to the foregoing requirements, all nonexempt contractors and subcontractors shall furnish to the owner, the following:

A. A stipulation by the Contractor or subcontractors, that any facility to be utilized in the performance of any nonexempt contract or subcontract, is not listed on the List of Violating Facilities issued by the Environmental Protection Agency (EPA) pursuant to 40 CFR Part 15, as amended.

B. Agreement by the Contractor to comply with all the requirements of Section 114 of the Clean Air Act, as amended, (42 USC 1857 c-8) and Section 308 of the Federal Water Pollution Control Act, as amended, (33 USC 1318) relating to inspection, monitoring, entry, reports and information, as well as all other requirements specified in said Section 114 and Section 308, and all regulations and guidelines issued thereunder

C. A stipulation that as a condition for the award of the contract, prompt notice will be given of any notification received from the Director, Office of Federal Activities, EPA, indicating that a facility

utilized, or to be utilized for the contract, is under consideration to be listed on the EPA List of Violating Facilities.

D. Agreement by the Contractor that he will include, or cause to be included, the criteria and requirements in paragraph (1) through (4) of this section in every nonexempt subcontract and requiring that the Contractor will take such action as the government may direct as a means of enforcing such provisions.

12. SPECIAL CONDITIONS PERTAINING TO HAZARDS, SAFETY STANDARDS AND ACCIDENT PREVENTION

A. Lead-Based Paint Hazards
(Include in contracts for construction or rehabilitation of residential structures)

The construction or rehabilitation of residential structures is subject to the HUD Lead-Based Paint regulations, 24 CFR Part 35. The Contractor and subcontractors shall comply with the provisions for the elimination of lead-based paint hazards under Subpart B of said regulations. The Owner will be responsible for the inspections and certifications required under Section 35.14 (f) thereof.

B. Use of Explosives (Modify as Required)

When the use of explosives is necessary for the prosecution of the work, the Contractor shall observe all local, state and federal laws in purchasing and handling explosives. The Contractor shall take all necessary precaution to protect completed work, neighboring property, water lines, or other underground structures. Where there is danger to structures or property from blasting, the charges shall be reduced and the material shall be covered with suitable timber, steel or rope mats.

The Contractor shall notify all owners of public utility property of intention to use explosives at least 8 hours before blasting is done close to such property. Any supervision or direction of use of explosives by the engineer does not in any way reduce the responsibility of the Contractor or his Surety for damages that may be caused by such use.

C. Danger Signals and Safety Devices (Modify as Required)

The Contractor shall make all necessary precautions to guard against damages to property and injury to persons. He shall put up and maintain in good condition, sufficient red or warning lights at night, suitable barricades and other devices necessary to protect the public. In case the Contractor fails or neglects to take such precautions, the Owner may have such lights and barricades installed and charge the cost of this work to the Contractor. Such action by the Owner does not relieve the Contractor of any liability incurred under these specifications or contract.

13. FLOOD DISASTER PROTECTION

This contract is subject to the requirements of the Flood Disaster Protection Act of 1973 (P.L. 93-234). Nothing included as a part of this contract is approved for acquisition or construction purposes as defined under Section 3(a) of said

Act, for use in an area identified by the Secretary of HUD as having special flood hazards which is located in a community not then in compliance with the requirements for participation in the National Flood Insurance Program pursuant to Section 201(d) of said Act; and the use of any assistance provided under this contract for such acquisition for construction in such identified areas in communities then participating in the National Flood Insurance Program shall be subject to the mandatory purchase of flood insurance requirements or Section 102(a) of said Act.

Any contract or agreement for the sale, lease, or other transfer of land acquired, cleared or improved with assistance provided under this Contract shall contain, if such land is located in an area identified by the Secretary as having special flood hazards and in which the sale of flood insurance has been made available under the National Flood Insurance Act of 1968, as amended, 42 U.S.C. 4001 et seq., provisions obligating the transferee and its successors or assigns to obtain and maintain, during the ownership of such land, such flood insurance as required with respect to financial assistance for acquisition or construction purposes under Section 102(a) of Flood Disaster Protection Act of 1973.

14. ACCESS TO RECORDS - MAINTENANCE OF RECORDS

The State of Louisiana, the Department of Housing and Urban Development, the Comptroller General of the United States, or any of their duly authorized representatives, shall have access to any books, documents, papers and records of the Contractor which are directly pertinent to this specific contract, for the purpose of audits, examinations, and making excerpts and transcriptions. All records connected with this contract will be maintained in a central location by the unit of local government and will be maintained for a period of five (5) years after the official date of the State's final closeout of its grant with HUD.

15. INSPECTION

The authorized representative and agents of the State of Louisiana and the Department of Housing and Urban Development shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records.

16. REPORTING REQUIREMENTS

The Contractor shall complete and submit all reports, in such form and according to such schedule, as may be required by the Owner.

17. CONFLICT OF INTEREST

A. No officer or employee of the local jurisdiction or its designees or agents, no member of the governing body, and no other public official of the locality who his/her tenure or for one year thereafter, shall have any interest, direct or indirect, in any contract or subcontract, or the proceeds thereof, for work to be performed. Further, the Contractor shall cause to be incorporated in all subcontracts the language set forth in this paragraph prohibiting conflict of interest.

B. No member of or delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

18. ACTIVITIES AND CONTRACTS NOT SUBJECT TO EXECUTIVE ORDER 11246, AS AMENDED
(Applicable to contracts and subcontracts of $10,000 and under)

During the performance of this contract, the Contractor agrees as follows:

A. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor shall take affirmative action to ensure that applicants for employment are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

B. The Contractor shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by Contracting Officer setting forth the provisions of this non-discrimination clause. The Contractor shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

C. Contractors shall incorporate foregoing requirements in all subcontracts.

19. PATENTS

A. The Contractor shall hold and save the Owner and its officers, agents, servants, and employees harmless from liability of any nature or kind, including cost and expenses for, or on account of any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the contract including its use by the Owner, unless otherwise specifically stipulated in the Contract Document.

B. License or Royalty Fees: License and/or Royalty Fees for the use of a process which is authorized by the Owner of the project must be reasonable, and paid to the holder of the patent, or his authorized license, direct by the Owner and not by or through the Contractor.

C. If the Contractor uses any design device or materials covered by letters, patent or copyright, he shall provide for such use by suitable agreement with the owner of such patented or copy-righted design device or material. It is mutually agreed and understood, that without exception the contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The Contractor and/or his Sureties shall indemnify and save harmless the Owner of the project from any and all claims for infringement by reason of the use of such patented or copy-righted design, device or materials or any trademark or copy-right in connection with work agreed to be performed under this contract, and shall indemnify the Owner for any cost, expense, or damage which it may be obliged to pay by reason of such infringement at any time during the prosecution of the work or after completion of the work.

20. COPYRIGHT

No materials, to include but not limited to reports, maps, or documents produced as a result of this contract, in whole or in part, shall be available to the Contractor for copyright purposes. Any such materials produced as a result of this contract that might be subject to copyright shall be the property of the Owner and all such rights shall belong to the Owner.

21. TERMINATION FOR CAUSE

If, through any cause, the Contractor shall fail to fulfill in a timely and proper manner his obligations under this contract, or if the Contractor shall violate any of the covenants, agreements, or stipulations of this contract, the Owner shall thereupon have the right to terminate this contract by giving written notice to the Contractor of such termination and 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, photographs, and reports prepared by the Contractor under this contract shall, at the option of the Owner, become the Owner's property and the Contractor shall be entitled to receive just and equitable compensation for any work satisfactorily completed hereunder. Notwithstanding the above, the Contractor shall not be relieved of liability to the Owner for damages sustained by the Owner by virtue of any breach of the contract by the Contractor, and the Owner may withhold any payments to the Contractor for the purpose of set-off until such time as the exact amount of damages due the Owner from the Contractor is determined.

22. TERMINATION FOR CONVENIENCE

The Owner may terminate this contract at any time by giving at least ten (10) days notice in writing to the Contractor. If the contract is terminated by the Owner as provided herein, the Contractor will be paid for the time provided and expenses incurred up to the termination date.

23. ENERGY EFFICIENCY

The Contractor shall comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Public Law 94-163).

24. SUBCONTRACTS

A. The Contractor shall not enter into any subcontract with any subcontractor who has been debarred, suspended, declared ineligible, or voluntarily excluded from participating in contacting programs by any agency of the United States Government or the State of Louisiana.

B. The Contractor shall be as fully responsible to the Owner for the acts and omissions of the Contractor's subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by the Contractor.

C. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractor to the Contractor by the terms of the contract documents insofar as applicable to the work of subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the contract documents.

D. Nothing contained in this contract shall create any contractual relation between any subcontractor and the Owner.

25. DEBARMENT, SUSPENSION, AND INELIGIBILITY

The Contractor represents and warrants that it and its subcontractors are not debarred, suspended, or placed in ineligibility status under the provisions of 2 CFR 180 that implement Executive Order 12549, *Debarment and Suspension* (3 CFR Part 1986 Comp., p. 189) and Executive Order 12689, *Debarment and Suspension* (3 CFR Part 1989 Comp., p. 235).

26. PROTECTION OF LIVES AND HEALTH

The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons or property, either on or off the worksite, which occur as a result of his prosecution of the work. The safety provisions of applicable laws and building and construction codes, in addition to specific safety and health regulations described by Chapter XIII, Bureau of Labor Standards, Department of Labor, Part 1518, Safety and Health Regulations for Construction, as outlined in the Federal Register, Volume 36, No. 75, Saturday, April 17, 1971, Title 29 - LABOR, shall be observed and the Contractor shall take or cause to be taken, such additional safety and health measures as the Owner may determine to be reasonably necessary.

27. BREACH OF CONTRACT TERMS

Any violation or breach of terms of this contract on the part of the Contractor or the Contractor's subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this contract. The duties and obligations imposed by the contract documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

28. PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this contract shall be deemed to be inserted herein and the contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party the contract shall forthwith be physically amended to make such insertion or correction.

29. CHANGES

The Owner may, from time to time, request changes in the scope of the services of the Contractor to be performed hereunder. Such changes, including any increase or decrease in the amount of the Contractor's compensation which are mutually agreed upon by and between the Owner and the Contractor, shall be incorporated in written and executed amendments to this Contract.

30. PERSONNEL

The Contractor represents that it has, or will secure at its own expense, all personnel required in performing the services under this Contract. Such personnel shall not be employees of or have any contractual relationship with the Owner.

All the services required hereunder will be performed by the Contractor or under its supervision, and all personnel engaged in the work shall be fully qualified and shall be authorized or permitted under State and local law to perform such services.

No person who is serving sentence in a penal or correctional institution shall be employed on work under this Contract.

31. ANTI-KICKBACK RULES

Salaries of personnel performing work under this Contract shall be paid unconditionally and not less often than once a month without payroll deduction or rebate on any account except only such payroll deductions as are mandatory by law or permitted by the applicable regulations issued by the Secretary of Labor pursuant to the "Anti-Kickback Act" of June 13, 1934 (48 Stat. 948; 62 Stat. 740; 63 Stat. 108; Title 18 U.S.C. 874; and Title 40 U.S.C. 276c). The Contractor shall comply with all applicable "Anti-Kickback" regulations and shall insert appropriate provisions in all subcontracts covering work under this contract to insure compliance by the subcontractors with such regulations, and shall be responsible for the submission of affidavits required of subcontractors thereunder except as the Secretary of Labor may specifically provide for variations of or exemptions from the requirements thereof.

32. ASSIGNABILITY

The Contractor shall not assign any interest in this Contract, and shall not transfer any interest in the same (whether by assignment or novation) without prior written approval of the Owner provided that claims for money due or to become due the Contractor from the Owner under this Contract may be assigned to a bank, trust company, or other financial institution, or to a Trustee in Bankruptcy, without such approval. Notice of any such assignment or transfer shall be furnished promptly to the Owner.

33. INTEREST OF CONTRACTOR

The Contractor covenants that he presently has no interest and shall not acquire any interest direct or indirect in the above described project or any parcels therein or any other interest which would conflict in any manner or degree with the performance of his services hereunder. The Contractor further covenants that in the performance of this Contract no person having any such interest shall be employed.

34. POLITICAL ACTIVITY

The Contractor will comply with the provisions of the Hatch Act (5 U.S.C. 1501 et seq.), which limits the political activity of employees.

35. COMPLIANCE WITH THE OFFICE OF MANAGEMENT AND BUDGET

The parties agree to comply with the regulations, policies, guidelines, and requirements of the Office of Management and Budget, *"Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards"*, 2 CFR Part 200, as they relate to the use of Federal funds under this contract.

36. DISCRIMINATION DUE TO BELIEFS

No person with responsibilities in operation of the project to which this grant relates will discriminate with respect to any program participant or any applicant for participation in such program because of political affiliation or beliefs.

37. CONFIDENTIAL FINDINGS

All of the reports, information, data, etc., prepared or assembled by the Contractor under this Contract are confidential, and the Contractor agrees that they shall not be made available to any individual or organization without prior written approval of the Owner.

38. LOBBYING

The Contractor certifies, to the best of his or her knowledge and belief that:

A. No federally appropriated funds have been paid or will be paid, by or on behalf of the contractor, to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.

B. If any funds other than federally appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, the contractor shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

39. CONTRACTING WITH SMALL AND MINORITY FIRMS, WOMEN'S BUSINESS ENTERPRISES, AND LABOR SURPLUS AREA FIRMS

The Contractor will take necessary affirmative steps to assure that minority firms, women's business enterprises, and labor surplus area firms are used in subcontracting when possible. Steps include:

A. Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

B. Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;

C. Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority business, and women's business enterprises;

D. Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority business, and women's business enterprises; and

E. Using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the Department of Commerce.

40. PROCUREMENT OF RECOVERED MATERIALS

A. In accordance with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, the Contractor shall procure items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition. The Contractor shall procure items designated in the EPA guidelines that contain the highest percentage of recovered materials practicable unless the Contractor determines that such items: (1) are not reasonably available in a reasonable period of time; (2) fail to meet reasonable performance standards, which shall be determined on the basis of the guidelines of the National Institute of Standards and Technology, if applicable to the item; or (3) are only available at an unreasonable price.

B. Paragraph A of this clause shall apply to items purchased under this contract where: (1) the Contractor purchases in excess of $10,000 of the item under this contract; or (2) during the preceding Federal fiscal year, the Contractor: (i) purchased any amount of the items for use under a contract that was funded with Federal appropriations and was with a Federal agency or a State agency or agency of a political subdivision of a State; and (ii) purchased a total of in excess of $10,000 of the item both under and outside that contract.

41. PROHIBITION ON CONTRACTING FOR COVERED TELECOMMUNICATIONS EQUIPMENT OR SERVICES

A. Definitions. As used in this clause, the terms backhaul; covered foreign country; covered telecommunications equipment or services; interconnection arrangements; roaming; substantial or essential component; and telecommunications equipment or services have the meaning as defined in FEMA Policy 405-143-1, Prohibitions on Expending FEMA Award Funds for Covered Telecommunications Equipment or Services (Interim), as used in this clause—

B. Prohibitions.

i) Section 889(b) of the John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. No. 115-232, and 2 C.F.R. § 200.216 prohibit the head of an executive agency on or after Aug.13, 2020, from obligating or expending grant, cooperative agreement, loan, or loan guarantee funds on certain telecommunications products or from certain entities for national security reasons.

ii) Unless an exception in paragraph (c) of this clause applies, the contractor and its subcontractors may not use grant, cooperative agreement, loan, or loan guarantee funds from the Federal Emergency Management Agency to:

(1) Procure or obtain any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology of any system;

(2) Enter into, extend, or renew a contract to procure or obtain any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology of any system;

(3) Enter into, extend, or renew contracts with entities that use covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system; or

(4) Provide, as part of its performance of this contract, subcontract, or other contractual instrument, any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system.

C. Exceptions.

i) This clause does not prohibit contractors from providing—

(1) A service that connects to the facilities of a third-party, such as backhaul, roaming, or interconnection arrangements; or

(2) Telecommunications equipment that cannot route or redirect user data traffic or permit visibility into any user data or packets that such equipment transmits or otherwise handles.

ii) By necessary implication and regulation, the prohibitions also do not apply to:

(1) Covered telecommunications equipment or services that:

i. Are not used as a substantial or essential component of any system; and
ii. Are not used as critical technology of any system.

(2) Other telecommunications equipment or services that are not considered covered telecommunications equipment or services.

D. Reporting requirement.

i) In the event the contractor identifies covered telecommunications equipment or services used as a substantial or essential component of any system, or as critical technology as part of any system, during contract performance, or the contractor is notified of such by a subcontractor at any tier or by any other source, the contractor shall report the information in paragraph (d)(2) of this clause to the recipient or subrecipient, unless elsewhere in this contract are established procedures for reporting the information.

ii) The Contractor shall report the following information pursuant to paragraph (d)(1) of this clause:

(1) Within one business day from the date of such identification or notification: The contract number; the order number(s), if applicable; supplier name; supplier unique entity identifier (if known); supplier Commercial and Government Entity (CAGE) code (if known); brand; model number (original equipment manufacturer number, manufacturer part number, or wholesaler number); item description; and any readily available information about mitigation actions undertaken or recommended.

(2) Within 10 business days of submitting the information in paragraph (d)(2)(i) of this clause: Any further available information about mitigation actions undertaken or recommended. In addition, the contractor shall describe the efforts it undertook to prevent use or submission of covered telecommunications equipment or services, and any additional efforts that will be incorporated to prevent future use or submission of covered telecommunications equipment or services.

iii) Subcontracts. The Contractor shall insert the substance of this clause, including this paragraph, in all subcontracts and other contractual instruments."

42. DOMESTIC PREFERENCES FOR PROCUREMENTS

As appropriate, and to the extent consistent with law, the contractor should, to the greatest extent practicable, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States. This includes, but is not limited to iron, aluminum, steel, cement, and other manufactured products.

For purposes of this clause:

Produced in the United States means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

Manufactured products mean items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber

43. FEDERAL LABOR STANDARDS PROVISIONS

The Contractor shall abide by the requirements of the Federal Labor Standards Provisions (form HUD-4010) as follows.

44. AUTHORIZATION

ATTEST:

[Owner]

_____

By:_____
[*name & title of GRANTEE Representative*]

_____

Date:_____

[name of CONTRACTOR]

_____

By: _____
[*name & title of CONTRACTOR Representative*]

_____

Date:_____

HUD-4010
Federal Labor Standards Provisions

U.S. Department of Housing and Urban Development
Office of Davis-Bacon and Labor Standards

A. APPLICABILITY

The Project or Program to which the construction work covered by this Contract pertains is being assisted by the United States of America, and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

1. Minimum wages and fringe benefits

i. All laborers and mechanics employed or working upon the site of the work (or otherwise working in construction or development of the project under a development statute), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of basic hourly wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. As provided in 29 CFR 5.5(d) and (e), the appropriate wage determinations are effective by operation of law even if they have not been attached to the contract. Contributions made or costs reasonably anticipated for bona fide fringe benefits under the Davis-Bacon Act (40 U.S.C. 3141(2)(B)) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(v) of these contract clauses; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics must be paid the appropriate wage rate and fringe benefits on the wage determination for the classification(s) of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided,* That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under 29 CFR 5.5(a)(1)(iii)) and the Davis-Bacon poster (WH-1321) must be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

ii. Frequently recurring classifications

A. In addition to wage and fringe benefit rates that have been determined to be prevailing under the procedures set forth in 29 CFR part 1, a wage determination may contain, pursuant to § 1.3(f), wage and fringe benefit rates for classifications of laborers and mechanics for which conformance requests are regularly submitted pursuant to 29 CFR 5.5(a)(1)(iii), provided that:

1. The work performed by the classification is not performed by a classification in the wage determination for which a prevailing wage rate has been determined;

2. The classification is used in the area by the construction industry; and

3. The wage rate for the classification bears a reasonable relationship to the prevailing wage rates contained in the wage determination.

B. The Administrator will establish wage rates for such classifications in accordance with 29 CFR 5.5(a)(1)(iii)(A)(3). Work performed in such a classification must be paid at no less than the wage and fringe benefit rate listed on the wage determination for such classification.

iii. Conformance

A. The contracting officer must require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract be

classified in conformance with the wage determination. Conformance of an additional classification and wage rate and fringe benefits is appropriate only when the following criteria have been met:

1. The work to be performed by the classification requested is not performed by a classification in the wage determination; and
2. The classification is used in the area by the construction industry; and
3. The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

B. The conformance process may not be used to split, subdivide, or otherwise avoid application of classifications listed in the wage determination.

C. If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken will be sent by the contracting officer by email to DBAconformance@dol.gov. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30–day period that additional time is necessary.

D. In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer will, by email to DBAconformance@dol.gov, refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30–day period that additional time is necessary.

E. The contracting officer must promptly notify the contractor of the action taken by the Wage and Hour Division under 29 CFR 5.5 (a)(1)(iii)(C) and (D). The contractor must furnish a written copy of such determination to each affected worker or it must be posted as a part of the wage determination. The wage rate (including fringe benefits where appropriate) determined pursuant to 29 CFR 5.5 (a)(1)(iii)(C) or (D) must be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

iv. Fringe benefits not expressed as an hourly rate
Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor may either pay the benefit as stated in the wage determination or may pay another bona fide fringe benefit or an hourly cash equivalent thereof.

v. Unfunded plans
If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided,* That the Secretary of Labor has found, upon the written request of the contractor, in accordance with the criteria set forth in 29 CFR 5.28, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

vi. Interest In the event of a failure to pay all or part of the wages required by the contract, the contractor will be required to pay interest on any underpayment of wages.

2. **Withholding**

   i. **Withholding requirements**

   The U. S. Department of Housing and Urban Development may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for the full amount of wages and monetary relief, including interest, required by the clauses set forth in 29 CFR 5.5(a) for violations of this contract, or to satisfy any such liabilities required by any other Federal contract, or federally assisted contract subject to Davis-Bacon labor standards, that is held by the same prime contractor (as defined in 29 CFR 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to Davis-Bacon labor standards requirements and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld. In the event of a contractor's failure to pay any laborer or mechanic, including any apprentice or helper working on the site of the work (or otherwise working in construction or development of the project under a development statute) all or part of the wages required by the contract, or upon the contractor's failure to submit the required records as discussed in 29 CFR 5.5(a)(3)(iv), HUD may on its own initiative and after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

   ii. **Priority to withheld funds**

   The Department has priority to funds withheld or to be withheld in accordance with 29 CFR 5.5(a)(2)(i) or (b)(3)(i), or both, over claims to those funds by:

   A. A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
   B. A contracting agency for its reprocurement costs;
   C. A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
   D. A contractor's assignee(s);
   E. A contractor's successor(s); or
   F. A claim asserted under the Prompt Payment Act, 31 U.S.C. 3901-3907.

3. **Records and certified payrolls**

   i. **Basic record requirements**

   A. Length of record retention. All regular payrolls and other basic records must be maintained by the contractor and any subcontractor during the course of the work and preserved for all laborers and mechanics working at the site of the work (or otherwise working in construction or development of the project under a development statute) for a period of at least 3 years after all the work on the prime contract is completed.

   B. Information required Such records must contain the name; Social Security number; last known address, telephone number, and email address of each such worker; each worker's correct classification(s) of work actually performed; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 40 U.S.C. 3141(2)(B) of the Davis-Bacon Act); daily and weekly number of hours actually worked in total and on each covered contract; deductions made; and actual wages paid.

   C. Additional records relating to fringe benefits. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(v) that the wages of any laborer or mechanic include the amount of any

costs reasonably anticipated in providing benefits under a plan or program described in 40 U.S.C. 3141(2)(B) of the Davis-Bacon Act, the contractor must maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

D. **Additional records relating to apprenticeship** Contractors with apprentices working under approved programs must maintain written evidence of the registration of apprenticeship programs, the registration of the apprentices, and the ratios and wage rates prescribed in the applicable programs.

ii. **Certified payroll requirements**

A. **Frequency and method of submission** The contractor or subcontractor must submit weekly, for each week in which any DBA- or Related Acts-covered work is performed, certified payrolls to HUD if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the certified payrolls to the applicant, sponsor, owner, or other entity, as the case may be, that maintains such records, for transmission to HUD. The prime contractor is responsible for the submission of all certified payrolls by all subcontractors. A contracting agency or prime contractor may permit or require contractors to submit certified payrolls through an electronic system, as long as the electronic system requires a legally valid electronic signature; the system allows the contractor, the contracting agency, and the Department of Labor to access the certified payrolls upon request for at least 3 years after the work on the prime contract has been completed; and the contracting agency or prime contractor permits other methods of submission in situations where the contractor is unable or limited in its ability to use or access the electronic system

B. **Information required** The certified payrolls submitted must set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i)(B), except that full Social Security numbers and last known addresses, telephone numbers, and email addresses must not be included on weekly transmittals. Instead, the certified payrolls need only include an individually identifying number for each worker (*e.g.*, the last four digits of the worker's Social Security number). The required weekly certified payroll information may be submitted using Optional Form WH-347 or in any other format desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at https://www.dol.gov/sites/dolgov/files/WHD/legacy/files/wh347.pdf or its successor website. It is not a violation of this section for a prime contractor to require a subcontractor to provide full Social Security numbers and last known addresses, telephone numbers, and email addresses to the prime contractor for its own records, without weekly submission by the subcontractor to the sponsoring government agency (or the applicant, sponsor, owner, or other entity, as the case may be, that maintains such records).

C. **Statement of Compliance** Each certified payroll submitted must be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor, or the contractor's or subcontractor's agent who pays or supervises the payment of the persons working on the contract, and must certify the following:

1. That the certified payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information and basic records are being maintained under 29 CFR 5.5 (a)(3)(i), and such information and records are correct and complete;
2. That each laborer or mechanic (including each helper and apprentice) working on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly

from the full wages earned, other than permissible deductions as set forth in 29 CFR part 3; and

3. That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification(s) of work actually performed, as specified in the applicable wage determination incorporated into the contract.

D. **Use of Optional Form WH-347** The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 will satisfy the requirement for submission of the "Statement of Compliance" required by 29 CFR 5.5(a)(3)(ii)(C).

E. **Signature** The signature by the contractor, subcontractor, or the contractor's or subcontractor's agent must be an original handwritten signature or a legally valid electronic signature.

F. **Falsification** The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 3729.

G. **Length of certified payroll retention** The contractor or subcontractor must preserve all certified payrolls during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

iii. **Contracts, subcontracts, and related documents** The contractor or subcontractor must maintain this contract or subcontract and related documents including, without limitation, bids, proposals, amendments, modifications, and extensions. The contractor or subcontractor must preserve these contracts, subcontracts, and related documents during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

iv **Required disclosures and access**

A. **Required record disclosures and access to workers** The contractor or subcontractor must make the records required under 29 CFR 5.5(a)(3)(i)–(iii), and any other documents that HUD or the Department of Labor deems necessary to determine compliance with the labor standards provisions of any of the applicable statutes referenced by 29 CFR 5.1, available for inspection, copying, or transcription by authorized representatives of HUD or the Department of Labor, and must permit such representatives to interview workers during working hours on the job.

B. **Sanctions for non-compliance with records and worker access requirements** If the contractor or subcontractor fails to submit the required records or to make them available, or refuses to permit worker interviews during working hours on the job, the Federal agency may, after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, that maintains such records or that employs such workers, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available, or to permit worker interviews during working hours on the job, may be grounds for debarment action pursuant to 29 CFR 5.12. In addition, any contractor or other person that fails to submit the required records or make those records available to WHD within the time WHD requests that the records be produced will be precluded from introducing as evidence in an administrative proceeding under 29 CFR part 6 any of the required records that were not provided or made available to WHD. WHD will take into consideration a reasonable request from the contractor or person for an extension of the time for submission of records. WHD will determine the reasonableness of the request and may consider, among other things, the location of the records and the volume of production.

C. **Required information disclosures** Contractors and subcontractors must maintain the full Social Security number and last known address, telephone number, and email address of each covered worker, and must provide them upon request to HUD if the agency is a party to

the contract, or to the Wage and Hour Division of the Department of Labor. If the Federal agency is not such a party to the contract, the contractor, subcontractor, or both, must, upon request, provide the full Social Security number and last known address, telephone number, and email address of each covered worker to the applicant, sponsor, owner, or other entity, as the case may be, that maintains such records, for transmission to HUD, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or other compliance action.

4. Apprentices and equal employment opportunity

i. Apprentices

A. Rate of pay Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship (OA), or with a State Apprenticeship Agency recognized by the OA. A person who is not individually registered in the program, but who has been certified by the OA or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice, will be permitted to work at less than the predetermined rate for the work they perform in the first 90 days of probationary employment as an apprentice in such a program. In the event the OA or a State Apprenticeship Agency recognized by the OA withdraws approval of an apprenticeship program, the contractor will no longer be permitted to use apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

B. Fringe benefits Apprentices must be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits must be paid in accordance with that determination.

C. Apprenticeship ratio The allowable ratio of apprentices to journeyworkers on the job site in any craft classification must not be greater than the ratio permitted to the contractor as to the entire work force under the registered program or the ratio applicable to the locality of the project pursuant to 29 CFR 5.5(a)(4)(i)(D). Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in 29 CFR 5.5(a)(4)(i)(A), must be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under this section must be paid not less than the applicable wage rate on the wage determination for the work actually performed.

D. Reciprocity of ratios and wage rates Where a contractor is performing construction on a project in a locality other than the locality in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyworker's hourly rate) applicable within the locality in which the construction is being performed must be observed. If there is no applicable ratio or wage rate for the locality of the project, the ratio and wage rate specified in the contractor's registered program must be observed.

ii Equal employment opportunity The use of apprentices and journeyworkers under this part must be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

5 Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6 **Subcontracts.** The contractor or subcontractor must insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (11), along with the applicable wage determination(s) and such other clauses or contract modifications as the U.S. Department of Housing and Urban Development may by appropriate instructions require, and a clause requiring the subcontractors to include these clauses and wage determination(s) in any lower tier subcontracts. The prime contractor is responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this section. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and may be subject to debarment, as appropriate.

7 **Contract termination: debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8 **Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9 **Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. **Certification of eligibility**.

i. By entering into this contract, the contractor certifies that neither it nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of 40 U.S.C. 3144(b) or 29 CFR 5.12(a).

ii. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of 40 U.S.C. 3144(b) or 29 CFR 5.12(a).

iii. The penalty for making false statements is prescribed in the U.S. Code, Title 18 Crimes and Criminal Procedure, 18 U.S.C. 1001.

11 **Anti-retaliation** It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

i. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the DBA, Related Acts, or 29 CFR parts 1, 3, or 5;

ii. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under the DBA, Related Acts, or 29 CFR parts 1, 3, or 5;

iii. Cooperating in any investigation or other compliance action, or testifying in any proceeding under the DBA, Related Acts, or 29 CFR parts 1, 3, or 5; or

iv. Informing any other person about their rights under the DBA, Related Acts, or 29 CFR parts 1, 3, or 5.

B. Contract Work Hours and Safety Standards Act (CWHSSA)

The Agency Head must cause or require the contracting officer to insert the following clauses set forth in 29 CFR 5.5(b)(1), (2), (3), (4), and (5) in full, or (for contracts covered by the Federal Acquisition Regulation) by reference, in any contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses must

be inserted in addition to the clauses required by 29 CFR 5.5(a) or 4.6. As used in this paragraph, the terms "laborers and mechanics" include watchpersons and guards.

1. **Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
2. **Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in 29 CFR 5.5(b)(1) the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages and interest from the date of the underpayment. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchpersons and guards, employed in violation of the clause set forth in 29 CFR 5.5(b)(1), in the sum of $31 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in 29 CFR 5.5(b)(1).
3. **Withholding for unpaid wages and liquidated damages**

i. **Withholding process** The U.S Department of Housing and Urban Development or the recipient of Federal assistance may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in 29 CFR 5.5(b) on this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in 29 CFR 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

ii **Priority to withheld funds** The Department has priority to funds withheld or to be withheld in accordance with 29 CFR 5.5(a)(2)(i) or (b)(3)(i), or both, over claims to those funds by:

- **A.** A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- **B.** A contracting agency for its reprocurement costs;
- **C.** A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- **D.** A contractor's assignee(s);
- **E.** A contractor's successor(s); or
- **F.** A claim asserted under the Prompt Payment Act, 31 U.S.C. 3901-3907.

4. ***Subcontracts.*** The contractor or subcontractor must insert in any subcontracts the clauses set forth in 29 CFR 5.5(b)(1) through (5) and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in 29 CFR 5.5(b)(1) through (5). In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss,

due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

5 **Anti-retaliation** It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

i. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in 29 CFR part 5;

ii. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or 29 CFR part 5;

iii. Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or 29 CFR part 5; or

iv. Informing any other person about their rights under CWHSSA or 29 CFR part 5.

C. **CWHSSA required records clause** In addition to the clauses contained in 29 CFR 5.5(b), in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other laws referenced by 29 CFR 5.1, the Agency Head must cause or require the contracting officer to insert a clause requiring that the contractor or subcontractor must maintain regular payrolls and other basic records during the course of the work and must preserve them for a period of 3 years after all the work on the prime contract is completed for all laborers and mechanics, including guards and watchpersons, working on the contract. Such records must contain the name; last known address, telephone number, and email address; and social security number of each such worker; each worker's correct classification(s) of work actually performed; hourly rates of wages paid; daily and weekly number of hours actually worked; deductions made and actual wages paid. Further, the Agency Head must cause or require the contracting officer to insert in any such contract a clause providing that the records to be maintained under this paragraph must be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview workers during working hours on the job.

D. **Incorporation of contract clauses and wage determinations by reference** Although agencies are required to insert the contract clauses set forth in this section, along with appropriate wage determinations, in full into covered contracts, and contractors and subcontractors are required to insert them in any lower-tier subcontracts, the incorporation by reference of the required contract clauses and appropriate wage determinations will be given the same force and effect as if they were inserted in full text.

E. **Incorporation by operation of law** The contract clauses set forth in this section (or their equivalent under the Federal Acquisition Regulation), along with the correct wage determinations, will be considered to be a part of every prime contract required by the applicable statutes referenced by 29 CFR 5.1 to include such clauses, and will be effective by operation of law, whether or not they are included or incorporated by reference into such contract, unless the Administrator grants a variance, tolerance, or exemption from the application of this paragraph. Where the clauses and applicable wage determinations are effective by operation of law under this paragraph, the prime contractor must be compensated for any resulting increase in wages in accordance with applicable law.

F. HEALTH AND SAFETY

The provisions of this paragraph (F) are applicable where the amount of the prime contract exceeds **$100,000**.

1. No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his or her health and safety, as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.
2. The contractor shall comply with all regulations issued by the Secretary of Labor pursuant to 29 CFR Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96), 40 U.S.C. § 3701 et seq.
3. The contractor shall include the provisions of this paragraph in every subcontract, so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

SECTION 01010

FEDERAL WAGE DECISION

[ST. JOHN THE BAPTIST PARISH]
[RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS]

"General Decision Number: LA20260005 01/30/2026

Superseded General Decision Number: LA20250005

State: Louisiana

Construction Type: Heavy

Counties: Jefferson, Orleans, Plaquemines, St Bernard, St Charles, St James, St John the Baptist and St Tammany Counties in Louisiana.

HEAVY CONSTRUCTION PROJECTS (Includes flood control, water & sewer lines, and water wells. Also includes elevated storage tanks in all listed parishes except Plaquemines and St. James. Excludes industrial construction-chemical processing, power plants, and refineries.)

Modification Number	Publication Date
0	01/02/2026
1	01/30/2026

CARP0729-001 01/01/2025

	Rates	Fringes
MILLWRIGHT	$ 40.34	14.16

CARP1846-006 07/01/2024

	Rates	Fringes
CARPENTER (formbuilding/formsetting and Piledrivers)	$ 32.59	10.52

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* ELEC0130-005 12/01/2025

JEFFERSON, ORLEANS, PLAQUEMINES, ST. BERNARD, ST. CHARLES, ST. JAMES, AND ST. JOHN THE BAPTIST PARISHES

	Rates	Fringes
ELECTRICIAN (including low voltage wiring)	$ 36.00	16.66

ELEC1077-002 05/26/2025

ST. TAMMANY PARISH

	Rates	Fringes
ELECTRICIAN (including low voltage wiring)	$ 30.35	3%+11.55

ENGI0406-018 07/01/2009

	Rates	Fringes
OPERATOR: Power Equipment		
Bulldozer	$ 21.26	6.70

Mechanic	$ 23.31	6.70

PLAS0567-003 08/01/2022

JEFFERSON, ORLEANS, PLAQUEMINES, ST. BERNARD, ST. CHARLES, ST. JOHN THE BAPTIST, and ST. TAMMANY PARISHES

	Rates	Fringes
Cement Mason/Concrete Finisher	$ 30.47	7.97

PLAS0812-003 01/01/2022

ST. JAMES PARISH

	Rates	Fringes
Cement Mason/Concrete Finisher	$ 31.83	5.90

PLUM0060-002 06/05/2023

JEFFERSON, ORLEANS, PLAQUEMINES, ST. BERNARD, ST. CHARLES, ST. JAMES (Southeastern Portion), ST. JOHN THE BAPTIST, and ST. TAMMANY PARISHES

	Rates	Fringes
Plumbers (excluding pipe laying)	$ 31.70	13.85

PLUM0198-005 12/08/2022

ST. JAMES PARISH (Northwestern Portion)

	Rates	Fringes
PLUMBER (excluding pipe laying)	$ 32.42	16.50

SULA2004-007 05/13/2004

	Rates	Fringes
CARPENTER (all other work)	$ 13.75	2.60
Laborers:		
Common/Landscape	$ 9.88	0.00
Fence	$ 11.24	0.00
Flagger	$ 8.58	0.00
Mason Tender	$ 7.25	0.00
Pipelayer	$ 9.84	0.00
PIPEFITTER (excluding pipelaying)	$ 17.52	4.51
Power equipment operators:		
Backhoe/Excavator	$ 14.42	0.00
Crane	$ 16.34	3.30
Dragline	$ 16.50	0.00
Front End Loader	$ 13.89	0.00
Oiler	$ 10.03	0.00
Truck drivers:		

Dump	$ 11.01	0.00
Pickup	$ 12.25	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded. If a contract is subject to Executive Order 13658, the contractor must pay all covered workers at least $13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was

prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which

the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

a) a survey underlying a wage determination
b) an existing published wage determination
c) an initial WHD letter setting forth a position on a wage determination matter
d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.

Washington, DC 20210.

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END OF GENERAL DECISION"

SECTION 01011

DAVIS-BACON AND LABOR STANDARDS CONTRACTOR GUIDE ADDENDUM

[ST. JOHN THE BAPTIST PARISH]
[RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS]

DAVIS-BACON AND LABOR STANDARDS

CONTRACTOR GUIDE ADDENDUM

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INTRODUCTION

This Guide has been prepared for you as a contractor performing work on construction projects that are assisted by the Department of Housing and Urban Development and subject to Davis-Bacon prevailing wage requirements. This Guide does not address contractor requirements involved in direct Federal contracting where HUD or another Federal agency enters into a procurement contract. In this latter case, the Federal Acquisition Regulations (FAR) are applicable. While the guidance contained in this Guide is generally applicable to any Davis-Bacon covered project, specific questions pertaining to direct Federal contracts should be addressed to the Contracting Officer who signed the contract for the Federal agency.

Our objective here is to provide you with a guide that is simple and non-bureaucratic yet comprehensive, and will help you better understand and comply with Davis-Bacon labor standards. HUD's Office of Davis Bacon and Labor Standards worked closely with the Department of Labor's Wage and Hour Division to make sure that the labor standards provisions in your contract and the specifics of complying with them represent the latest information. It is the Department of Labor that has general administrative oversight of all Federal contracting agencies, such as HUD, which administer the day-to-day responsibilities of enforcing Davis-Bacon provisions in construction contracts that they either fund or assist in funding.

This Guide contains six main chapters. The first chapter includes the laws and regulations associated with Federal labor standards administration and enforcement. The second chapter lists the responsibilities of contractors and of state, tribal, and local contracting agencies that administer HUD programs. The third chapter lists wage basics, including wage decisions, wage classifications, and wage rates, to provide background for the rest of the Guide. The fourth chapter discusses reviewing and reporting payrolls. The fifth chapter delves into additional work classifications and wage rates. The sixth and final chapter discusses sanctions and restitution. For further background, the DBLS Agency Guide may be used as a reference.

Finally, not all HUD construction projects are covered by Davis-Bacon wage rates. For the purpose of this Guide, we are assuming that a determination has already been made that Davis-Bacon wage rates are applicable. Should you wish assistance in determining whether Davis-Bacon wage rates apply to a particular project or if you need other related technical assistance, please consult with the HUD Labor Standards Field staff for your area.

RESOURCE

Visit the Office of Davis Bacon and Labor Standards online
www.hud.gov/program_offices/davis_bacon_and_labor_standards

BASIC DBA DEFINITIONS

See Section 3 in the Agency Guide.

LAWS AND REGULATIONS

The Davis-Bacon Act (DBA)

The Davis-Bacon Act (DBA) requires the payment of prevailing wage rates (determined by the U.S. Department of Labor) to all laborers and mechanics on Federal government and District of Columbia construction projects in excess of $2,000. Construction includes alteration and/or repair, including painting and decorating, of public buildings or public works. Most HUD construction work is not covered by the DBA itself since HUD seldom contracts directly for construction services. Most often, if DB applies to a HUD project is it because of a labor provision contained in one of HUD's "Related Acts" (see 5.9 in the Agency Guide). The Related Acts are often referred to as the Davis-Bacon and Related Acts or DBRA.

The Contract Work Hours and Safety Standards Act (CWHSSA)

CWHSSA requires time and one-half pay for overtime (OT) hours (over 40 in any workweek) worked on a covered project. The CWHSSA applies to both direct federal contracts and to federally-assisted contracts where those contracts require or involve the employment of laborers and mechanics and where federal wage standards (e.g., Davis-Bacon or HUD-determined prevailing wage rates) are applicable. CWHSSA provisions apply to all laborers and mechanics, including watchmen and guards, employed by any contractor or subcontractor. CWHSSA also applies to maintenance laborers and mechanics employed by contractors or subcontractors engaged in the operation of Public Housing Agencies (PHA), Tribally Designated Housing Entities (TDHE), and Indian Housing Agencies (IHA) developments.

Exemptions:

CWHSSA O/T provisions do not apply where the federal assistance is only in the nature of a loan guarantee or insurance.

CWHSSA O/T provisions do not apply to prime contracts of $100,000 or less.

The Copeland Act (Anti-Kickback Act)

The Copeland Act makes it a Federal crime for anyone to require any laborer or mechanic (employed on a Federal or Federally-assisted project) to kickback, (i.e., give up or pay back) any part of their wages. The Copeland Act requires every employer to submit weekly certified payroll reports, and regulates permissible payroll deductions.

The Fair Labor Standards Act (FLSA)

The FLSA governs matters such as federal minimum wage rates and O/T. These standards are generally applicable to any labor performed and may be pre-empted by other (often more stringent) federal standards such as the DBRA prevailing wage requirements and CWHSSA O/T provisions. The authority to administer and enforce FLSA provisions resides solely with DOL.

Davis-Bacon Regulations

DOL has published rules and instructions concerning Davis-Bacon and other labor laws in the Code of Federal Regulations (CFR). These regulations can be found in Title 29 CFR Parts 1, 3, 5, 6, and 7. Part 1 explains how DOL establishes and publishes DBA wage determinations (also referred to as wage decisions) and provides instructions on how to use the determinations. Part 3 describes Copeland Act requirements for payroll deductions and the submission of weekly CPRs. Part 5 covers the labor standards provisions that are in contracts relating to Davis-Bacon Act wage rates and the responsibilities of contractors and contracting agencies to administer and enforce the provisions. Part 6 provides for administrative proceedings enforcing Federal labor standards on construction and service contracts. Finally, Part 7 sets parameters for practice before the Administrative Review Board. These regulations are used as the basis for administering and enforcing the laws.

DOL Regulations are available online: www.ecfr.gov/current/title-29

Construction Contract Provisions and Labor Standards Administration

Labor standards administration involves the activities that take place primarily before construction begins. Administration sets the stage for the compliance activities that occur during the construction phase. The first and sometimes most difficult step is determining whether and to what extent Davis-Bacon wage standards apply to a particular contract or project. The Factors of Labor Standards Applicability (see Appendix II-6) should be helpful. Most HUD-assisted construction work is covered by Davis-Bacon, but there are some exceptions. The best and safest approach is to first assume that Davis-Bacon requirements will be applicable whenever the contract/project involves construction work valued in excess of $2,000, then look more closely to see if there is any reason for non-coverage. Each contract subject to Davis-Bacon labor standards requirements must contain labor standards clauses and a Davis-Bacon wage decision. These documents are normally wound into the contract specifications.

The labor standards clauses

The contract for construction is the vehicle to ensure contractor compliance and Davis-Bacon wage enforcement. Therefore, the bid specifications and/or the contract for each project subject to Davis-Bacon wage rates must contain both a Davis-Bacon wage decision and labor standards clauses. The labor standards clauses describe the responsibilities of the contractor concerning Davis-Bacon wages and obligate the contractor to comply with the Davis-Bacon wage and reporting requirements and with the O/T provisions of the CWHSSA (applicable only when the prime contract is valued at over $100,000). The labor standards clauses also provide for remedies in the event of violations, including the withholding of payments due to the contractor to ensure the payment of wages or liquidated damages that may be found due, and sanctions should violations occur. These contract clauses enable the contract administrator to enforce the Federal labor standards applicable to the project. HUD has standard forms that contain contract clauses. For example, the HUD-92554M, Supplementary Conditions Of The Contract for Construction, which is issued primarily for FHA (Federal Housing Administration) multifamily housing and other construction projects administered by HUD; the HUD-4010, Federal Labor Standards Provisions, which is used for CDBG (Community Development and Block Grant) and HOME (HOME Investment Partnerships Program) projects; and the HUD-5370, General Conditions for Construction Contracts (construction contracts >$150,000) or the HUD-5370-EZ, General Contract Conditions for Small Construction/Development Contracts (construction contracts >$2,000 but ≤$150,000) which are used for Public and Indian Housing projects. These should be wound into the contract specifications or incorporated by specific reference in the bid/contract documents (see Labor Relations Letter 96-03).

Davis-Bacon Wage Decisions

The term "wage decision" includes the original decision and any subsequent decisions that modify, supersede, correct, or otherwise change the provisions of the original decision. The term "wage decision" is used within this Guide to mean the Davis-Bacon wage decision. The terms "wage decision" and "wage determination" are used interchangeably. A wage decision is a schedule of construction work classifications, wage rates, and fringe benefits that represent the minimum rates that must be paid to workers employed in those classifications. Wage decisions are established for defined geographic areas, usually by county or group of counties, and four general characters of construction work.

RESOURCE

The Department of Housing and Urban Development (HUD) one stop forms resource page

www.hud.gov/program_offices/administration/hudclips/forms

RESOURCE

All current Davis Bacon wage decisions can be accessed online at no cost at www.sam.gov

CONTRACTOR RESPONSIBILITIES

The principal contractor is responsible for the full compliance of all employers (the contractor, subcontractors, and any lower-tier subcontractors) with the labor standards provisions applicable to the project. Because of the contractual relationship between a prime contractor and their subcontractors, subcontractors generally should communicate with the contract administrator only through the prime contractor. (See Contract Administrator Responsibilities, below.)

CONTRACT ADMINISTRATOR RESPONSIBILITIES

The contract administrator is responsible for the proper administration and enforcement of the Federal labor standards provisions on contracts covered by Davis-Bacon requirements. This term is used to represent the person (or persons) who will provide labor standards advice and support to contractors and other project principals (e.g., owner, sponsor, architect), including providing the proper Davis-Bacon wage decision (see 6.1, The Wage Decision) and ensuring that the wage decision and contract clauses are incorporated into the contract for construction. The contract administrator also monitors labor standards compliance (see Section 12, Payroll Compliance Reviews and Corrections, in the Agency Guide) by conducting interviews with construction workers at the job site and reviewing payroll reports, and oversees any enforcement actions that may be required.

The contract administrator could be an employee or agent of HUD, or of a city or county or public housing agency. For HUD projects administered directly by HUD staff, usually FHA-insured multifamily projects, the contract administrator will be the HUD Labor Standards field staff. But many HUD-assisted projects are administered by local contracting agencies such as PHAs, TDHEs, and States, cities and counties under HUD's CDBG and HOME programs.

In these cases, the contract administrator will likely be local agency staff. In either case, the guidance for contractors remains essentially the same.

DOL also has a role in monitoring Davis-Bacon administration and enforcement. In addition, DOL has independent authority to conduct investigations. A DOL investigator or other DOL representative may visit Davis-Bacon construction sites to interview construction workers or review payroll information.

RESOURCE

Program technical guidance

For interpretations of program requirements or handbooks and instructions on the use of forms

Housing Programs - See our Contact List for help.

WAGE BASICS

The Wage Decision

Davis-Bacon labor standards stipulate the wage payment requirements for skilled workers, operators, truck drivers, and laborers—for example: carpenters, electricians, plumbers, roofers, rollers, screeds, bulldozers, water wagons, dump trucks, and other construction work classifications that may be needed for the project. The Davis-Bacon wage decision that applies to the project contains a schedule of work classifications and wage rates that must be followed.

Remember, the wage decision is contained in the contract specifications along with the labor standards clauses. See 5.12 in the Agency Guide.

The work classifications and wage rates

A Davis-Bacon wage decision is simply a listing of different work classifications and the minimum wage rates that must be paid to anyone performing work in those classifications.

You'll want to make sure that the work classifications you need are contained in the wage decision, and make certain that you know exactly what wage rate(s) you will need to pay. Some wage decisions cover several counties and/or types of construction work (e.g., residential and commercial work) and can be lengthy and difficult to read. The contract administrator (HUD Labor Standards field staff or local agency staff) is available to assist with any trouble reading the wage decision or finding the applicable work classification(s).

To make reading lengthy wage decisions easier, a contract administrator may prepare a Project Wage Sheet (HUD-4720). This sheet is a one-page transcript that will show only the classifications and wage rates for a project. A blank copy of a Project Wage Rate Sheet is provided in the Appendix.

RESOURCE

A fillable version of this form is available online at HUDClips www.hud.gov/program_offices/administration/hudclips/forms Contact the contract administrator monitoring the project for assistance with a Project Wage Rate.

Posting the wage decision, Davis-Bacon poster, and Additional Classifications wages

The prime contractor is responsible for posting a copy of the wage decision (or the Project Wage Rate Sheet), a copy of the DOL Davis-Bacon poster titled Employee Rights Under the Davis-Bacon Act (Form WH-1321), and Additional Classifications wages at the job site in a place that is easily accessible to all the construction workers employed on the project and where the wage decision and poster will not be destroyed by wind, rain, etc. The purpose of this posting is to provide information to the construction laborers and mechanics working on the project about their entitlement to the prevailing wage for their trade, and to advise them whom to contact (the contract administrator) if they have any questions or want to file a complaint.

RESOURCE

The Employee Rights Under the Davis Bacon Act poster replaces the Notice To All Employees. The new poster is available in English and Spanish online at www.hud.gov/program_offices/davis_bacon_and_labor_standards/olrmk13

REVIEWING PAYROLLS

Certified Payroll Reports (CPRs)

To demonstrate compliance with labor standards requirements, each employer shall prepare, certify, and submit payroll reports for each week to the sponsor, applicant, or owner for any contract work that is performed. See 29 CFR § 5.5(a)(3)(ii) for information on CPRs.

CPR format

Employers on an FHA project are required to use the HUD-authorized Electronic Payroll System (EPS) to submit CPR reports. If an approved electronic payroll reporting system is not being used by the LCA,, the employer must ensure that all information from DOL Payroll Form WH-347 is included and that the LSS can reasonably interpret it. Form WH-347 is available online at www.dol.gov/whd/forms/wh347.pdf.

Submission requirements

Each employer shall submit payroll reports beginning with the first week such employer performs work on the site of the work. Employers shall submit reports promptly following the close of each such pay week.

"No Work" payrolls

Employers are not required to submit reports for weeks during which no work was performed at the site of work, provided that the payroll reports are numbered sequentially or that the employer has provided written notice that its work on the project has been suspended.

Weekly payroll certification

Each weekly payroll submitted shall be accompanied by a "Statement of Compliance" that bears the original signature of the owner, executive/ corporate officer, or a designee authorized by the owner or officer. The signature must be in ink; pencil is not acceptable. Signature stamps, photocopies, and facsimiles are not acceptable. The employer may utilize the reverse side of the DOL Payroll Form WH-347 as its Statement of Compliance or another document that contains the same language prescribed on the reverse of the WH-347.

False Submissions

The falsification of any of the above certifications may subject the employer to civil or criminal prosecution under § 1001 of Title 18 and § 231 of Title 31 of the United States Code (USC).

Payroll Review and Submission

The prime contractor should review each subcontractor's payroll reports for compliance prior to submitting the reports to the contract administrator. Remember, the prime contractor is responsible for the full compliance of all subcontractors on the contract and will be held accountable for any wage restitution that may be found due to any laborer or mechanic that is underpaid and for any liquidated damages that may be assessed for O/T violations. All the payroll reports for any project must be submitted to the contract administrator through the prime contractor.

An alert prime contractor that reviews subcontractor payroll submissions can detect any misunderstandings early, prevent costly underpayments, and protect itself from financial loss should underpayments occur.

Payroll Retention

Every contractor (including every subcontractor) must keep a complete set of their own payrolls and other basic records—such as employee addresses and full SSNs, time cards, tax records, evidence of fringe benefit payments—for a Davis-Bacon project for at least three years after the project is completed. The prime contractor must keep a complete set of all the payrolls for every contractor (including subcontractors) for at least three years after completion of the project.

Payroll Inspection

In addition to submitting payrolls to the contract administrator, every contractor (including subcontractors) must make their own copy of the payrolls and other basic records available for review or copying to any authorized representative from HUD or DOL.

REPORTING PAYROLLS

Completing a Payroll Report

Each employer shall maintain payroll records with respect to their own workforce employed at the site of the work. The prime contractor shall maintain such records relative to all laborers and mechanics working at the site of the work during the course of the construction work for at least three years following the completion of the work. Such records shall contain:

Project and contractor/subcontractor information

Each payroll must identify the contractor or subcontractor's name and address, the project name and number, and the week ending date. Week dates must be indicated in the spaces provided. Numbering payrolls is optional but strongly recommended.

Employee information

The name and an individually identifying 4-digit number for each laborer and mechanic. Employers must always maintain each employee's address and full Social Security number (SSN) during the construction of the project and for no less than three years following completion. This information must be made available to the prime contractor, HUD, and/or the LCA upon request.

Employers (prime contractors and subcontractors) must maintain the current address and full SSN for each employee and must provide this information upon request to the contracting agency or other authorized representative responsible for Federal labor standards compliance monitoring. Prime contractors may require a subcontractor to provide this information for the prime contractor's records. DOL has modified form WH-347, Payroll, to accommodate these reporting requirements.

Work classification

Each employee must be classified in accordance with the wage decision based on the type of work they perform.

Apprentices or trainees

The first payroll on which any apprentice or trainee appears must be accompanied by a copy of that apprentice's or trainee's registration in a registered or approved program. A copy of the portions of the registered or approved program pertaining to the wage rates and ratios shall also accompany the first payroll on which the first apprentice or trainee appears.

Split classifications

For an employee that worked in a split classification, make a separate entry for each classification of work performed, distributing the hours of work to each classification accordingly, and reflecting the rate of pay and gross earnings for each classification. Deductions and net pay may be based upon the total gross amount earned for all classifications.

Hours worked

The payroll should show only the regular and O/T hours worked on one particular project. The employer must show both the daily and total weekly hours for each employee. If an employee performs work at job sites other than the project for which the payroll is prepared, those "other job" hours should not be reported on the payroll. In these cases, employers should list the employee's name, classification, hours for this project only, the rate of pay and gross earnings for this project, and the gross earned for all projects. Deductions and net pay may be based upon the employee's total earnings (for all projects) for the week.

Rate of pay

Employers must show the basic hourly rate of pay for each employee for one particular project. If the wage decision includes a fringe benefit and the employer does not participate in approved fringe benefit programs, the employer must add the fringe benefit rate to the basic hourly rate of pay, and must list the O/T rate if O/T hours were worked.

Piece-work

For any piece-work employees, the employer must compute an effective hourly rate for each employee each week based upon the employee's piece-work earnings for that week. To compute the effective hourly rate, divide the piece-work earnings by the total number of hours worked, including consideration for any O/T hours.

The effective hourly rate must be reflected on the certified payroll. This hourly rate may be no less than the wage rate (including fringe benefits, if any) on the wage decision for the classification of work performed. It does not matter that the effective hourly rate changes from week to week, only that the rate is no less than the rate on the wage decision for the classification of work performed.

Remember, the O/T rate is computed at one and one-half times the basic rate of pay plus any fringe benefits. For example, if the wage decision requires $10/hour basic plus $5/hour fringe benefits, the O/T rate would be: ($10 x 1.5) + $5 = $20/hour.

Gross wages earned

Show the gross amount of wages earned for work performed on a particular project. Note: Employees with work hours and earnings on other projects may show gross wages for a particular project over gross earnings from all projects (e.g., $425.40/$764.85) and base deductions and net pay on the "all projects" earnings.

Deductions

Show the amounts of any deductions from the gross earnings. "Other" deductions should be identified (e.g., Savings Account or Loan Repayment). Any voluntary deduction (i.e., not required by law or by an order of a proper authority) must be authorized in writing by the employee or provided for in a collective bargaining (union) agreement. A short note signed by the employee is all that is needed and should accompany the first payroll on which the other deduction appears. The note needs to show the type, amount, and frequency of the deduction. A new deduction authorization is required when any of the aforementioned items change.

MORE INFO

Only one employee authorization is needed for recurring (e.g., weekly) "other" deductions. Written employee authorization is not required for income tax and Social Security deductions.

Net pay

Show the net amount of wages paid.

Statement of Compliance

The Statement of Compliance is the certification. It is located on the reverse side of a standard payroll form (WH-347). Employers must be sure to complete the identifying information at the top, particularly if attaching the Statement of Compliance to an alternate payroll form such as a computer payroll. Also, the employer must check either 4(a) or 4(b) if the wage decision contains a fringe benefit. Checking 4(a) indicates that the employer is paying required fringe benefits to approved plans or programs; and 4(b) indicates that the employer is paying any required fringe benefit amounts directly to the employee by adding the fringe benefit rate to the basic hourly rate of pay. If the employer is paying a portion of the required fringe benefit to programs and the balance directly to the employee, the employer must explain those differences in box 4(c).

Signature

For paper payrolls submitted, the payroll is signed with an original signature in ink. The payroll must be signed by a principal of the firm (owner or officer such as the president, treasurer, or payroll administrator) or by an authorized agent (a person authorized by a principal in writing to sign the payroll reports). Signature authorization (for persons other than a principal) should be submitted with the first payroll signed by such an agent. For paper payrolls, signatures in pencil, signature stamps, Xerox copies, PDFs, and other facsimiles are not acceptable.

MORE INFO

Only one Statement of Compliance is required for each employer's weekly payroll no matter how many pages are needed to report the employee data.

ADDITIONAL WORK CLASSIFICATION AND WAGE RATES

After contract award, if it is determined that additional work classifications are required because the wage decision lacks all the necessary classifications and wage rates, the prime contractor and, if applicable, its subcontractors employing workers in such classifications shall request an additional work classification and propose a wage rate and fringe benefits for such classification on form SF-1444, Request for Authorization of Additional Classification and Rate. The contractor or subcontractor shall make its request for a final decision through the LSS or LCA, as appropriate, to DOL at whd-cbaconformance_incoming@dol.gov. The LSS/LCA shall assist the employer in preparing the request and, if necessary, provide guidance on the policies and procedures involved.

Note: Additional work classifications and wage rates may be requested only after the effective wage decision "lock-in" date. (See DOL Regulations at 29 CFR Part 5 § 5.5(a)(1)(ii).)

Additional Work Classification and Wage Rate Parameters

Signature

Additional work classifications must be signed by DBLS for FHA-insured projects managed by HUD and signed by the LCA contracting officer for projects managed by LCAs, then forwarded to DOL with the applicable wage decision where:

The requested work classification is used in the area of the project by the construction industry;

The work that will be performed by the requested work classification is not performed by a work classification that is already contained within the applicable wage decision;

The proposed wage rate for the requested work classification bears a reasonable relationship to the wage rates on the wage decision; and

The workers that will be employed in the requested work classification (if it is known who the workers are or will be) or the workers' representatives agree with the proposed wage rate.

General guide

The wage rate and fringe benefits proposed for any classification must be in accordance with the guidance available in All Agency Memorandum 213. The proposed wage rate and fringe benefits should bear a reasonable relationship to the entirety of the rates within the relevant category. There are four basic categories: skilled crafts, laborers, truck drivers, and power equipment operators. Additional classifications proposed for power equipment operators must specify the type(s) of power equipment involved.

Making the Request

Although a request for additional work classification and wage rate may be prompted following an LSS/LCA review, the proposal must originate with the prime contractor/employer that will utilize the work classification. The prime contractor/employer must submit the request in writing. A basic request must identify the contract/project involved, the work classification requested, and the wage rate, including any bona fide fringe benefits proposed. In some cases, it may be necessary for the prime contractor/employer to describe the work that the requested work classification would perform. The prime contractor/employer should use form SF-1444, Request for Authorization of Additional Classification and Rate, to submit the request.

LSS/LCA Review of Request

The LSS/LCA will review the prime contractor/employer's request to determine if it satisfies the approval criteria at 5.12.1.9.2. The LSS/LCA will contact the prime contractor/employer if clarification or additional information is needed to complete the review.

Signing the request, reporting to DOL

If the LSS/LCA review finds that the requested work classifications and wage rate/fringe benefits meet the criteria at 5.12.1.9.2, the LSS/LCA submits the completed SF-1444, related documentation, and the applicable wage decision to the DOL National Office for final decision using DOL's dedicated email address:

whd-cbaconformance_incoming@dol.gov.

Disagreement with the request; referring for DOL decision

If the LSS/LCA review finds that the requested work classification and wage rate/fringe benefits fails to meet the approval criteria or if the parties do not agree on the proper classification or wage rate/fringe benefits for the work described, the LSS/LCA shall prepare an SF-1444 and a written report explaining the results of the review and any issues in dispute among the parties, and shall forward these along with a copy of the applicable wage decision to the DOL National Office for its decision using the same dedicated DOL email address.

DOL decision

DOL regulations permit 30 days for DOL to respond to the SF-1444. DOL will notify the LSS/LCA in writing of its decision.

DOL approval

When DOL approves the requested additional work classification and wage rate/fringe benefits, the LSS/LCA shall provide a copy of the DOL notice of approval to the prime contractor/employer with instructions that the additional work classification and wage rate/fringe benefits must be posted on the job site with the wage decision.

DOL disapproval

When DOL disapproves the requested work classification and wage rate/fringe benefits, DOL will notify the LSS/LCA in writing of the reasons why the request cannot be approved. DOL may also indicate what work classifications/wage rate/fringe benefits could be approved for the work involved if a modified request is submitted.

Notification to the prime contractor/employer

The LSS/LCA will notify the prime contractor/employer in writing of the results of the LSS/LCA review and/or DOL decision and provide a copy of the DOL notice.

Requests for DOL reconsideration

The LSS/LCA, the prime contractor/employer, or other interested parties may request reconsideration of the DOL decision on a requested additional work classification and wage rate/fringe benefits. Such requests must be made in writing accompanied by a full statement of the interested party's views and any supporting wage data or other pertinent information.

SANCTIONS AND RESTITUTION

Introduction

Even in the best of circumstances, things can go wrong. In a Davis-Bacon context, "things going wrong" usually means there's a difference of opinion or a dispute about whether and to what extent underpayments have occurred. These disputes are usually between the contract administrator and one or more employers (the prime contractor and/or a subcontractor). The dispute may involve something simple such as an additional classification request that is pending before DOL, or something as significant as investigative findings following a complaint of underpayment. This chapter discusses some of the things you might expect, and what you can do to make your views known and to lessen any delays in resolving the problem or issue.

Administrative Review on Labor Standards Disputes

The labor standards clauses in the contract and DOL regulations provide for administrative review of issues where there is a difference of views between the contract administrator and any employer. The most common circumstances include:

Additional classifications and wage rates

Additional classification and wage rate requests are sometimes denied by DOL. An employer that is dissatisfied with the denial can request reconsideration by the DOL Wage and Hour Administrator. The employer may continue to pay the wage rate, as requested, until a final decision is rendered on the matter. When the final decision is known, the employer will be required to pay any additional wages that may be necessary to satisfy the wage rate that is established.

Reconsideration

DOL normally identifies the reasons for denial in its response to the request. Any interested person (e.g., the contract administrator, employer, or representatives of the employees) may request reconsideration of the decision on the additional classification request.

The request for reconsideration must be made in writing and must thoroughly address the denial reasons identified by DOL. Employer requests for reconsideration should be made through the contract administrator but may be made directly to DOL. (See DOL Regulations 29 CFR § 1.8.) All requests initiated by or made through the contract administrator or HUD must be submitted through HQLS (Headquarters Office Davis-Bacon and Labor Standards).

Administrative Review Board

Any interested party may request a review of the Administrator's decision on reconsideration by DOL's Administrative Review Board. DOL regulations 29 CFR Part 7 explain the procedures for such reviews. (See also 29 CFR § 1.9.)

Findings of underpayment

Compliance reviews and other follow-up enforcement actions may result in findings of underpayment. The primary goal in every case and at every step in this process is to reach agreements about who may have been underpaid and how much wage restitution may be due, and to promptly deliver restitution to any underpaid workers. The contract administrator will usually work informally with employers to reach such agreements.

Rulings and interpretations unrelated to findings of underpayment

DOL is the authority for rulings and interpretations unrelated to findings of underpayments. This includes disputes concerning the prevailing wage rates as determined by DOL, DBRA applicability, character of work decisions, and interpretation and application of DOL regulations at 29 CFR Parts 1, 3, and 5. These and other such matters must be referred to the DOL Wage and Hour Administrator for their ruling and/or interpretation per 29 CFR § 5.13. Any request for a ruling or an interpretation from the DOL Administrator via DBLS must be submitted through HQLS with a copy to the local LSS.

Disputes concerning findings of underpayment

Underpayments usually occur when a contractor or subcontractor does not properly pay wages according to the approved wage determination and it has been identified as part of a Davis-Bacon and DBLS enforcement action. There may be other situations that also create underpayments, and they can originate from the employer, prime contractor, or any other interested party. Any underpayment decision by DBLS will include a formal decision letter with a Notice of Right to Appeal.

DOL review

DOL will review the contract administrator's report and the arguments against the findings presented in the hearing request. DOL may affirm or modify the findings based upon the materials presented. You will be notified in writing by DOL of the results of its review. If DOL concludes that violations have occurred, you will be given an opportunity to correct any underpayments or to request a hearing before a DOL ALJ. (See DOL Regulations 29 CFR § 5.11 (b) and 29 CFR Part 6, Rules of Practice for Administrative Proceedings.)

Administrative Review Board

Contractors and/or subcontractors may request a review by the Administrative Review Board of the decision(s) rendered by the DOL ALJ in the administrative hearing process. See DOL regulations 29 CFR Part 7 for more information about this proceeding.

Withholding

The contract administrator shall cause the withholding of payments due to the prime contractor to ensure the payment of wages that are believed to be due and unpaid (e.g., if wage underpayments or other violations are not corrected within 30 days after written notification to the prime contractor). DOL may also direct the withholding of contract payments for alleged wage underpayments. Withholding is serious and is not taken unless warranted. If withholding is deemed necessary, the contractor will be notified in writing. Only the amounts needed to meet the contractor's (and/or subcontractors') liability shall be withheld.

Deposits and Escrows

In some situations, certain labor standards issues are not or cannot be resolved in time to meet project closeout schedules. In order to permit a final closing/closeout to proceed while certain labor issues are outstanding, a deposit account (HUD-administered projects, e.g. multifamily housing-insured and grant programs) or an escrow account (LCA-administered projects, e.g., CDBG, HOME, HOPE VI (Housing Opportunities for People Everywhere)) may be established as a guarantee to ensure the payment of any wages that have been or may be found due to workers that were employed in the construction of the project. Deposit and escrow accounts may also hold fringe benefits payments that are due to plans or programs and/or liquidated damages that are assessed for violations of CWHSSA O/T provisions. The deposit or escrow account is controlled by the contract administrator. When a final decision is rendered, the contract administrator makes disbursements from the account in accordance with the decision. Deposit/escrow accounts are established for one or more of the following reasons:

MORE INFO

Remember, the prime contractor is responsible and will be held liable for any wage restitution that is due to any worker employed in the construction of the project, including workers employed by subcontractors and any lower-tier subcontractors. See 3.2, Responsibilities of the Principal Contractor, and 12.4, Restitution for Underpayment of Wages, in the Agency Guide.

Where the parties have agreed to amounts of wage restitution that are due, but the employer hasn't furnished evidence yet that all the underpaid workers have received their back wages (e.g., unfound workers)

The amount of the deposit is equal to the total gross amount of restitution due to workers lacking payment evidence. As these workers are paid and proper documentation is provided to the contract administrator, amounts corresponding to the documented payments are returned to the depositor. Amounts for any workers who cannot be located are held in the deposit/escrow account for three years and disposed as described in Section 11.4.1 of this Guide;

Sometimes, wage restitution cannot be paid to an affected employee because, for example, the employee has moved and cannot be located. After wage restitution has been paid to all the workers who could be located, the employer must submit a list of any workers who could not be found and paid (unfound workers). See 12.4.6 in the Agency Guide for more information.

Where underpayments are suspected or alleged and an investigation has not yet been completed

The deposit is equal to the amount of wage restitution and any liquidated damages, if applicable, that are estimated to be due. If the final determination of wages due is less than the amount estimated and placed in the escrow account, the escrow will be reduced to the final amount and the difference will be returned to the depositor. If the parties agree to the investigative findings, the amounts due to the workers will be paid by the employer. As these workers are paid and proper

documentation is provided to the contract administrator, the gross amounts corresponding to the documented payments are returned to the depositor;

If the employer is unable to make the payments to the workers (e.g., lacks the funds necessary), the contract administrator may make disbursements directly to the workers in the net amounts calculated by the employer. The amounts withheld from the workers for tax deduction will be returned to the employer as payments to workers are made. The employer shall be responsible for reporting and transmitting withholdings to the appropriate agencies.

If the employer is not cooperating in the resolution, the contract administrator shall make disbursements to the workers in accordance with the schedule of wages due. Amounts for unfound workers will be retained as described in Section 13.4.6 in the Agency Guide.

If the parties do not agree and an administrative hearing is requested, the escrow will be maintained.

MORE INFO

Remember, if you have any questions or need assistance concerning labor standards requirements, help is always available. Contact the contract administrator for the project you're working on or the HUD Field Labor Standards staff in your area.

Where the parties are waiting for the outcome of an administrative hearing that has been or will be requested contesting a final determination of wages due

The deposit shall be equal to the amount of wage restitution and liquidated damages, if applicable, that have been determined due. Once a final decision is rendered, disbursements from the escrow account are made in accordance with the decision.

Administrative Sanctions

Contractors and/or subcontractors that violate the labor standards provisions may face administrative sanctions imposed by HUD and/or DOL.

DOL debarment

Contractors and/or subcontractors that are found by the Secretary of Labor to be in aggravated or willful violation of the labor standards provisions of the DBRA will be ineligible (debarred) to participate in any DBRA or Davis-Bacon Act contracts for up to three years. Debarment includes the contractor or subcontractor and any firm, corporation, partnership, or association in which the contractor or subcontractor has a substantial interest. Debarment proceedings can be recommended by the contract administrator or initiated by DOL. Debarment proceedings are described in DOL regulations 29 CFR § 5.12.

HUD sanctions

HUD sanctions may include Limited Denials of Participation (LDPs), debarments, and suspensions.

Limited Denial of Participation

HUD may issue to the employer an LDP, which prohibits the employer from further participation in HUD programs for a period of up to one year. The LDP is usually effective for the HUD program in which the violation occurred and for the geographic jurisdiction of the issuing HUD Office. HUD regulations concerning LDPs are found at 24 CFR §§ 24.700-24.714.

Debarment and suspensions

In certain circumstances, HUD may initiate its own debarment or suspension proceedings against a contractor and/or subcontractor in connection with improper actions regarding Davis-Bacon obligations. For example, HUD may initiate debarment where a contractor has been convicted for making false statements (such as false statements on certified payrolls or other prevailing wage certifications), or initiate suspension where a contractor has been indicted for making false statements. HUD regulations concerning debarment and suspension are found at 24 CFR Part 24.

Falsification of Certified Payroll Reports

Cases that involve certified payroll falsification may be referred to DOL for its investigation at the outset or referred to DOL for administrative review/hearings or other sanctions.

All referrals suggesting consideration for criminal prosecution must be submitted through the established hierarchy:

States may submit any such recommendation to DOL directly.

MORE INFO

Remember, if you have any questions or need assistance concerning labor standards requirements, help is always available. Contact the contract administrator for the project you're working on or the HUD Field Labor Standards staff in your area.

SECTION 01020

SECTION 3 GENERAL INFORMATION

[ST. JOHN THE BAPTIST PARISH]
[RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS]

This Construction Contract includes the requirement to ensure that employment opportunities be directed to low – and very low income persons, particularly those who are recipients of government assistance for housing. These requirements are included in Section 3 of the Housing and Urban Development Act of 1968; and are known as "Section 3 Provisions".

The rules and requirements for adherence with Section 3 will impact the obligation and reporting requirements of you as the prime contractor, as well as all of your subcontractors. Section 3 regulations:

1. Establishes a benchmark of twenty-five (25) percent of the total labor hours on the project (worked by existing employees and new employees) must be performed by Section 3 Workers. A **Section 3 Worker** must meet one of the following criteria:
    a. Household income is below HUD's income limits (worker's self-certification); **or**
    b. Participation in a means-tested program such as public housing or Section 8 assisted housing (worker's self-certification); **or**
    c. Employment by a Section 3 Business Concern.

2. Establishes a benchmark of five (5) percent of the total labor hours on the project (worked by existing employees and new employees) must be performed by Targeted Section 3 Workers. In addition to meeting the criteria for a Section 3 Worker, **Targeted Section 3 Worker** must also meet one of the following criteria:
    a. Employment by a Section 3 Business Concern; **or**
    b. Live within a one (1) mile radius of the project site; **or**
    c. Participate in a YouthBuild program.

Contractors and subcontractors must document efforts to comply with Section 3 and meet the benchmarks stated above though the compilation and maintenance of a "good faith efforts" file. It should contain memoranda, correspondence, advertisements, etc., illustrating your attempts to reach eligible persons and businesses.

SECTION 01021

SECTION 3 FREQUENTLY ASKED QUESTIONS

[ST. JOHN THE BAPTIST PARISH]
[RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS]

(Published: February 10, 2025)

FREQUENTLY ASKED QUESTIONS

for

SECTION 3

Published: February 10, 2025

The following is a guidance document published by the Department of Housing and Urban Development Office of Field Policy and Management for the purpose of providing answers to frequently asked questions about Section 3 of the HUD Act of 1968 (12 U.S.C § 1701u) and its associated regulations (24 C.F.R. Part 75). This document is intended to provide guidance for Section 3 funding recipients, subrecipients, contractors, subcontractors, workers, and other stakeholders.

This guidance document covers questions in several topic areas and is divided into parts that contain questions on that part's topic.

I. GENERAL QUESTIONS REGARDING SECTION 3:

1. What is Section 3?

2. What Do "Best Efforts" and "to the Greatest Extent Feasible" Mean?

3. What Does "Section 3 Worker" Mean?

4. What Does "Targeted Section 3 Worker" Mean?

5. What Does "Section 3 Business Concern" mean?

6. How are low-income and very low-income determined?

7. What is YouthBuild?

8. As a funding recipient, what are my Section 3 reporting goals?

9. What is a Section 3 project?

10. Who is considered a recipient of Section 3 funding?

11. What are funding thresholds and how do they apply to Section 3 covered financial assistance?

12. Which recipient agencies (or sources of HUD financial assistance) are required to comply with Section 3?

13. Can a non-profit organization be considered a business concern for the purposes of Section 3?

14. What is a "Service Area" or "Neighborhood of the project"?

15. What if my agency does not meet all benchmark goals for employment or contracting?

16. My agency has met all benchmark goals for employment and contracting, does this mean that we are considered in compliance with Section 3?

II. APPLICABILITY:

1. What HUD assistance does Section 3 apply to?

2. Do the requirements of Section 3 apply to grantees on a per project basis?

3. If a project is funded with non-HUD assistance, do the requirements of Section 3 still apply?

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5. Do the Section 3 requirements apply to material only contracts?

6. Do the Section 3 requirements apply to Section 8 project-based rental assistance contracts?

7. Are maintenance projects covered by Section 3?

8. Does the reduction and abatement of lead-based paint hazards constitute housing rehabilitation?

9. Are demolition projects covered by the requirements of Section 3?

10. Are professional service contracts required to be reported under Section 3?

11. Does Section 3 apply to labor hours by a CDBG-Entitlement recipient?

12. Does Section 3 apply to labor hours by a Public Housing Authority?

III. CONSISTENCY WITH OTHER LAWS:

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1. What are the responsibilities of recipient agencies under Section 3?

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3. What are the reporting requirements for Section 3 projects for which assistance or funds are committed during the transition period?

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5. What are the reporting requirements for Public Housing Authorities and other recipients of public housing financial assistance during the transition period?

6. What are good strategies for targeting Section 3 workers and businesses?

7. Are funds provided to recipients so that they can comply with the requirements of Section 3?

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9. Are recipients, developers, and contractors required to provide long- term employment opportunities, and not simply seasonal or temporary employment?

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V. SECTION 3 CERTIFICATION:

1. How can a prospective Section 3 worker or business concern certify that they meet the eligibility requirements?

2. What documentation must be maintained by HUD recipients, contractors and subcontractors certifying that low- and very-low individuals and business concerns meet the regulatory definitions under Section 3?

3. What are examples of acceptable evidence to determine eligibility as a Section 3 worker?

4. What are examples of acceptable evidence for determining eligibility as a Section 3 business concern?

5. Are all public housing residents considered Section 3 workers regardless of their income?

6. Does qualifying as a Section 3 businesses mean that the business will be selected if it meets the technical requirements of the bid, regardless of bid price?

7. Does a business have to be incorporated to be considered a Section 3 eligible business?

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1. How can low- and very low-income persons and businesses locate recipient agencies that are required to comply with Section 3 in their area?

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3. Do the benchmark requirements only count toward new hires?

4. Should PHA's report on staff hours?

5. What category of PHA Staff should be included?

6. Are recipient agencies required to meet the Section 3 benchmarks, or are they optional?

7. Will there be changes to the benchmark requirements?

8. What is considered "other" public construction?

9. What is the meaning of the safe harbor determination?

VII. SECTION 3 COMPLAINTS:

1. How should complaints be made?

2. Where else can I file complaints alleging denied employment and contracting opportunities?

I. GENERAL QUESTIONS REGARDING SECTION 3:

1. What is Section 3?

Section 3 is a provision of the Housing and Urban Development Act of 1968. The purpose of Section 3 is to ensure that employment and other economic opportunities generated by certain HUD financial assistance shall, to the greatest extent feasible, and consistent with existing Federal, State, and local laws and regulations, be directed to low- and very low-income persons, particularly those who are recipients of government assistance for housing, and to business concerns which provide economic opportunities to low- and very low-income persons.

2. What Do "Best Efforts" and "to the Greatest Extent Feasible" Mean?

"Best efforts" and "greatest extent feasible" are statutory terms, used in the statute in different contexts. As such, HUD uses both terms to track compliance, and there are many ways to interpret the language. Traditionally, HUD has used the terms interchangeably, as referenced in

the statute, and will continue to be consistent with the statutory language. *See* 12 U.S.C. 1701u(b)-(d). These terms are integral to the statutory intent and provide flexibility, rather than administrative burden, to grantees or recipients of HUD funding.

HUD acknowledges that some perceive "best efforts" to be the more rigorous standard, while others perceive "greatest extent feasible" to be the more rigorous standard. HUD has determined not to define the difference between these two terms but rather to increase the emphasis on outcomes as a result of these efforts. A recipient's reported results will be compared to the outcome metrics defined in the benchmark notice. HUD program staff will evaluate the level of effort expended by those recipients that fail to meet the benchmark safe harbor, and thus will ensure that the statutory terms are being properly enforced. HUD included a list of examples in the regulation at 24 CFR §§ 75.15 and 75.25, including engagement in outreach efforts to generate job applicants who are Targeted Section 3 workers, providing training or apprenticeship opportunities, and providing technical assistance to help Section 3 workers compete for jobs (e.g., resume assistance, coaching).

3. What Does "Section 3 Worker" Mean?

A Section 3 worker is any worker who currently fits, or when hired within the past five years fit, at least one of the following categories, as documented:

1. The worker's income for the previous or annualized calendar year is below the income limit established by HUD (see Question 6 of this part I of these FAQs, below);
2. The worker is employed by a Section 3 business concern (see Question 5 of part I, below); or
3. The worker is a YouthBuild participant.

4. What Does "Targeted Section 3 Worker" Mean?

A Section 3 targeted worker for Public Housing Financial Assistance projects is a Section 3 worker who:

(1) is employed by a Section 3 business concern; or
(2) currently fits or when hired fit at least one of the following categories, as documented within the past five years:
  (i) A resident of public housing or Section 8-assisted housing;
  (ii) A resident of other public housing projects or Section 8-assisted housing managed by the PHA that is providing the assistance; or
  (iii) A YouthBuild participant.

A Section 3 targeted worker for Housing and Community Development Financial Assistance projects is a Section 3 worker who:

(1) is employed by a Section 3 business concern; or

(2) currently fits or when hired fit at least one of the following categories, as documented within the past five years:
   (i) Living within the service area or the neighborhood of the project, as defined in 24 CFR § 75.5; or
   (ii) A YouthBuild participant.

5. What Does "Section 3 Business Concern" mean?

A Section 3 business concern is a business that meets at least one of the following criteria, documented within the last six-month period:

1. At least 51 percent owned and controlled by low- or very low-income persons;
2. Over 75 percent of the labor hours performed for the business over the prior three-month period are performed by Section 3 workers; or
3. A business at least 51 percent owned and controlled by current public housing residents or residents who currently live in Section 8-assisted housing.

6. How are low-income and very low-income determined?

Low- and very low-income limits are defined in Section 3(b)(2) of the Housing Act of 1937 and are determined annually by HUD. These limits are typically established at 80 percent and 50 percent of the area median individual income. HUD income limits may be obtained from: https://www.huduser.gov/portal/datasets/il.html.

7. What is YouthBuild?

YouthBuild is a community-based pre-apprenticeship program that provides job training and educational opportunities for at-risk youth ages 16-24 who have previously dropped out of high school.

YouthBuild participants learn vocational skills in construction, as well as in other in-demand industries that include health care, information technology, and hospitality. Youth also provide community service through the required construction or rehabilitation of affordable housing for low-income or homeless families in their own neighborhoods.

The Division of Youth Services within the Employment and Training Administration's Office of Workforce Investment at the U.S. Department of Labor administers the YouthBuild program. Each year, more than 6,000 youth participate in approximately 210 YouthBuild programs in more than 40 states. More information can be found here: https://www.dol.gov/agencies/eta/youth/youthbuild.

8. As a funding recipient, what are my Section 3 reporting goals?

Your Section 3 reporting goals depend on the type of assistance you are receiving, whether public housing financial assistance or housing and community development financial assistance.

For public housing financial assistance, the benchmark for Section 3 workers is set at *25 percent* or more of the total number of labor hours worked by all workers employed with public housing financial assistance in the PHA's or other recipient's fiscal year. The benchmark for Targeted Section 3 workers is set at *5 percent* or more of the total number of labor hours worked by all workers employed with public housing financial assistance in the PHA's or other recipient's fiscal year. This means that the *5 percent* is included as part of the *25 percent* threshold.

For housing and community development financial assistance projects, the benchmark for Section 3 workers is set at *25 percent* or more of the total number of labor hours worked by all workers on a Section 3 project. The benchmark for Targeted Section 3 workers is set at *5 percent* or more of the total number of labor hours worked by all workers on a Section 3 project. This means that the *5 percent* is included as part of the *25 percent* threshold.

9. What is a Section 3 project?

Section 3 projects are housing rehabilitation, housing construction, and other public construction projects assisted under HUD programs that provide housing and community development financial assistance when the total amount of assistance to the project exceeds a threshold of $200,000. The threshold is $100,000 where the assistance is from the Lead Hazard Control and Healthy Homes programs, as authorized by Sections 501 or 502 of the Housing and Urban Development Act of 1970 (12 U.S.C. 1701z–1 or 1701z–2), the Lead-Based Paint Poisoning Prevention Act (42 U.S.C 4801 *et seq.*,; and/or the Residential Lead-Based Paint Hazard Reduction Act of 1992 (42 U.S.C. 4851 *et seq.*). (See Question 12 of this part I of these FAQs for more detail regarding Lead Hazard Control and Healthy Homes programs.)

The project is the site or sites together with any building(s) and improvements located on the site(s) that are under common ownership, management, and financing. The requirements of Part 75 apply to an entire Section 3 project, regardless of whether the project is fully or partially assisted under HUD programs that provide housing and community development financial assistance.

10. Who is considered a recipient of Section 3 funding?

A recipient is any entity that receives directly from HUD public housing financial assistance or housing and community development assistance that funds Section 3 projects, including, but not limited to, any State, local government, instrumentality, PHA, or other public agency, public or private nonprofit organization. It does not include contractors or any intended beneficiary under the HUD program to which Section 3 applies, such as a homeowner or a Section 3 worker.

11. What are funding thresholds and how do they apply to Section 3 covered financial assistance?

Funding thresholds are minimum dollar amounts that trigger Section 3 requirements. There are no thresholds for public housing programs. The requirements of Section 3 apply to all programs

receiving public housing financial assistance regardless of the amount of assistance received from HUD. Section 3 also applies to the entirety of a mixed-finance development project as described in 24 CFR 905.604, regardless of whether the project is fully or partially assisted with public housing financial assistance.

Section 3 projects are housing rehabilitation, housing construction, and other public construction projects assisted under HUD programs that provide housing and community development financial assistance when the total amount of assistance to the project exceeds a threshold of $200,000 (Lead Hazard Control and Healthy Homes (LHCHH) assistance is not included in calculating whether the assistance exceeds the $200,000 threshold).

The threshold is $100,000 when the assistance is from the Lead Hazard Control and Healthy Homes programs, as authorized by Sections 501 or 502 of the Housing and Urban Development Act of 1970, the Lead-Based Paint Poisoning Prevention Act, and the Residential Lead-Based Paint Hazard Reduction Act of 1992. LHCHH programs require Section 3 compliance if there is over $100,000 of LHCHH funding for the project (neither HUD public housing financial assistance nor HUD housing and community development financial assistance is included in calculating whether the assistance exceeds the $100,000 threshold). Recipients of LHCHH funding will also be required to comply with Section 3 regulations and report on the entirety of the project when the total amount of HUD housing and community development financial assistance to the project exceeds $200,000 (LHCHH funding is not included in calculating whether the total assistance exceeds the $200,000 threshold), or if any public housing financial assistance is provided.

12. Which recipient agencies (or sources of HUD financial assistance) are required to comply with Section 3?

For public housing financial assistance, Public Housing Authorities (PHAs), regardless of size or number of public housing units, are required to comply with Section 3 and its reporting requirements. However, small PHAs (fewer than 250 units) are permitted to report qualitatively as permitted under 24 CFR § 75.15(d). Some examples of those qualitative efforts are listed in the answer to Question 15.

As previously stated, Section 3 also applies to projects with more than $200,000 in funding from housing and community development financial assistance programs. The following is a list of examples of such funds:

- Community Development Block Grant (CDBG)
- HOME Investment Partnership
- Housing Trust Fund (HTF)
- Neighborhood Stabilization Program Grants (NSP 1, 2 & 3)
- Housing Opportunities for Persons with AIDS (HOPWA)
- Emergency Solutions Grants (ESG)

- University Partnership Grants
- Economic Stimulus Funds
- 202/811 Grants
- Lead Hazard Control Grants ($100,000 threshold; see Question 12, above, in this part I of these FAQs)
- Healthy Homes Production Grants ($100,000 threshold; see Question 12, above, in this part I)
- Rental Assistance Demonstration (RAD) (see most recent RAD Notice, found through HUD's RAD website, www.hud.gov/rad/)

*Note: The requirements of Section 3 typically apply to recipients of HUD funds that will be used for housing construction, rehabilitation, or other public construction. Contact your local HUD field office to determine applicability to a particular project/activity.

13. Can a non-profit organization be considered a business concern for the purposes of Section 3?

Yes. A non-profit organization can be a business concern. Non-profit organizations must meet the criteria of a Section 3 business concern as defined at 24 CFR § 75.5 in order to receive Section 3 preference. See response to Question 5 above.

14. What is a "Service Area" or "Neighborhood of the project"?

"Service area" or the "neighborhood of the project" means an area within one mile of the Section 3 project or, if fewer than 5,000 people live within one mile of a Section 3 project, within a circle centered on the Section 3 project that is sufficient to encompass a population of 5,000 people according to the most recent U.S. Census.

15. What if my agency does not meet all benchmark goals for employment or contracting?

If reporting indicates that the agency has not met the Section 3 benchmarks, the agency must report in a method prescribed by HUD program offices on the qualitative nature of its activities and those its contractors and subcontractors pursued per 24 CFR § 75.15(b) and § 75.25(b).

Such qualitative efforts may, for example, include but are not limited to the following:

- Engaged in outreach efforts to generate job applicants who are Targeted Section 3 workers.
- Provided training or apprenticeship opportunities.
- Provided technical assistance to help Section 3 workers compete for jobs (e.g., resume assistance, coaching).
- Provided or connected Section 3 workers with assistance in seeking employment including: drafting resumes, preparing for interviews, and finding job opportunities connecting residents to job placement services.
- Held one or more job fairs.

- Provided or referred Section 3 workers to services supporting work readiness and retention (e.g., work readiness activities, interview clothing, test fees, transportation, childcare).
- Provided assistance to apply for/or attend community college, a four-year educational institution, or vocational/technical training.
- Assisted Section 3 workers to obtain financial literacy training and/or coaching.
- Engaged in outreach efforts to identify and secure bids from Section 3 business concerns.
- Provided technical assistance to help Section 3 business concerns understand and bid on contracts.
- Divided contracts into smaller jobs to facilitate participation by Section 3 business concerns.
- Provided bonding assistance, guaranties, or other efforts to support viable bids from Section 3 business concerns.
- Promoted use of business registries designed to create opportunities for disadvantaged and small businesses.
- Outreach, engagement, or referrals with the state one-stop system as defined in Section 121(e)(2) of the Workforce Innovation and Opportunity Act

16. My agency has met all benchmark goals for employment and contracting, does this mean that we are considered in compliance with Section 3?

Yes. Recipients will be considered to have complied with Section 3 requirements, in the absence of evidence to the contrary, if they meet all benchmark goals and certify compliance with prioritization requirements found in 24 CFR § 75.9 or §75.19. However, if subsequent HUD enforcement activities reveal that the recipient has failed to comply with the recipient responsibilities set forth at 24 CFR §75.13 or §75.23, this compliance determination may be rescinded.

II. APPLICABILITY:

1. What HUD assistance does Section 3 apply to?

Section 3 applies to both:

a. Public Housing Financial Assistance –
   i. Development assistance provided pursuant to Section 5 of the United States Housing Act of 1937 (the 1937 Act);
   ii. Operations and management assistance provided pursuant to Section 9(e) of the 1937 Act;
   iii. Development, modernization, and management assistance provided pursuant to Section 9(d) of the 1937 Act; and

iv. The entirety of a mixed-finance development project as described in 24 CFR 905.604, regardless of whether the project is fully or partially assisted with public housing financial assistance as defined in subsections (i) through (iii).

b. Housing and Community Development Financial Assistance expended for housing rehabilitation, housing construction, or other public construction. See Question #2 below for applicability thresholds.

2. Do the requirements of Section 3 apply to grantees on a per project basis?

Yes, for housing and community development financial assistance projects. Section 3 projects are housing rehabilitation, housing construction, and other public construction projects assisted under HUD programs that provide housing and community development financial assistance when the total amount of assistance to the project exceeds a threshold of $200,000. The threshold is $100,000 where the assistance is from the Lead Hazard Control and Healthy Homes programs. See Question 12 of part I of these FAQs.

Section 3 applies to all public housing financial assistance funds, regardless of the amount of assistance from HUD.

3. If a project is funded with non-HUD assistance, do the requirements of Section 3 still apply?

Section 3 applies to projects that are fully or partially funded with HUD financial assistance. Projects that are financed with state, local or private matching or leveraged funds used in conjunction with HUD funds are covered by Section 3 if the amount of HUD funding for the project exceeds the regulatory thresholds (listed in Section I, Question #11).

For RAD projects, Section 3 applies regardless of what money is used to pay for repairs. Per the RAD Notice, "While most RAD conversions do not utilize funding covered by Section 3, HUD has established the alternative requirement that any Work required by the conversion after the RAD Closing that involves housing rehabilitation or housing construction is subject to the Section 3 requirements applicable to housing and community development activities as set forth in 12 U.S.C. 1701u(c)(2) and (d)(2) and the regulations derived from such provisions except that, with the exception of transactions receiving HUD housing and community development assistance, such as CDBG (24 CFR part 570) or HOME (24 CFR part 92), first priority for employment and other economic opportunities shall be given to residents of public housing or Section 8 assisted housing. Otherwise, the receipt of Section 8 rental assistance does not, in itself, trigger the applicability of Section 3."

4. What recordkeeping responsibilities do contractors/subcontractors have if they receive Section 3 covered contracts?

Recordkeeping requirements for recipients are found at 24 CFR § 75.31. Recipients are required to maintain documentation to demonstrate compliance with the regulations and are responsible

for requiring their contractors/subcontractors to maintain or provide any documentation that will assist recipients in demonstrating compliance, including documentation that shows hours worked by Section 3 workers, Targeted Section 3 workers, and any qualitative efforts to comply with Section 3. Examples of documentation can be found in 24 CFR §75.31.

5. Do the Section 3 requirements apply to material only contracts?

No. Section 3 does not apply to material only contracts or those that do not require any labor. For example, a contract for office or janitorial supplies would not be covered by Section 3. In this example, Section 3 would be encouraged but not required. However, a contract to replace windows that includes the removal of existing windows and the installation of new windows would be covered due to the involvement of labor.

6. Do the Section 3 requirements apply to Section 8 project-based rental assistance contracts?

No. Section 8 project-based voucher or project-based rental assistance housing assistance payment contracts, are not covered by the statute, including properties converted through the Rental Assistance Demonstration (RAD).

7. Are maintenance projects covered by Section 3?

Yes, but only for PIH funded programs administered by Public Housing Authorities.

8. Does the reduction and abatement of lead-based paint hazards constitute housing rehabilitation?

No, reduction and abatement of lead-based paint hazards focuses on mitigating lead paint hazards only, not conducting general rehabilitation activities.

9. Are demolition projects covered by the requirements of Section 3?

Yes. Recipients of assistance covered by Section 3 should, where feasible, comply with Section 3 benchmarks.

10. Are professional service contracts required to be reported under Section 3?

No, professional service contracts for non-construction services that require an advanced degree or professional licensing are not required to be reported as a part of total Section 3 labor hours. However, this exclusion does not cover all non-construction services.

However, professional services staff labor hours are permitted to be reported and PHAs will be given credit for reporting opportunities created for professional services by including professional services labor hours in the numerator, and not in the denominator, of the reported outcome ratios. The reporting structure in the rule allows a recipient to count any work performed by a professional services Section 3 worker or Targeted Section 3 worker as Section 3 labor hours and as Targeted Section 3 labor hours (i.e., in the numerator of the calculation), even

when the professional services as a whole are not counted in the baseline reporting (i.e., in the denominator of the calculation). The effect of this reporting structure is to give a recipient a bonus if they are able to report Section 3 hires in the professional services context.

11. Does Section 3 apply to labor hours by a CDBG-Entitlement recipient?

Yes. If the recipient intends to use its HUD grant to perform housing construction, rehabilitation, or other public construction and the total HUD assistance to the project exceeds $200,000, then Section 3 applies to the project.

12. Does Section 3 apply to labor hours by a Public Housing Authority?

Yes. Section 3 applies to all Public Housing capital, operating, or development funds.

III. CONSISTENCY WITH OTHER LAWS:

1. Are recipients required to comply with Federal/state/local laws in addition to Section 3?

Yes. Compliance with Section 3 shall be achieved, to the greatest extent feasible, consistent with existing Federal, state and local laws and regulations. Accordingly, recipients of Section 3-covered assistance are required to develop strategies for meeting both the regulatory requirements at 24 CFR part 75 and any other applicable statutes or regulations.

2. What is the relationship between Section 3 and Davis Bacon requirements?

Compliance with Section 3 must be achieved consistent with the requirements of Davis-Bacon. Certain construction contracts are subject to compliance with the requirement to pay prevailing wages determined under the Davis-Bacon Act (40 U.S.C. 3141 et seq.) and implementing U.S. Department of Labor regulations in 29 CFR Part 5. Additionally, certain HUD-assisted rehabilitation and maintenance activities on public housing projects are subject to compliance with the requirement to pay prevailing wage rates, as determined or adopted by HUD, to laborers and mechanics employed in this work. (24 CFR § 965.101).

3. What does the new rule mean for Tribes and Tribally Designated Housing Entities?

After the Section 3 new rule went into effect on November 30, 2020, Tribes and Tribally Designated Housing Entities under the Indian Housing Block Grant and Indian Community Development Block Grant programs are no longer required comply with Section 3 requirements.

The new rule at 24 CFR part 75 provides that contracts, subcontracts, grants, or subgrants subject to Section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5307(b)) or subject to tribal preference requirements as authorized under 101(k) of the Native American Housing Assistance and Self-Determination Act (25 U.S.C. 4111(k)) must provide preferences in employment, training, and business opportunities to Indians and Indian organizations, and are therefore not subject to the requirements of 24 CFR Part 75.

IV. RECIPIENT RESPONSIBILITIES:

1. What are the responsibilities of recipient agencies under Section 3?

Recipients are required to ensure their own compliance and the compliance of their contractors/subcontractors with the Section 3 regulations, as outlined at 24 CFR part 75. These responsibilities include but are not limited to the following:

Designing and implementing procedures to comply with the requirements of Section 3: Recipient agencies must take an ***active role*** in ensuring Section 3 compliance. The first step is implementing procedures to ensure that all parties, including residents, businesses, contractors, and subcontractors, comply with Section 3 and maintain records verifying that compliance.

Facilitating the training and employment of Section 3 workers: The recipient agency must act as a facilitator, connecting Section 3 workers to training and employment opportunities.

Facilitating the award of contracts to Section 3 business concerns: The recipient agency must also work to link developers and contractors with capable Section 3 business concerns. Additionally, recipient agencies, when necessary, may direct Section 3 business concerns to organizations that provide capacity-building training.

Ensuring Contractor and Subcontractor Awareness of and Compliance with Section 3 Benchmarks and responsibilities: The recipient agency is responsible for ensuring that contractors and subcontractors are aware of, and in compliance with, Section 3 requirements.

Ensuring Compliance and Meeting Numerical Benchmarks: Recipient agencies shall ensure compliance with Section 3 by assessing the hiring and subcontracting needs of contractors; regularly monitoring contractor compliance; assisting and actively cooperating with the Secretary of HUD in obtaining the compliance of contractors; penalizing non-compliance; providing incentives for good performance; and refraining from entering into contracts with any contractor that previously failed to comply with the requirements of Section 3.

Reporting Requirements: Recipient agencies must document all actions taken to comply with the requirements of Section 3 and report these activities either through the Section 3 Reporting tool (currently under development- a notice will be issued when it is authorized for use), for Public Housing financial assistance, or any reporting system designated by program areas overseeing other funding. HUD financial assistance recipients must maintain their own record keeping for Section 3 requirements while reporting tools are not yet available.

2. What are the reporting requirements for legacy contracts entered into under the old Part 135 rule?

On and after November 30, 2020, Section 3 regulations codified at 24 CFR Part 135 (the old rule) have not applied and will not apply to new grants, commitments, contracts, or projects.

Contracts executed or projects for which assistance or funds were committed prior to November 30, 2020 are still required to adhere to the requirements of the old rule. Recipients of such assistance or funds will still be expected to maintain records of Section 3 statutory, regulatory, and contractual compliance but will no longer be required to report Section 3 compliance to HUD in the decommissioned Section 3 Performance Evaluation And Registration System (SPEARS).

HUD does not require funding recipients to change or alter contracts that were in place prior to the new Section 3 requirements becoming effective on November 30, 2020.

3. What are the reporting requirements for Section 3 projects for which assistance or funds are committed during the transition period?

Projects for which assistance or funds are committed between November 30, 2020 and July 1, 2021 are subject to the new Section 3 regulations found in 24 CFR part 75, and HUD expects that funding recipients will begin following this final rule's requirements for new grants, commitments, and contracts. Recipients will be expected to maintain records of statutory, regulatory, and contractual compliance with Section 3 for these projects but will not be required to report to HUD on the requirements found in 24 CFR part 75.

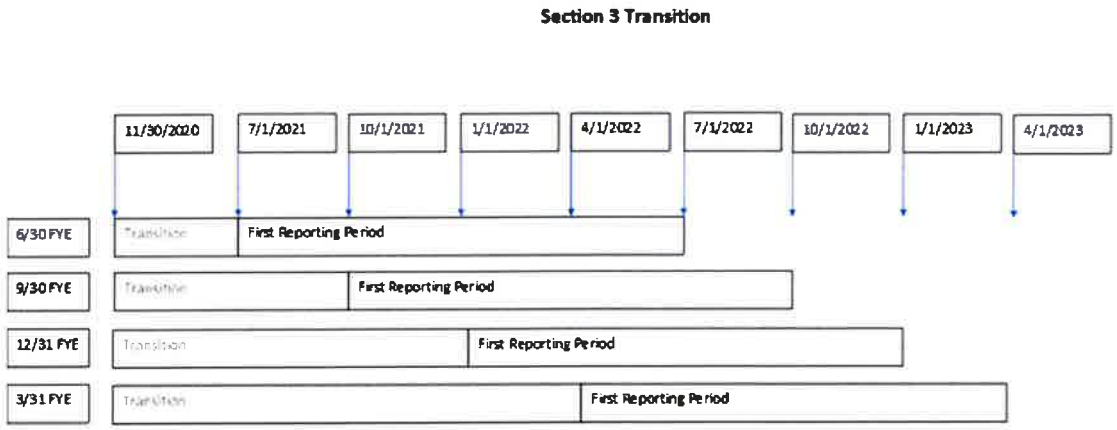
During the transition period between November 30, 2020 and July 1, 2021, recipients are expected to plan and revise processes, systems, and documents to comply with the new rule's requirements. During this time, funding recipients are still required to comply with Section 3's statutory requirements by ensuring that, to the greatest extent feasible, recipients continue to direct economic opportunities generated by certain HUD financial assistance to low- and very low-income persons and businesses that provide economic opportunities to low- and very low-income persons.

Recipients and employers should use this time to update policies and procedures for tracking labor hours and other requirements to ensure compliance with the new rules for projects for which funds are committed on or after July 1, 2021.

4. What is the reporting timeline for Public Housing Authorities and other recipients of public housing financial assistance?

As of November 30, 2020, PHAs' requirement to report their Section 3 activities and efforts starts 60 days after the end of their first fiscal year that begins after July 1, 2021. Please see the charts below for examples of PHA reporting schedules:

Fiscal Year End	New Reporting Period Begins	New Reporting Period Ends
6/30/21	7/1/21	6/30/22
9/30/21	10/1/21	9/30/22
12/31/21	1/1/22	12/13/22
3/31/22	4/1/22	3/31/23



5. What are the reporting requirements for Public Housing Authorities and other recipients of public housing financial assistance during the transition period?

All recipients of public housing financial assistance are required to follow the new Section 3 regulations found in 24 CFR part 75 beginning on November 30, 2020, and HUD expects that funding recipients and employers will begin following this final rule's requirements for new grants, commitments, and contracts on and after this date. Recipients will be expected to maintain records of statutory, regulatory, and contractual compliance with Section 3.

The Section 3 Reporting System is not yet available. The Office of Public and Indian Housing will issue a notice when it is ready as they are the HUD office which monitors Section 3 compliance for Public Housing Authorities. The most recent guidance related to PHA reporting on Section 3 can be found in this December 20, 2022 notice.

During the transition period between November 30, 2020 and a PHA or other recipient's required reporting start date, employers and grantees are expected to plan and revise processes, systems, and documents to comply with the new rule's requirements. During this time, PHAs and other recipients are still required to comply with Section 3's statutory requirements by ensuring that, to the greatest extent feasible, PHA's continue to direct economic opportunities generated by certain HUD financial assistance to low- and very low-income persons, tenants of public and assisted housing, and businesses that provide economic opportunities to low- and very low-income persons.

6. What are good strategies for targeting Section 3 workers and businesses?

In order to successfully target Section 3 workers and businesses for employment and contracting opportunities, recipients must establish and maintain an effective Section 3 program. HUD has found that hiring a Section 3 coordinator or assigning one individual the responsibility of coordinating all Section 3 related activities is instrumental in reaching Section 3's employment and contracting goals.

It is recommended that recipient agencies establish procedures to certify Section 3 workers and Section 3 business concerns for employment and contracting opportunities. Thereafter, they should maintain a list of eligible workers and businesses by skill, capacity or interest and contact them on a periodic basis when employment and contracting opportunities are available. Refer to the Section 3 regulations at 24 CFR § 75.15(b) and § 75.25(b) for a listing of qualitative efforts.

7. Are funds provided to recipients so that they can comply with the requirements of Section 3?

No. Funding has not been appropriated for Section 3 compliance. Section 3 requirements are only triggered when the normal expenditure of covered funds results in employment, training, or contracting opportunities.

8. Are Section 3 workers or business concerns guaranteed employment or contracting opportunities under Section 3?

Section 3 is not an entitlement program; therefore, employment and contracts are not guaranteed. Low and very low-income individuals and Section 3 business concerns must be able to demonstrate that they have the ability or capacity to perform the specific job or successfully complete the contract that they are seeking.

9. Are recipients, developers, and contractors required to provide long- term employment opportunities, and not simply seasonal or temporary employment?

Recipients, developers, and contractors are required, to the greatest extent feasible, to direct employment opportunities to low- and very low-income persons, including seasonal and temporary employment opportunities. Benchmark goals include the calculation of all Section 3 worker and Targeted Section 3 Worker labor hours as a percentage of all labor hours worked on a project.

Recipients, developers, and contractors are encouraged to provide long-term employment to ensure that they meet the benchmark goals.

10. When might a recipient agency be exempt from the quantitative reporting requirements of Section 3?

A Small Public Housing Agency (less than 250 units) may elect to not report on labor hours. If the agency does elect not to report on labor hours, it is required to report solely on qualitative efforts as permitted in 24 CFR § 75.15(d).

11. Are recipients required to request developers or contractors to make payments into Section 3 training or implementation funds?

No. Recipients are not required to request contractors to make payments into a fund.

V. SECTION 3 CERTIFICATION:

1. How can a prospective Section 3 worker or business concern certify that they meet the eligibility requirements?

The individual or business must contact the agency or developer from which they are seeking employment or contracting opportunities (e.g., the PHA, city, or local government). They should identify themselves as a Section 3 worker, Targeted Section 3 worker, or Section 3 business concern and provide whatever documentation that the recipient agency requires under their certification procedures. Prospective Section 3 workers and business concerns may self-certify that they meet the requirements as defined in the regulations. HUD recipients, contractors and subcontractors may also establish their own system to certify Section 3 workers and business concerns.

2. What documentation must be maintained by HUD recipients, subrecipients, contractors, and/or subcontractors certifying that low- and very-low individuals and business concerns meet the regulatory definitions under Section 3?

There are many ways that a worker can be certified as either a Section 3 Worker or Targeted Section 3 Worker under 24 CFR part 75:

For a worker to qualify as a *Section 3 worker*, one of the following must be maintained:

(i) A worker's self-certification that their income is below the income limit from the prior calendar year;
(ii) A worker's self-certification of participation in a means-tested program such as public housing or Section 8-assisted housing;
(iii) Certification from a PHA, or the owner or property manager of project-based Section 8- assisted housing, or the administrator of tenant-based Section 8-assisted housing that the worker is a participant in one of their programs;
(iv) An employer's certification that the worker's income from that employer is below the income limit when based on an employer's calculation of what the worker's wage rate would translate to if annualized on a full-time basis; or
(v) An employer's certification that the worker is employed by a Section 3 business concern.

For a worker to qualify as a *Targeted Section 3 worker*, one of the following must be maintained:

For Public Housing Financial Assistance projects:

(i) A worker's self-certification of participation in public housing or Section 8-assisted housing programs;
(ii) Certification from a PHA, or the owner or property manager of project-based Section 8- assisted housing, or the administrator of tenant-based Section 8-assisted housing that the worker is a participant in one of their programs;

(iii) An employer's certification that the worker is employed by a Section 3 business concern; or

(iv) A worker's certification that the worker is a YouthBuild participant.

For Housing and Community Development Financial Assistance projects:

(i) An employer's confirmation that a worker's residence is within one mile of the work site or, if fewer than 5,000 people live within one mile of a work site, within a circle centered on the work site that is sufficient to encompass a population of 5,000 people according to the most recent U.S. Census;

(ii) An employer's certification that the worker is employed by a Section 3 business concern; or

(iii) A worker's self-certification that the worker is a YouthBuild participant.

The documentation must be maintained for the time period required for record retentions in accordance with applicable program regulations or, in the absence of applicable program regulations, in accordance with 2 CFR § 200.334, Retention Requirements for Records (www.ecfr.gov/cgibin/retrieveECFR?n=se2.1.200_1334), which provides for retaining records for at least three years, as described in detail in that regulation.

A PHA or recipient may report on Section 3 workers and Targeted Section 3 workers for five years from when their certification as a Section 3 worker or Targeted Section 3 worker is established.

3. What are examples of acceptable evidence to determine eligibility as a Section 3 worker?

HUD does not prescribe that any specific forms of evidence to establish Section 3 eligibility. Acceptable documentation includes, but is not limited to the following:

- Proof of residency in a public housing project; or
- Evidence of participation in the YouthBuild program.

4. What are examples of acceptable evidence for determining eligibility as a Section 3 business concern?

HUD does not prescribe that any specific forms of evidence be required to establish Section 3 eligibility. The business seeking the preference must be able to demonstrate that they meet one of the following criteria:

1. At least 51 percent owned and controlled by low- or very low-income persons;
2. Over 75 percent of the labor hours performed for the business over the prior three-month period are performed by Section 3 workers; or
3. A business at least 51 percent owned and controlled by current public housing residents or residents who currently live in Section 8-assisted housing.

5. Are all public housing residents considered Section 3 workers regardless of their income?

No. To qualify as a Section 3 Worker, an individual must meet one of the following criteria:

1. The worker's income for the previous or annualized calendar year is below the income limit established by HUD;
2. The worker is employed by a Section 3 business concern; or
3. The worker is a YouthBuild participant.

6. Does qualifying as a Section 3 businesses mean that the business will be selected if it meets the technical requirements of the bid, regardless of bid price?

No. As provided in 2 CFR 200.318, contract awards shall only be made to responsible contractors possessing the ability to perform under the terms and conditions of the proposed contract. In order to meet the requirements of Section 3 and Federal and state procurement laws, recipient agencies must develop procedures that are consistent with all applicable regulations.

7. Does a business have to be incorporated to be considered a Section 3 eligible business?

No. A Section 3 business concern can be any type of business, such as a sole proprietorship, partnership, or a corporation, properly licensed and meeting all legal requirements to perform the contract under consideration.

VI. ECONOMIC OPPORTUNITIES NUMERICAL BENCHMARKS:

1. How can low- and very low-income persons and businesses locate recipient agencies that are required to comply with Section 3 in their area?

To find local recipients' agencies, Section 3 residents or businesses should contact their local HUD office. To find your closest office, visit: www.hud.gov/localoffices.

2. How can I find Section 3 business concerns in my area?

The Section 3 Business Registry is unavailable. One may use the Small Business Administration's Dynamic Small Business Search to find nearby small businesses. Please contact your local HUD field office for possible local business registries and the most recent list of Section 3 registered businesses, dated August 28, 2023.

3. Do the benchmark requirements only count toward new hires?

No, the rule does not apply to only new hires, but if someone is currently on staff and qualifies as a Section 3 resident under 24 CFR part 135, they will need to re-certify as either a Section 3 worker or Targeted Section 3 worker under 24 CFR part 75.

4. Should PHA's report on staff hours?

Yes, but not all PHA staff qualify as Section 3 workers. Only PHA staff that meet the definition of a Section 3 worker or Targeted Section 3 worker would qualify to be counted toward total

Section 3 or Targeted Section 3 labor hours. Once a PHA determines that a Section 3 worker or Targeted Section 3 worker is hired or currently employed, the PHA would just report those hours as the numerator over the total labor hours funded with public housing financial assistance as the denominator.

5. What category of PHA Staff should be included?

Both salaried and hourly workers need to be reported. There is a limited good faith assessment exception for PHAs and other recipient employers of hourly and salaried workers that are not subject to requirements specifying time and attendance reporting and do not have systems already in place to track labor hours. This exception is to address employers that do not already track labor hours without making changes in time and attendance or payroll.

6. Are recipient agencies required to meet the Section 3 benchmarks, or are they optional?

The Section 3 benchmarks are minimum targets that must be reached in order for the Department to consider a recipient in compliance. Recipient agencies are required to make best efforts, or to the greatest extent feasible, to achieve the benchmarks required for the number of labor hours performed by both Section 3 workers and Targeted Section 3 workers. If an agency fails to fully meet the Section 3 benchmarks, they must adequately document the efforts taken to meet the numerical goals (see Question #9 for a discussion of safe harbor.)

7. Will there be changes to the benchmark requirements?

The Secretary of Housing and Urban Development is required in the Benchmark Notice published in the Federal Register to review and update the Benchmarks by Federal Register notice no less frequently than once every three years.

8. What is considered "other" public construction?

Other public construction includes infrastructure work, such as extending water and sewage lines, sidewalk repairs, site preparation, and installing conduits for utility services.

9. What is the meaning of the safe harbor determination?

Recipients will be considered to have complied with the Section 3 requirements and met the safe harbor, in the absence of evidence to the contrary, if they certify that they have followed the required prioritization of effort and met or exceeded the applicable Section 3 benchmarks.

If a recipient agency or contractor does not meet the benchmark requirements but can provide evidence that they have made a number of qualitative efforts to assist low- and very low-income persons with employment and training opportunities, the recipient or contractor is considered to be in compliance with Section 3, absent evidence to the contrary (i.e., evidence or findings obtained from a Section 3 compliance review).

VII. SECTION 3 COMPLAINTS:

1. How should complaints be made?

Complaints alleging failure of compliance with this part may be reported to the HUD program office responsible for the public housing financial assistance or the Section 3 project, or to the local HUD field office. These offices can be found through the HUD website, www.hud.gov/.

2. Where else can I file complaints alleging denied employment and contracting opportunities?

You may be eligible to bring complaints under other federal laws. The U.S. Equal Employment Opportunity Commission (EEOC) is responsible for enforcing federal laws that make it illegal to discriminate against a job applicant or an employee because of the person's race, color, religion, sex (including pregnancy), national origin, age (40 or older), disability or genetic information (medical history or predisposition to disease). For more information about your rights, please contact EEOC at: www.EEOC.gov.

The Department of Labor Office of Federal Contract Compliance Programs (OFCCP) enforces, for the benefit of job seekers and wage earners, the contractual promise of affirmative action and equal employment opportunity required of those who do business with the Federal government. More information about the services they provide can be obtained at: http://www.dol.gov/ofccp/.

SECTION 01022

CERTIFICATION OF **PRIME CONTRACTOR** REGARDING SECTION 3 AND SEGREGATED FACILITIES

[ST. JOHN THE BAPTIST PARISH]
[RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS]

Name of Prime Contractor	Project Name

The undersigned hereby certifies that:

a) Section 3 provisions are included in the Contract;

b) To the greatest extent feasible economic opportunities, most importantly employment, generated by this project shall be directed to low- and very low-income persons, particularly those who are recipients of government assistance for housing or residents of *[St. John the Baptist Parish]*.

c) No segregated facilities will be maintained as required by Title VI of the Civil Rights Act of 1964.

Typed Name and Title of Authorized Representative	Company (Prime Contractor)
Signature of Authorized Representative	Date

SECTION 01023

CERTIFICATION OF **SUBCONTRACTOR** REGARDING SECTION 3 AND SEGREGATED FACILITIES

[ST. JOHN THE BAPTIST PARISH]
[RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS]

_____	_____
Name of Subcontractor	Project Name

The undersigned hereby certifies that:

a) Section 3 provisions are included in the Contract;

b) To the greatest extent feasible economic opportunities, most importantly employment, generated by this project shall be directed to low- and very low-income persons, particularly those who are recipients of government assistance for housing or residents of [*St. John the Baptist Parish*].

c) No segregated facilities will be maintained as required by Title VI of the Civil Rights Act of 1964.

_____	_____
Typed Name and Title of Authorized Representative	Company (Prime Contractor)
_____	_____
Signature of Authorized Representative	Date

SECTION 01024

CONTRACTOR SECTION 3 PLAN

[ST. JOHN THE BAPTIST PARISH]
[RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS]

[Name of Contractor], Contractor, agrees to ensure, to the greatest extent feasible, that economic opportunities, most importantly employment, generated by CDBG financial assistance shall be directed to low- and very low-income persons, particularly those who are recipients of government assistance for housing or residents of the community in which the CDBG financial assistance is spent.

Goals

To the greatest extent feasible, and consistent with existing Federal, state, and local laws and regulations, the Contractor agrees to comply with the employment and training, and contract prioritization efforts of 24 CFR 75.19. The goals of this Plan are, where feasible, to:

- Provide employment opportunities and training to Section 3 workers, participants in YouthBuild programs.
- Provide contacting opportunities to qualified Section 3 business concerns.
- Give priority for employment opportunities and training to Section 3 workers residing within the service area of the project and participants in YouthBuild Programs.

On this project, the Contractor and its subcontractors will collectively strive to meet the following Section 3 minimum labor hour benchmarks:

Labor Hour Standard	Ratio Formula	Minimum %
Section 3 Workers	Section 3 Worker Hours ÷ Total Labor Hours	25%
Targeted Section 3 Workers	Targeted Section 3 Worker Hours ÷ Total Labor Hours	5%

Reporting

To document the Contractor's and subcontractor's efforts to achieve the benchmarks and comply with the reporting requirements set forth in 24 CFR 75.25(a), the Contractor and its subcontractors will complete and submit the following certifications and reports[1] as applicable:

- Section 3 Employee Data Form and Self-Certification.
- Section 3 Business Concern Contractor/Subcontractor Certification.
- Section 3 Activity and Good Faith Efforts Report (quarterly).
- Section 3 Employee Roster-Job specific
- Section 3 Utilization Report (final)

Contract Provisions

In compliance with 24 CFR 75.27, the Contractor will include contract provisions in all subcontract agreements that require the subcontractor to meet the requirements of 24 CFR 75.19 as outlined above.

The undersigned declares that the Contractor agrees to implement this Section 3 Plan for the above-named Section 3 covered project.

Printed Name and Title	Authorized Signature	Date

[1] The Contractor may substitute an internal computer-generated employee registry in lieu of completing a specific form or report provided it includes the worker's name, worker's address, employer, hours worked and indicates Section 3/targeted Section 3 Status.

SECTION 01025

SECTION 3 WORKER SELF CERTIFICATION

[ST. JOHN THE BAPTIST PARISH]
[RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS]

To be completed by Employee:

Employee General Information

1. Name of Employer _____
2. Name of Employee _____
3. Street Address of Employee _____
4. City and Zip Code of Employee _____
5. Phone Number and Email _____
6. Date of Employment _____

The purpose of this form is to comply with Section 3 of the HUD Act of 1968 employer certification requirements listed in 24 CFR § 75.31. To qualify as a Section 3 worker, any United States legal resident's annual income must not exceed the HUD income limits for the year before the worker was hired, or the individual's current income annualized on a full-time basis for the year must be below the HUD income limit. Additionally, an individual can qualify as a Section 3 worker if they are a YouthBuild participant or employee of a Section 3 Business concern.

SECTION 3 WORKER QUALIFICATIONS

To qualify as a Section 3 Worker, you must meet **one** of the following requirements **OR** have your employer certify that you are employed by a Section 3 Business Concern.

• Income for the previous calendar year is below the income limit* • A participant in a means-tested program such as public housing or Section 8-assisted housing • A YouthBuild Participant*	Income limit $XX,XXX

* Currently or at the time of hire if hired within the past 5 years

Income Limit is the HUD 80% One Person Income Limit for Parish for which employee resides. Income limits may be obtained at: Income Limits | HUD USER

☐ I meet at least one of the requirements in the box above and therefore qualify to be counted as a Section 3 Worker under 24 CFR § 75.

TARGETED SECTION 3 WORKER QUALIFICATIONS

If applicable, please indicate which requirement you meet to be considered a Targeted Section 3 worker in the box below. If you select "Living within the service area or neighborhood of the project," that selection will have to be confirmed by your employer. If you do not meet any of these requirements or do not know if you meet any of the requirements listed below, you may leave this section blank.

___	Living within the service area or neighborhood of the project (requires employer confirmation)*
___	YouthBuild participant*

*Currently or at the time of hire if hired within the past 5 years

Service area or the neighborhood of the project means an area within one mile of the Section 3 project or, if fewer than 5,000 people live within one mile of a Section 3 project, within a circle centered on the Section 3 project that is sufficient to encompass a population of 5,000 people according to the most recent U.S. Census.

☐ In addition to qualifying as a Section 3 Worker, I meet at least one of the requirements in the box above and therefore qualify to be counted as a Targeted Section 3 Worker under 24 CFR § 75.

I/We, the undersigned, certify under penalty of perjury that the information provided above is true and correct and certifies that the worker identified above meets the definition of a Section 3 worker. WARNING: Anyone who knowingly submits a false claim or makes a false statement is subject to criminal and/or civil penalties, including confinement for up to 5 years, fines, and civil and administrative penalties. (18 U.S.C. §§ 287, 1001, 1010, 1012; 31 U.S.C. §3729, 3802)

Signature _____ Date _____

SECTION 01026

SECTION 3 WORKER EMPLOYER CERTIFICATION FORM

[ST. JOHN THE BAPTIST PARISH]
[RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS]

To be completed by Employer:

A. Employer General Information

1. Name of Employer _____
2. Street Address of Employer _____
3. City and Zip Code of Employer _____
4. Phone Number and Email _____

The purpose of this form is to comply with Section 3 of the HUD Act of 1968 employer certification requirements listed in 24 CFR § 75.31. To qualify as a Section 3 worker, the United States legal resident's annual income must not exceed the HUD income limits for the year before the worker was hired, or the individual's current income annualized on a full-time basis for the year must be below the HUD income limit. Additionally, an individual can qualify as a Section 3 worker and Targeted Section 3 worker, if an employee of a Section 3 Business Concern. To qualify as a Targeted Section 3 worker, an employer can confirm that the employee lives within the service area or neighborhood of the project.

B. Employee General Information

1. Name of Employee _____
2. Street Address of Employee _____
3. City and Zip Code of Employee _____
4. Phone Number and Email _____

SECTION 3 WORKER AND TARGETED SECTION 3 WORKER QUALIFICATIONS

Please indicate which of the following is true for the worker listed above: (Select ALL that apply)

___ Worker's income from your employment is below the income limit based on a calculation of what the worker's wage rate would translate to if annualized on a full-time basis* ___ Worker is employed by a Section 3 Business Concern (Select if your business qualifies as a Section 3 Business Concern) ___ Worker's residence is within the service area or neighborhood of the project *	Income Limit $XX,XXX

*Currently or at the time of hire if hired within the past 5 years

Income Limit is the HUD 80% One Person Income Limit for Parish for which employee resides. Income limits may be obtained at: Income Limits | HUD USER

Service area or the neighborhood of the project means an area within one mile of the Section 3 project or, if fewer than 5,000 people live within one mile of a Section 3 project, within a circle centered on the Section 3 project that is sufficient to encompass a population of 5,000 people according to the most recent U.S. Census.

I/We, the undersigned, certify under penalty of perjury that the information provided above is true and correct and certifies that the worker identified above meets the definition of a Section 3 worker. WARNING: Anyone who knowingly submits a false claim or makes a false statement is subject to criminal and/or civil penalties, including confinement for up to 5 years, fines, and civil and administrative penalties. (18 U.S.C. §§ 287, 1001, 1010, 1012; 31 U.S.C. §3729, 3802)

Employer Signature _____ Date _____

SECTION 01027

SECTION 3 BUSINESS CONCERN CONTRACTOR/SUBCONTRACTOR CERTIFICATION

[ST. JOHN THE BAPTIST PARISH]
[RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS]

Name of Business:_____

Name of Business Owner:_____

Address of Business:_____

Phone Number:_____

Email Address:_____

Type of Business: ____ Corporation ____ Partnership ____ Sole Proprietorship ____ Joint Venture

The undersigned hereby certifies that **(select any that apply):**

_____ The business is at least 51% owned and controlled by low or very low income persons; **or**

_____ Over 75% of the labor hours performed for the business over the previous 3 month period are preformed by Section 3 workers; **or**

_____ The business is at least 51% owned and controlled by current resident of public housing or Section 8 assisted housing.

Business Concern Affirmation

I affirm and certify that the above statements are true, complete, and correct to the best of my knowledge and belief. I understand that businesses who misrepresent themselves as Section 3 business concerns and report false information may have their contracts terminated as default and be barred from ongoing and future considerations for contracting opportunities. I hereby certify, under penalty of law, that all information provided is correct to the best of my knowledge.

_____
Name & Title of Company Representative (Print or Type)

_____ _____
Signature Date

FOR ADMINISTRATIVE USE ONLY

Qualifies as Section 3 Business Concern: _____ Yes _____ No
By: _____ Date: _____

*This certification expires six (6) months after date of signature.

SECTION 01028

SECTION 3 ACTIVITY AND GOOD FAITH EFFORTS MONTHLY REPORT

[ST. JOHN THE BAPTIST PARISH]
[RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS]

General Contractor:_____

Subcontractor (If applicable):_____

Reporting Period:_____ **Report Type: Monthly**

Contractors are required to submit monthly activity reports to grantee's Section 3 Coordinator _____ [Coordinator's email address] by the ____ day of each month.

Contractor Section 3 Point of Contact: _____

Phone:_____ Email:_____

Section 3 Goals

Section 3 is a provision of the Housing and Urban Development (HUD) Act of 1968 that helps foster local economic development, neighborhood economic improvement, and individual self-sufficiency. The Section 3 program requires recipients of certain HUD financial assistance to provide job training, employment, and contracting, to the greatest extent feasible, for low- or very low-income residents in connection with projects andactivities in their neighborhoods. Section 3 is race and gender-neutral and is NOT the same as WBE/MBE.

Projects over $200,000 trigger Section 3. When triggered, best efforts must be made to extend Section 3 opportunities to verified Section 3 residents and business concerns to meet these *minimum* numeric goals:

1. Twenty-five percent (25%) of the total hours on a Section 3 project worked by Section 3 workers; and
2. Five percent (5%) of the total hours on a Section 3 project worked by Targeted Section 3 workers.

Programmatic Responsibilities

Contractors and/or Subcontractors are expected to meet the minimum goals listed above, to the greatest extent feasible. All efforts to utilize Section 3 businesses and workers should be documented.

PART 1: SECTION 3 COMPLIANCE (See Sample Labor Hour Tracker for example of information to be compiled for reporting – Page 6 of 7)		
I. SECTION 3 HOURS WORKED – *Report the number of Section 3 hours for this reporting period.*		
A. Total hours worked this period by all workers	B. Number of Section 3 hours worked this period	% Section 3 hours (Divide column B by column A)
II. TARGETED SECTION 3 HOURS WORKED – *Report the number of targeted Section 3 hours for this reporting period*		
A. Total hours worked this period by all workers	B. Number of targeted Section 3 hours worked this period	% Targeted Section 3 hours (Divide column B by column A)

PART 2: SUBCONTRACTOR INFORMATION

☐ This project WILL NOT utilize subcontractors.
☐ This project MAY utilize the following subcontractors:

No.	Sect3 Bus.	Subcontractor Name	Subcontractor Address and Phone Number	Trade	Subcontract Amount
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					

PART 3: PERMANENT EMPLOYEES (On This Project Only)

Please list all current permanent employees (both full and part-time) employed by your company (or local/regional office) as of the signature date on Section 001020 – Certification of Prime Contractor Regarding Section 3 and Segregated Facilities, as well as employees of all subcontractors working on this project. Use additional sheets as necessary. A computer-generated employee registry can be provided in lieu of this form if it includes the worker's name, employer and job category and indicates Section 3/targeted Section 3 status.

No.	Name of Worker	Employer	Job Category/Trade	Section 3 Worker (Y/N)	Targeted Section 3 Worker (Y/N)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					

PART 4: DOCUMENTATION OF QUALITATIVE EFFORTS

Describe efforts to provide Sec 3 Workers and Section 3 Business Concerns with first consideration for employment and contracting opportunities, and all outreach activities performed. If no activity, explain why*

1. Describe all efforts made to direct the employment and other economic opportunities generated by HUD financial assistance for housing and community development programs, to the greatest extent feasible, to Section 3 workers. Attach additional pages if needed.

   Attach supporting documentation such as:

   - Copies of all publications, notices, pictures of posted notices, and other outreach materials.
   - List of all Section 3 workers that responded to your responded to your outreach efforts (e.g., submitted job applications, phone logs, etc.); were any of them hired? If not, please explain why.

2. Describe all efforts made to notify Section 3 businesses of any subcontracting opportunities generated by HUD financial assistance for this project, to the greatest extent feasible. Attach additional pages if needed.

   Attach supporting documentation such as:

   - Section 3 Business List used in any solicitation.
   - List of Section 3 business included in any solicitation and documentation of efforts (emails, letters, phone, logs, etc.).
   - List of Section 3 businesses that responded to your solicitation and/or outreach efforts; were any ofthem hired? If not, please explain why.
   - Copies of all publications, notices, pictures of posted notices, and any other outreach material utilized.

3. Describe all additional qualitative efforts made to comply with Section 3 requirements. See below for examples. Attach all applicable supporting documentation.

4. If there are employment opportunities associated with your project, include a draft of the proposed signage. Section 3 signage should be posted at the construction site. Signage must be large enough to be visible from the street. The sign must (a) identify the name of the project, (b) state the project is a HUD Section 3 Project, and (c) include the name, phone number and email address of an appropriate point of contact regarding employment opportunities.

Examples of Qualitative Efforts

- Engage in outreach efforts to generate job applicants who are Targeted Section 3 workers
- Provide training or apprenticeship opportunities
- Provide technical assistance to help Section 3 workers compete for jobs (e.g., resume assistance, coaching)
- Assist or connect Section 3 workers with drafting resumes, preparing for interviews, and finding job opportunities
- Hold one or more job fairs
- Provide or refer Section 3 workers to services supporting work readiness and retention (e.g., work readiness activities, interview clothing, test fees, transportation, childcare)
- Provide assistance to apply for or attend community college, a four-year educational institution, or vocational/technical training
- Help Section 3 workers to obtain financial literacy training and/or coaching
- Engage in outreach efforts to identify and secure bids from Section 3 business concerns
- Provide technical assistance to help Section 3 business concerns understand and bid on contracts
- Divide contracts into smaller jobs to facilitate participation by Section 3 business concerns
- Provide bonding assistance, guaranties, or other efforts to support viable bids from Section 3 business concerns
- Promote use of business registries designed to create opportunities for disadvantaged and small businesses
- Outreach, engagement, or referrals with the state one-stop system as defined in Section 121(e)(2) of the Workforce Innovation and Opportunity Act

I declare that all statements contained in this report and any accompanying documents are true and correct, and made with full knowledge that all statements given are subject to investigation and that any false or dishonest answer to any question may be grounds for denial or revocation of funding or other penalties as prescribed under 18 U.S. Code § 1001.

Typed/Printed Name and Title of Company Representative

Signature of Company Representative **Date**

Section 3 Labor Hour Tracker Methodology
(Sample)

[Owner]
[Project Title]

LABOR HOURS TRACKER

Contractor:

Subcontractor:

Employee Name	Status				Hours Worked per Pay Period							
	Existing	New	Sec 3 Worker	Sec 3 Targeted Worker	PR #1	PR #2	PR #3	PR #4	PR #5	PR #6	PR #7	PR #8

SECTION 01029

SECTION 3 UTILIZATION FINAL REPORT

[ST. JOHN THE BAPTIST PARISH]
[RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS]

(To Be Completed By the Prime Contractor and Include Data for All Sub-Contractors and Submitted to Owner and Owner's Grant Manager)

☐ Within Ten (10) Days of Bid ☐ After Substantial Completion

A. Section 3 Employee Labor Information

1. Total number of Labor Hours on the project: _____

2. Total number of Section 3 Labor Hours on the project: _____

   Percent of Total Labor Hours: _____

3. Total number of Targeted Section 3 Labor Hour on the project: _____

   Percent of Total Labor Hours: _____

4. Section 3 Employees Utilized on the Project by Prime Contractor *(attach additional sheet(s) if necessary)*:

Number	Wage Rate	Position	Description
_____	_____	_____	_____
_____	_____	_____	_____

5. Section 3 Employees Utilized on the Project by Subcontractors *(attach additional sheet(s) if necessary)*:

Number	Wage Rate	Position	Description
_____	_____	_____	_____
_____	_____	_____	_____

6. Total Number of Section 3 Employees Utilized on Project: _____

7. Names of all subcontractors *(attach additional sheet(s) if necessary)*:

_____ _____

_____ _____

B. Certification of Prime Contractor

General Contractor: _____

Address: _____

Phone: _____

As an officer and representative of the Company, I hereby certify that the above information is true and accurate and is reported fully for this construction project. It is understood final payment from the Owner for this project cannot be made until this report is submitted to the owner or authorized designee.

_____
Name & Title of Company Representative (Print or Type)

_____ _____
Signature Date

(Reporting and Compliance Form)

DIRECTIONS FOR COMPLETION OF SECTION 3 UTILIZATION REPORT

1. Determine the level of Section 3 participation in the construction project.
   a) All employees of the Prime Contractor and all subcontractors must fill out an Employee Information Form, to be retained by the Prime Contractor with copies submitted to the Owner's Compliance Officer. All new hires during the construction project must also complete the Employee Information Form.
   b) Distribute copies of the Employee Information Form to **all** subcontractors you engage for the project, for completion by all employees to be submitted to the prime for retention, with copies submitted to the Owner's Compliance Officer.
   c) Determine Section 3 eligibility for all employees in order to track labor hours performed (tracking spreadsheet provided separately)
2. Complete **(A) Section 3 Employee Information** area of the report.
   a) Enter the total number of labor hours on the project on Line 2.
   b) Enter the number of labor hours for Section 3 Workers, on Line 3; calculate the percentage (Line 2 divided by Line 3)
   c) Enter the number of labor hours for Targeted Section 3 Workers on Line 4; calculate the percentage (Line 2 divided by Line 4)
   d) Enter number of Section 3 Employees utilized by Prime Contractor on Line 5
   e) Enter number of Section 3 Employees utilized by subcontractors on Line 6
   f) Enter total number Section 3 Employees utilized on the project on Line 7 (Line 5 + Line 6)
   g) List all subcontractors on Line 8 (insert additional pages as needed)
3. Complete **(B) Certification by Prime Contractor** section of the report
   a) List name, address, and telephone of your company (prime contractor)
   b) Print or type the name and title of authorized company representative
   c) Have authorized company representative sign and date the Report

Important Reminder

Final payment of retainage funds will not be made until Section 3 Utilization Report is submitted to the Owner or Owner's Compliance Officer.

SECTION 01030

ATTESTATIONS AFFIDAVIT

[ST. JOHN THE BAPTIST PARISH]
[RESERVE RELIEF HOMEWOOD PUMP STATION REPLACEMENT AND DRAINAGE IMPROVEMENTS]

Before me, the undersigned notary public, duly commissioned and qualitied in and for the parish and state aforesaid, personally came and appeared Affiant, who after being duly sworn, attested as follows:

LA R.S. 38:2227 PAST CRIMINAL CONVICTIONS OF BIDDERS

A. No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes:

(a) Public bribery (R.S. 14:118)
(b) Corrupt influencing (R.S. 14:120)
(c) Extortion (R.S. 14:66)
(d) Money laundering (R.S. 14:230)

B. Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation or execution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statutes:

(a) Theft (R.S. 14:67)
(b) Identity Theft (R.S. 14:67.16)
(c) Theft of a business record (R.S.14:67.20)
(d) False accounting (R.S. 14:70)
(e) Issuing worthless checks (R.S. 14:71)
(f) Bank fraud (R.S. 14:71.1)
(g) Forgery (R.S. 14:72)
(h) Contractors; misapplication of payments (R.S. 14:202)
(i) Malfeasance in office (R.S. 14:134)

LA R.S. 38:2212.10 VERIFICATION OF EMPLOYEES

A. Appearer is registered and participates in a status verification system to verify that all employees in the state of Louisiana are legal citizens of the United States or are legal aliens.

B. If awarded the contract, Appearer shall continue, during the term of the contract, to utilize a status verification system to verify the legal status of all new employees in the state of Louisiana.

C. If awarded the contract, Appearer shall require all subcontractors to submit to it a sworn

affidavit verifying compliance with Paragraphs (A) and (B) of this Subsection.

LA R.S. 23:1726(B) CERTIFICATION REGARDING UNPAID WORKERS COMPENSATION INSURANCE

A. R.S. 23:1726 prohibits any entity against whom an assessment under Part X of Chapter 11 of Title 23 of the Louisiana Revised Statutes of 1950 (Alternative Collection Procedures & Assessments) is in effect, and whose right to appeal that assessment is exhausted, from submitting a bid or proposal for or obtaining any contract pursuant to Chapter 10 of Title 38 of the Louisiana Revised Statutes of 1950 and Chapters 16 and 17 of Title 39 of the Louisiana Revised Statutes of 1950.

B. By signing this bid/proposal, Affiant certifies that no such assessment is in effect against the bidding/proposing entity.

LA R.S. 38:2216.1 PROHIBITION OF CONTRACTS WITH COMPAINIES THAT DISCRIMINATE AGAINST FIREARM AND AMMUNITION INDUSTRIES

A. R.S. 38:2216.1 prohibits public entities from entering into or renewing contracts valued at $100,000 or more, funded primarily with public money, with for-profit companies of fifty or more employees that discriminate against firearm entities or firearm trade associations.

B. By signing this bid/proposal, Affiant certifies:

(1) Affiant does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association based solely on the entity's or association's status as a firearm entity or firearm trade association.

(2) Affiant will not discriminate against a firearm entity or firearm trade association during the term of the contract based solely on the entity's or association's status as a firearm entity or firearm trade association.

NAME OF BIDDER

NAME OF AUTHORIZED SIGNATORY OF BIDDER

DATE

TITLE OF AUTHORIZED SIGNATORY OF BIDDER

SIGNATURE OF AUTHORIZED
SIGNATORY OF BIDDER

WITNESSES:

Sworn to and subscribed before me this _____ day of _____, 202__

Notary Public

LA R.S. 38:2224 CONTRACTOR NON-COLLUSION AFFIDAVIT

STATE OF LOUISIANA

PARISH OF _____

BE IT KNOWN, that on this _____day of _____, 20_____, before me the undersigned Notary Public, duly commissioned and qualified, within and for the Parish of _____, State of Louisiana, personally came and appeared _____, as the duly authorized agent of _____, who after being by me first duly sworn, did depose and say:

That _____ has/have been selected as Contractor for the PROJECT NAME: _____ and that affiant employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project or in securing the public contract were in the regular course or their duties for affiant; and

That no part of the contract price received by affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project were in the regular course of their duties for affiant.

APPEARER FURTHER DECLARES, that they will, in all respects, comply with the public contract laws of the State of Louisiana, including Title 38 of the Louisiana Statutes, and particularly Section 2224, as amended, of such Title 38 of the Louisiana Revised Statutes.

WITNESSES:

_____

_____ BY: _____

Sworn to and subscribed before me this _____day of _____, 20__.

_____

Notary Public

SECTION 01031

PROJECT SIGN

PART 1 - GENERAL

1.1 Scope: This Section covers the construction and installation of a project sign as detailed on the Drawings.

1.2 General: Immediately upon beginning work under this contract, the CONTRACTOR shall accomplish the work covered under this section. Location of the project sign shall be as determined by the OWNER at the pre-construction conference.

1.3 Other Signs: No other signs are allowed, except those required by law.

1.4 Submittal Review: *As part of the submittal review process the wording and sign logos layout is to be forwarded to the OCD Project Manager for approval.*

PART 2 - PRODUCTS

2.1 Plywood: The sign shall be constructed of 1/2 inch thick, grade A-C, exterior type plywood.

2.2 Paint: The signs shall receive two (2) coats of an approved semi-gloss, exterior type enamel, colors as shown on the Drawings. Lettering shall be as shown on the Drawings and shall be white, black or brown semi-gloss, exterior type enamel.

PART 3 - EXECUTION

3.1 General:

A. The sign shall be constructed by skilled craftsmen, experienced in carpentry and painting.

B. Sign posts, structure, lettering and dimensions shall be in accordance with details contained herein.

C. The sign shall be installed at the beginning of the project and removed at the completion of the project.

D. The location of the sign shall be selected by the ENGINEER.

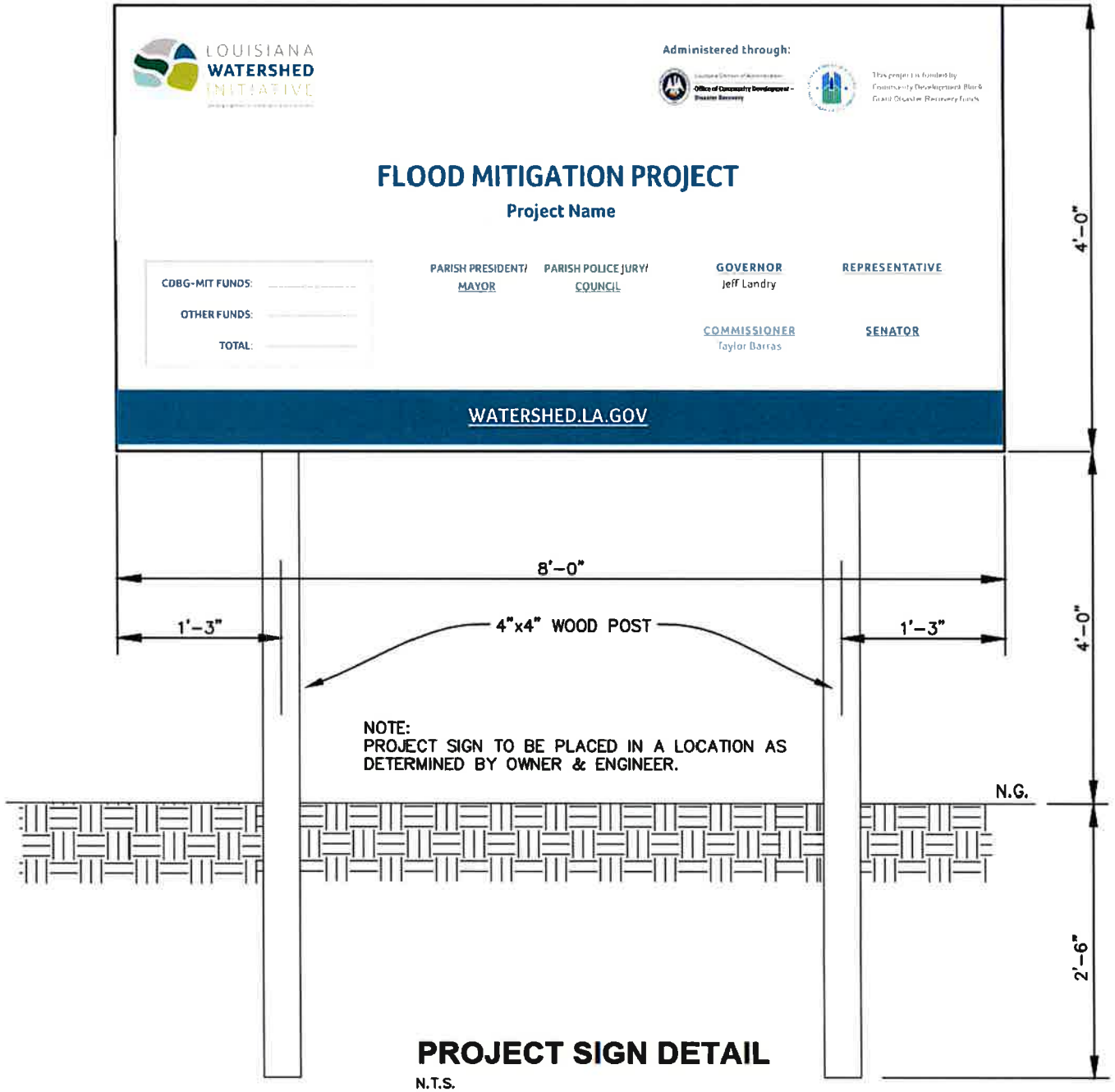
3.2 Maintenance: Maintain signs and supports in a neat, clean condition; repair damages to structures, framing or sign.

3.3 Removal: Remove signs, framing, supports and foundations at completion of project.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION –



PROJECT SIGN DETAIL

N.T.S.

LOUISIANA WATERSHED INITIATIVE

Administered through:

Louisiana Division of Administration
Office of Community Development – Disaster Recovery

This project is funded by Community Development Block Grant Disaster Recovery funds.

FLOOD MITIGATION PROJECT

Project Name

CDBG-MIT FUNDS: _____

OTHER FUNDS: _____

TOTAL: _____

PARISH PRESIDENT/ MAYOR

PARISH POLICE JURY/ COUNCIL

GOVERNOR
Jeff Landry

REPRESENTATIVE

COMMISSIONER
Taylor Barras

SENATOR

WATERSHED.LA.GOV

SECTION 01252: WEATHER DELAYS

PART 1: GENERAL

1.1 Related Documents: The general conditions of the Contract, including (General, Supplementary, and other Conditions, Division 0) and Division 1 as appropriate, apply to the work specified in this Section.

1.2 Extensions of Contract Time:

A. If the basis exists for an extension of time in accordance with the General Conditions, an extension of time on the basis of weather may be granted only for the number of weather delay days in excess of the number of days listed as the standard baseline for that month.

1.3 Standard Baseline for Average Climatic Range:

A. The Louisiana Department of Transportation Department has reviewed weather data available from the U.S. National Weather Service (NWS) and defined a Standard Baseline average climatic range for the State of Louisiana.

B. The standard baseline is defined as the normal number of anticipated calendar days for each month during which construction activity exposed to weather conditions is expected to be prevented and suspended by cause of adverse weather. Suspension of construction activity for the number days each month as listed in the standard baseline is included in the contract time allotted and is not eligible for extension of Contract Time.

C. Standard baseline is as follows:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
11	10	8	7	5	6	6	5	4	3	5	8

D. The contractor's request shall be considered only for days over the allowable number of days stated above.

1.4 Adverse Weather and Weather Delays Days:

A. Adverse weather is defined as the occurrence of one or more of the following conditions within a twenty-four (24) hour day that prevents construction activity exposed to weather conditions or access to the site:

1. Precipitation (rain, snow, or ice) in excess of 1/2 inch (0.5") liquid measure.
2. Sustained wind in excess of thirty-five (35) m.p.h.

B. Adverse weather may include, if appropriate, "dry-out" or "mud" days:

1. Resulting from precipitation days that occur beyond the standard baseline;

2. Only if there is a hindrance to site access or sitework and Contractor has taken all reasonable accommodations to avoid such hindrance; and,
3. At a rate no greater than 1 make-up day for each day or consecutive days of precipitation beyond the standard baseline that total 1/2 inch or more, liquid measure, unless specifically recommended otherwise by the Designer.

C. A weather delay day may be counted if adverse weather prevents work on the project for fifty percent (50%) or more of the contractor's scheduled work day and critical path construction activities were included in the day's schedule.

D. Contractor shall take into account that certain construction activities are more affected by adverse weather and seasonal conditions than other activities, and that "dry-out" or "mud" days are not eligible to be counted as a weather delay day until the standard baseline is exceeded. Hence, Contractor should allow for an appropriate number of additional days associated with the standard baseline days in which such applicable construction activities are expected to be prevented and suspended.

E. If adverse weather conditions are the basis for a claim for additional time, the Contractor shall document that weather conditions had an adverse effect on the scheduled construction. An increase in the contract time due to weather shall not be cause for an increase in the contract sum. At the end of each month, the Contractor shall make one Claim for any adverse weather days occurring within the month. The Claim must be accompanied by sufficient documentation evidencing the adverse days and the impact on construction. Failure to make such Claim within **twenty-one (21) days** from the last day of the month shall prohibit any future claims for adverse days for that month. No additional adverse weather days shall be granted after the original or extended contract completion date, except those adverse weather days associated with a NWS named storm or federally declared weather related disaster directly affecting the project site.

1.5 Documentation and Submittals:

A. Submit daily jobsite work logs showing which and to what extent critical path construction activities have been affected by weather on a monthly basis.

B. Submit actual weather data to support claim for time extension obtained from nearest NWS station.

C. Use standard baseline data provided in this section when documenting actual delays due to weather in excess of the average climatic range.

D. Organize claim and documentation to facilitate evaluation on a basis of calendar month periods and submit to the A/E.

E. If an extension of the Contract Time is appropriate, such extension shall be made by Change Order.

* * *

DIVISION I
GENERAL SPECIFICATIONS

SPECIAL PROVISIONS

1.0 BIDDERS CHECK LIST, PROPOSAL FORM AND AFFIDAVIT

1.1 The Proposal Form and Affidavit bound in these Specifications are for bidder's information only. They may be reproduced from these Specifications.

1.2 An Affidavit is NOT required to be submitted with the bid. An Affidavit must be provided within 10 calendar days of bid opening by the apparent low bidder. A copy of this Affidavit is included following these Bidding Documents.

1.3 Prevailing Wage Rates are applicable to this project.

2.0 COOPERATION BETWEEN CONTRACTORS

2.1 The Contractor shall be cognizant of the fact that other work may be under construction at the same time that this Contract is active. There shall be complete cooperation with any other Contractor in the area, and any unavoidable conflicts shall be immediately brought to the A/E's attention.

3.0 LABOR PREFERENCE - OMIT

4.0 CORRECTION OF WORK AFTER FINAL PAYMENT

4.1 Neither the final payment nor any provision in the Contract Documents shall relieve the Contractor of the responsibility for negligence or faulty materials, equipment, or workmanship, and upon written notice he shall remove any defects due thereto and pay for any damage due to other work resulting therefrom which shall appear within one (1) year after date of completion and acceptance.

5.0 STANDARD SPECIFICATIONS

5.1 All work performed under this contract shall conform with the Louisiana STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES, 2016 EDITION, AS AMENDED, EXCEPT AS MODIFIED IN THE TECHNICAL SPECIFICATIONS.

6.0 PRE-BID CONFERENCE

6.1 A pre-bid conference, date to be announced, may be called by and at the discretion of the Owner.

7.0 PRE-CONSTRUCTION CONFERENCE

7.1 Prior to the start of construction the Project A/E shall schedule a pre-construction conference. The Contractor shall be represented at the conference by his Project Superintendent and any other concerned personnel. Representatives from the Owner will be invited as well as representatives of utility companies, when necessary.

8.0 UTILITY RELOCATION AND ADJUSTMENTS

8.1 Private utilities located on public right-of-way which are required to be permanently relocated at the jobsite or removed entirely from the jobsite to accommodate the project will be indicated on the plans and will be done so at the expense of the utility owner.

8.2 Private utilities located on public right-of-way which the Contractor requests to be temporarily relocated, disconnected or de-energized for the convenience of construction or for safety reasons shall be done so at the contractor's expense.

8.3 Disposition of Utilities: Follow rules and regulations of the authority having jurisdiction in executing all Work under this article. Adequately protect active utilities shown on the Drawings from damage and remove or relocate only as indicated or specified. Where active utilities are encountered, but are not shown on the Drawings, advise the A/E. Adequately protect, support, or relocate the Work as directed. Remove, plug or cap inactive and abandoned utilities encountered in excavating and grading operations as directed.

9.0 DRAINAGE AND SHEETING, SHORING AND BRACING

9.1 The Contractor shall impede drainage only in the event such impediment is necessary for the implementation of the work. When impeding drainage is necessary, Contractor shall take the necessary steps to protect life and property.

9.2 The Contractor shall be responsible for supplying materials, services, and labor necessary to provide sheeting, shoring and bracing or supports as required to provide a safe working condition for Contractor's personnel and to provide for protection of utilities, buildings, and structures. It shall be the sole responsibility of the Contractor to comply with these requirements.

10.0 BENCH MARK AND ALIGNMENT

10.1 The A/E will furnish a bench mark for use by the Contractor to develop vertical control.

10.2 The Contractor will be responsible for establishing all lines and grades and staking out all work on this project from these controls. The Contractor shall employ sufficient qualified engineering personnel experienced in layout and construction of streets, drainage, sewerage, water, and related structures to correctly establish, keep complete and comprehensive notebook records of all lines and grades necessary during various operations, from initial layouts or final acceptance as the work progresses. The Contractor is accordingly liable for the accuracy of the initial layout along with all subsequent alignment and elevations during his construction operations. He shall, at his own expense, rebuild, restore, repair and make good any members or portions of the work found to be incorrectly positioned, either horizontally or vertically at any time before final acceptance.

10.3 Number notebooks for complete and comprehensive recording of all lines and grades will be provided to the A/E and shall be properly indexed and cross referenced by the Contractor for as-built data. The Contractor will be responsible for providing a marked-up set of prints showing as-built conditions.

10.4 The A/E may, at his option, make either spot or complete checks on all construction alignment and grades to determine the correctness of the survey work; however, these checks by the A/E will not relieve the Contractor of his responsibility for constructing the work in the positions and to the elevations shown on the plans or approved revisions thereto. All measurements for determination of pay quantities will be plan dimension unless amended by field construction.

11.0 EXISTING POWER POLES

11.1 Where excavation is required adjacent to existing power poles or other structures, the Contractor has the responsibility to maintain the integrity of the structure by bracing or other means subject to the approval of the Project A/E.

12.0 TRAFFIC MAINTENANCE, CONSTRUCTION SIGNING, TEMPORARY SIGNS AND BARRICADES

12.1 With reference to Section 713 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended, the Contractor will be required to provide all necessary signs and barricades shown in the plans and in accordance with The Manual on Uniform Traffic Control Devices,

Part VI Traffic Controls for Street and Highway Construction and Maintenance Operations as well as all signs, barricades, blinking lights or other necessary traffic control devices required by Owner or other governing authority or Specifications.

12.2 The Contractor shall be responsible for providing safe and expeditious movement of traffic through construction zones. A construction zone is defined as the immediate area of actual construction and all abutting areas which are used by the Contractor and which interfere with the driving or walking public. The Contractor shall be responsible for installation and maintenance of all devices and requirements in accordance with the construction signing details for the duration of the construction period. Cuts in roadway lanes which must be left open overnight shall be covered with steel plates sufficiently heavy to carry vehicular traffic or backfilled and shelled, and properly lighted and barricaded.

13.0 MEASUREMENT AND PAYMENT

13.1 Measurement and Payment shall be as specified and as shown on the plans and in the proposal. No direct payment will be made for any item of work normally required for the type of construction involved that is not a pay item on the Proposal Form.

13.2 All measurements for payment shall be reviewed by the Project A/E or his representative.

14.0 SUMMARY OF WORK

14.1 Work Covered by Contract Documents:

A. The Work of this Contract comprises of pump station replacement and drainage improvements as follows:
   1. Drainage improvements including earthen canal section improvements, two railroad crossings, culvert installation, four culvert crossings at Airline Highway and miscellaneous related improvements.
   2. New pump station construction with three 135 CFS vertical axial flow pumps with motors, generator, and related equipment, including electrical work.

B. The Contractor shall furnish all labor, materials, equipment, tools, services, and incidentals to complete all work required by these Specifications and as shown on the Drawings.

C. The Contractor shall perform the work complete, in place and ready for continuous service, and shall include repairs, replacements, and restoration required as a result of damages caused during this construction.

D. Furnish and install all materials, equipment, and labor which is reasonably and properly inferable and necessary for the proper completion of the work, whether specifically indicated in the Contract Documents or not.

E. Protect all existing work from damage. It is intended that any existing Work in place shall be repaired to original condition if damaged by Work of this Contract.

F. The Contractor shall verify all field and job conditions prior to preparing his bid. Any conditions not described in these Drawings and Specifications shall be brought to the attention of the A/E prior to bid date. Failure to do so shall render the Contractor responsible for correction of this condition should he be awarded the contract.

G. The work "Provide" as used in these Specifications and on the Drawings will be termed to mean "furnish and install".

H. Visit and examine the job site, and with all authorities concerned in order to become familiar with all existing conditions pertinent to the work to be performed thereon. No additional compensation will be allowed for failure to be so informed. Pay all costs and fees for utility connections.

I. All work shall be performed in a neat and workmanlike manner, and in accordance with all codes, standards, and requirements of the industry.

J. Check all Specifications and all Drawings and bring to attention any conflicts or variations as shown or noted.

K. Specifications and accompanying Drawings apply to all material and/or labor for construction of work specified herein and shown on the Drawings.

L. For any points which are not clear, or from items and/or details which the Contractor feels are in need of clarification, consult the A/E before submission of a proposal.

M. The Drawings and the Specifications are complementary and what is shown and/or called for one shall be furnished and installed the same as if shown and/or called for in the other.

N. In case of discrepancies and/or ambiguities in the Drawings and/or in the Specifications, the A/E shall be consulted prior to submission of a proposal. Failure to do so on the part of the successful bidder shall be construed as explicit agreement on his part to abide by the A/E's decision in such matters.

O. Protect all existing fencing, other work to remain, from damage. If damaged, restore or replace at no additional cost to Owner.

P. Any excavation made immediately adjacent to existing utilities shall be done with caution. It shall be Contractor's responsibility to verify utility locations. Any damage to utilities shall be repaired at no cost to Owner.

14.2 Contract: Construct work under a contract with unit prices. It is understood by the Contractor that the quantities given in the Schedule of Bid Items are a fair approximation of the amount of work to be done and that the sum of the products of the approximate quantities multiplied by the unit prices bid constitutes the Total Bid Price, which sum shall be used in the comparison of bids and award of the Contract.

14.3 Work Sequence: Contractor is responsible for work sequence.

15.0 APPLICATIONS FOR PAYMENT

15.1 General: Submit Applications for Payment monthly to A/E in accord with the schedule established by General Conditions of the Contract and Agreement Between Owner and Contractor.

15.2 Format and Data Required: Submit itemized applications Monthly.

15.3 Preparation of Application for Each Progress Payment:

A. Application Form:
   1. Fill in required information, including that for Change Orders executed prior to the date of submittal of application.
   2. Fill in summary of dollar values to agree with the respective totals indicated on the continuation sheets.
   3. Execute certification with the signature of a responsible officer of the Contract firm.

B. Continuation Sheets:
   1. Fill in total list of all scheduled component items of Work, with item number and the scheduled dollar value for each item.
   2. Fill in the dollar value in each column for each scheduled line item when Work has been performed or products stored.
   3. List each Change Order executed prior to the date of submission, at the end of the continuation sheets. List by Change Order Number, and description, as for an original component item of work.
   4. Prior to each pay request, present project record documents for review by the A/E. Documents shall be annotated as required herein to include those portions of work of which payment is requested. Failure to have properly maintained Project Record Documents will be considered as incomplete work. At contract close-out, deliver record documents to the A/E.

15.4 Substantiating Data for Progress Payments:

A. When the Owner or the A/E requires substantiating data, Contractor shall submit suitable information, with a cover letter identifying:
   1. Project.
   2. Application number and date.
   3. Detailed list of enclosures.
   4. For stored products:
      a. Item number and identification as shown on application.
      b. Description of specific material.

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

C. Submit Record Drawings for review by A/E. A/E will return Record Drawings after review.

15.5 Preparation of Application for Final Payment:

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

B. Use continuation sheet for presenting the final statement of accounting as specified in Contract Closeout Section.

15.6 Submittal Procedure:

A. Submit Applications for Payment to the A/E at the times stipulated in the Conditions of the Contract.

B. Number: Five (5) copies of each Application.

C. When the A/E finds the Application properly completed and correct, he will transmit a certificate for payment to Owner, with a copy to Contractor.

D. Contractor must submit a Project Schedule with each Application for Payment. The Project Schedule must be up to date and included in each and every Application for Payment submittal. Each schedule shall indicate the original schedule with the current schedule immediately below it.

16.0 TESTING LABORATORY

16.1 Testing Laboratory:

A. Should the owner so decide, an independent testing laboratory shall be employed and paid by the Owner for the purposes of conducting tests of materials.

B. The selection of the testing laboratory by the Owner shall be understood as in no way relieving the Contractor of his responsibility for satisfactory performance of the work in full conformance with the requirements of the contract. Excluding written protest by the Contractor in advance of processing or use of materials, services of the testing laboratory shall be understood as constituting full acceptance and approval of the Contractor.

C. The Contractor shall cooperate with and make available to the testing laboratory such facilities and material samples as may be necessary for the performance of these services without charge.

16.2 Contractor's Responsibilities:

A. Cooperate with laboratory personnel, provide access to Work.

B. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other materials mixes which require control by the testing laboratory. Material supplier shall provide laboratory with field mix data for each delivery.

C. Make available, without cost, samples of all materials to be tested in accordance with applicable standard Specifications.

D. Furnish such nominal labor and sheltered working space as is necessary to obtain samples at the Project.

E. Advise the laboratory of the identity of materials sources and instruct the suppliers to allow tests or inspections by the laboratory.

F. Notify the laboratory sufficiently in advance, 24 hours minimum, of operations to allow for completion of initial tests and assignment of inspection personnel.

G. Notify the laboratory sufficiently in advance of cancellation of required testing operations. The Contractor shall be responsible to the laboratory for charges due to failure to notify if requirements for testing are cancelled.

H. Make arrangements with laboratory and pay for additional samples and tests required for Contractor's convenience. Employ and pay for the services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling, and testing required when initial tests indicate Work does not comply with Contract Documents.

I. The Contractor shall pay all fees and charges incurred for retesting due to failure of initial test or other deficiencies that are the contractor's responsibility.

J. If tests indicate insufficient concrete strength and if additional tests are ordered (cores, etc.), Contractor shall pay for such additional tests and any additional design services required.

16.3 Test Methods: Tests and inspections shall be conducted in accordance with the latest standards of the American Society of Testing and Materials (ASTM), or other methods as described or modified herein.

16.4 Test Reports: The laboratory shall promptly submit written reports on each test and inspection made to the A/E within 48 hours after the tests have been made.

16.5 Extent of Laboratory Tests and Inspections:

A. The A/E will recommend to the Owner the type and number of tests to be performed on the project. The Contractor will be advised of

the number and type of tests to be performed by the testing laboratory.

B. The laboratory shall immediately notify the A/E by telephone of any test data prerequisite to continuance of the Work by the Contractor.

C. The A/E will be immediately notified of any test result that falls below the requirements of these Specifications and the laboratory will hold this information confidential until notified otherwise by the A/E.

17.0 CONSTRUCTION PROGRESS PHOTOGRAPHS

17.1 Construction Progress Photographs:

A. General: All photographs shall be produced by a professional photographer acceptable to A/E. All negatives and two (2) 8" x 10" prints of each view shall be submitted. Negatives shall be identified with description of view and date. Prints shall be mounted on linen with flap for binding or enclosed in clear plastic binders, and marked on the back with the name and number of the contract, name of Contractor, and/or Sub-Contractor, description and location of view and date photographed. Photographs shall be glossy and shall be taken with a 35mm camera or a special graphic press type camera. All photography shall be at the contractor's expense. A/E shall transmit one (1) copy of each photograph to Owner.

B. Number required per submittal: At least two (2) different views of typical construction.

C. Schedule:
   1. Prior to beginning of work. Existing conditions.
   2. Deliver two (2) sets of photographs to the A/E with each Application for Payment.
   3. Prior to final inspection.

D. Direction of view/vantage points: As directed by the A/E.

E. Prints:
   1. Photographs shall be sharp, clearly showing all details.
   2. Full color prints of each view.
   3. Glossy Finish.
   4. Size: 8 x 10 inch
   5. Paper weight: Professional Quality.

17.2 Audio Video Survey

A. General: Prior to the start of construction on the Contract, the Contractor shall furnish to the A/E, the video tapes of the construction areas. The tapes will remain available for viewing by the Contractor and may be reviewed by him for any assistance that the tapes may provide in resolving disputes which arise with the property owners claiming improper restoration of their properties. The tapes will also be used as a guide by the A/E, prior to issuance

of final payments, in determining the adequacy of restoration and the extent of damages attributable to the Contractor's work. At least 24 hours prior to taping, the Contractor shall notify the A/E when taping will begin so that the A/E may have a representative present.

B. Technical Requirements: The total audio-video recording system and the procedures employed in its use shall be such as to produce a finished product that will fulfill the technical requirements of the project, as well as those more subjective requirements of high-quality audio and video protection. The video portion of the recording shall reproduce bright, sharp, clear pictures with accurate colors and shall be free from distortion, tearing, rolls or any other form of picture imperfection. The audio portion of the recording shall reproduce precise and concise explanatory notes by the camera operator with proper volume, clarity and freedom from distortion.

1. Recorder: The records shall record the color signal with a minimum horizontal resolution of 240 lines. The recorder shall be of the 1/2 inch VHS format.
2. Camera: When taping areas accessible to conventional wheeled vehicles, the color video camera shall have a horizontal resolution of 300 lines at center (e.g. JVC KY 1900 or equivalent). When taping areas not accessible to conventional vehicles, the color video camera shall have a horizontal resolution of at least 300 lines at center.
3. Character Printout: All video recordings must, by electronic means, display continuously and simultaneously, generated transparent digital information to include (1) the date and the time of the recording, (2) the Engineering stationing corresponding to the stationing on the plans, or as directed by the A/E, (3) the name of the street, easement, or building being documented, (4) the project name, and (5) the direction of travel and the viewing side. The time and date shall appear linearly in the bottom left hand corner (e.g. 9-20-81 8:30:15).

C. Operator Experience: The operator in charge must have had previous experience video documenting a minimum of 50 miles of pre-construction work, any apprentice operators must be continuously supervised by an above described experienced operator.

D. Recording Schedule: The recording shall be performed prior to the placement of any construction materials or equipment on the proposed construction site, but not more than seven (7) weeks prior to the placement of materials or equipment.

E. Tape Indexing: All video tapes and their storage cases shall be properly identified by video tape index number, project title and general project location. Displayed on the storage case of each

video tape shall be a log of that tape's contents. That log shall describe (1) the various segments contained on that tape in terms of the names and the sides of the streets or easements, (2) coverage start, direction and endpoints, with corresponding video tape player counter numbers. A cumulative index correlating the various segments of coverage to their corresponding tapes shall be typed and supplied to the Owner.

F. Unacceptable Documentation: The Owner shall have the authority to reject all or any portion of the video tape documentation not conforming to the Specifications. Those rejected portions shall be re-taped at no additional cost to the Owner.

G. Specification Deviations: Any deviation from these Specifications must have the written approval of the A/E.

H. Ownership: Upon payment made in accordance with Specifications, all tapes and written records become the property of the Owner.

I. Plan Stationing: Plan stationing shall be expressed in engineering symbols and shall appear directly beneath the time and date information (e.g. 87 + 03). The remainder of the printed information shall appear at the bottom of the viewing screen (e.g. N on First St. V/E Maybury Twp.). To maximize viewing area no more than 24 masters shall be used to express the transparent digital information.

J. Audio: At the start of production, and at the beginning of a new street or easement, an identification summary shall be read into the record while, at the same time, a wide-angle view with numeric displays shall be provided for a visual record. This summary will include (1) tape number, (2) job title, (3) job location, (4) positional location at job start, (5) date and time, (6) weather, and (7) any other notable conditions.

K. Coverage: The recording shall include coverage of all surface features located within the construction zone-of-influence. This zone shall be defined as 1) the area within the permanent and temporary easements and areas adjacent to these easements which may be affected by routing construction operations, 2) road right-of-way, 3) areas directed by the Owner. The surface features within the construction zone shall include, but not be limited to, all roadways, traffic signs and signals, pavements, curbs, driveways, sidewalks, culverts, headwalls, retaining walls, buildings, landscaping, shrubbery and fences. Of particular concern shall be the existence, or non-existence, of any faults, fractures or defects.

L. Visibility: No recording shall be done during periods of significant precipitation, mist or fog. The recording shall only be done when sufficient sunlight is present to properly illuminate the subjects of recording.

M. Rate of Travel: The vehicle's rate of travel shall be indirectly proportional to the number, size and value of the surface features within that construction area's zone-of-influence. The average rate

of travel shall not exceed 48 feet per minute.

N. Camera Elevation: To ensure proper perspective and to capture optimal detail, the distance from the camera lens to the ground shall not be less than 12 feet when conventional wheeled vehicles are employed.

O. All tapes and written records become the property of the Owner.

18.0 TEMPORARY FACILITIES

18.1 General:

A. Comply with Federal, State, and Local codes and regulations.

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

18.2 Job Sign:

A. Construct and maintain job sign as detailed herein; painted by professional sign painter. All lumber shall be treated pine. Signs shall be 3/4 inch thick exterior grade plywood with "B" or better face.

B. At his option, Contractor may provide and maintain a separate sign, approved by the A/E, for listing of subcontractors. If approved, paint (by professional) in identical colors as project sign.

C. Do not allow other signs or advertisements at or near the project site.

18.3 Temporary Sanitary Facilities: The Contractor shall provide and maintain an adequate number of temporary toilets with proper enclosures as necessary for use of workmen during construction. Keep toilets clean and comply with all local and state health requirements and sanitary regulations. Toilet facilities shall consist of the prefabricated chemical type.

18.4 Temporary Electricity and Lighting:

A. Comply with National Electric Code.

B. Provide connections to existing facilities, size to provide service required for power and lighting at Contractor's expense.

C. Provide adequate artificial lighting for all areas of work when natural light is not adequate for Work, and for areas accessible to the public.

18.5 Temporary Access: Do not disturb any lawn areas. Construct and maintain in good, usable condition required temporary access and appurtenances; when no longer required, remove temporary construction.

18.6 Temporary Field Office: The Contractor shall provide and maintain a suitable temporary field office at the project site for his own use and for the

use of representatives of the Owner and the A/E. Provide the office with adequate heat, electric lighting, separate telephone, file racks for storage of Drawings, and a counter top for drawing references. Locate office where indicated or directed and remove when work is complete.

18.7 Temporary Sheds: The Contractor shall provide and maintain additional offices, storage sheds, and other temporary buildings or trailers as required. Location of sheds and trailers shall be approved by the Owner and the A/E. Remove sheds when work is completed, or as directed.

18.8 Temporary Sewerage Flow Control:

A. Plugging or Blocking: A sewer line plug shall be inserted into the line at a manhole upstream from the section being inspected and/or worked. The plug shall be so designed that all or any portion of the sewage flows can be released. During the inspecting, testing, or sealing portion of the operation flows shall be shut off. After the work tasks have been completed, flows shall be restored to normal.

B. Pumping and Bypassing:

1. When pumping/bypassing is required, the Contractor shall supply the necessary pumps, conduits, and other equipment to divert the flow of wastewater around the area in which work is to be performed. The bypass system shall be of sufficient capacity to handle existing flows plus additional flow that may occur during periods of a rainstorm. Six (6") inch or eight (8") inch trailer-mounted electric pumps shall be used. No other type of pump will be acceptable without prior approval of the A/E. The Contractor shall be responsible for furnishing the necessary power, labor, and supervision to set up and operate the pumping and bypassing system. If pumping is required on a 24-hour basis, all equipment shall be operated in a manner to keep the pump noise at a minimum.
2. Bypassing of waste water to storm drainage systems or canals will not be allowed.

C. Flow Control Precautions: Whenever flows in a sewer line are blocked, plugged, or bypassed, sufficient precautions shall be taken to protect the sewer lines from damage that might be inflicted by excessive sewer surcharging. Further, precautions shall be taken to ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved.

18.9 Removal:

A. Completely remove temporary materials and equipment when their use is no longer required. Clean and repair damage caused by temporary installations or use of temporary facilities.

B. Restore existing facilities used for temporary services to specified, or to original, condition.

C. Restore any permanent facilities used for temporary services to specified condition.

18.10 There will be no direct payments for Items of this Section.

19.0 MATERIAL AND EQUIPMENT

19.1 Reuse of Existing Material:

A. Except as specifically indicated or specified, materials and equipment removed from the existing structure shall not be used in the completed Work.

B. For material and equipment specifically indicated or specified to remain or to be used in the Work.

1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed Work.

2. Arrange transportation, storage, and handling of products which require off-site storage, restoration, or renovation. Pay all costs for such work.

20.0 SHOP DRAWINGS

20.1 General:

A. Submit, to the A/E, shop drawings, project data, and samples required by specification sections.

B. Prepare and submit, with Construction Schedule, a separate schedule listing dates for submission and date reviewed shop drawings, project data, and samples will be needed for each product.

20.2 Shop Drawings: Original drawings, prepared by Contractor, Subcontractor, Supplier, or Distributor, which illustrate some portion of the Work; showing fabrication, layout, setting, or erection details.

A. Prepared by a qualified detailer.

B. Identify details by reference to sheet and detail numbers shown on Contract Drawings.

C. Maximum Sheet Size: 24" x 36".

D. Reproduction for Submittals: Three (3) opaque diazo prints or one (1) reproducible sepia transparency.

20.3 Manufacturer's Literature, Project Data:

A. Manufacturer's standard schematic drawings.

1. Modify drawings to delete information to provide additional information applicable to project.

2. Supplement standard information to provide additional information applicable to project.

B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data.
   1. Clearly mark each copy to identify pertinent materials, products, or models.
   2. Show dimensions and clearances required.
   3. Show performance characteristics and capacities.
   4. Show wiring diagrams and control.

20.4 Samples: Physical examples to illustrate materials, equipment, or workmanship, and to establish standards by which completed work is judged.

20.5 Contractor Responsibilities:

A. Review Shop Drawings, Project Data, and Samples prior to submission.

B. Verify field measurements, field construction criteria, catalog numbers, and similar data.

C. Coordinate each submittal with requirements of Work and of Contract Documents.

D. Contractor's responsibility for errors and omissions in submittals is not relieved by A/E's review of submittals.

E. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by A/E's review of submittals, unless A/E gives written acceptance of specific deviations.

F. Notify A/E, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.

G. Begin no work which requires submittals until return of submittals with A/E's stamp and initials or signature indicating review.

H. After A/E's review, distribute copies.

I. Contractor shall direct specific attention, in writing, to the A/E of the failure to receive reviewed submittals after a reasonable time and shall denote consequences of an excessive review period with regard to the progress of work.

J. Contractor shall submit a schedule of the submittals needed prior to construction.

K. Contractor shall review each submittal and verify in writing to the A/E each submittal conforms with the Contract Documents.

20.6 Submission Requirement:

A. Schedule submissions at least 21 days before dates reviewed submittals will be needed.

B. Shop Drawings: Submit one (1) reproducible sepia transparency and three (3) opaque print of Shop Drawings.

C. Manufacturer's Literature: Number of copies of Project Datum which Contractor requires for distribution plus 2 copies which will be retained by A/E, plus one (1) copy retained by the Consulting A/E for mechanical or electrical submittals.

D. Submit number of Samples specified in each of specification sections.

E. Accompany submittals with transmittal letter containing: date; project title and number; Contractor's name and address; the number of each Shop Drawings, Project Datum, and Sample submitted; notification of deviations from Contract Documents; other pertinent data.

F. Submittals shall include:

1. Date and revision dates.
2. Project title, A/E Project number, and Owner's Project number, if any.
3. The names of: A/E; Contractor; Subcontractor; Supplier; Manufacturer.
4. Identification of product or material.
5. Relation to adjacent structure or materials.
6. Field dimensions, clearly identified as such.
7. Applicable standards, such as ASTM number or Federal Specification.
8. A blank space, 8" x 8" for the A/E's stamp.
9. Identification of deviations from Contract Documents.
10. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements, and compliance with Contract Documents.
11. Applicable standards, such as ASTM number or Federal Specification number.

20.7 Resubmission Requirements:

A. Shop Drawings: Revise initial drawings as required and resubmit as specified for initial submittal. Indicate on drawings any changes which have been made other than those requested by A/E.

B. Project Data and Samples: Submit new datum and samples as required for initial submittal.

C. Contractor shall accept full responsibility for the completeness of each submission, and, in the case of a resubmission, shall verify that all exceptions previously noted by A/E have been taken into

account. In the event that more than one (1) resubmission is required because of failure of Contractor to account for exceptions previously noted, Contractor shall reimburse Owner for the charges of A/E for review of the additional resubmissions.

D. Any need for more than one (1) resubmission, or any other delay in obtaining A/E's review of submittals, will not entitle Contractor an extension of the Contract Time unless delay of the Work is directly caused by a change in the Work authorized by a Change Order or by failure of A/E to return any submittal within a reasonable time after its receipt in A/E's office.

E. When the drawings and data are returned marked SUBMIT SPECIFIED ITEM the Contractor shall do so. When the drawings and data are returned marked REVISE AND RESUBMIT, the corrections shall be made as noted thereon and as instructed by the A/E and nine (9) corrected copies (or one (1) corrected reproducible copy) resubmitted.

20.8 Distribution of Submittals after Review:

A. Distribute copies of Shop Drawings and Project Datum which carry A/E stamp to:
   1. Contractor's file
   2. Job site file
   3. Record Documents file
   4. Subcontractors
   5. Supplier or fabricator
   6. Other affected Contractors

B. Distribute samples as directed.

20.9 A/E's Duties:

A. Review submittals with reasonable promptness.

B. Review for design concept of project and information given in Contract Documents.

C. Review of separate item does not constitute review of an assembly in which item functions.

D. Affix stamp and initials or signature certifying to review of submittal.

E. Return sepia of Shop Drawings and other submittals to Contractor for distribution, or for resubmission. Contractor is responsible obtaining number of opaque prints from sepia necessary for distribution.

F. A/E's review of drawings and data submitted by Contractor will cover only general conformity to the drawings and specifications, external connections, and dimensions which affect the layout. A/E's review does not indicate a thorough review of all dimensions, quantities, and details of the material, equipment, device, or item

shown. A/E's review of submittals shall not relieve Contractor from responsibility for errors, omissions, or deviations, nor responsibility for compliance with the Contract Documents.

G. The A/E shall review and approve Contractor's submittals, such as shop drawings, product data, samples and other data, as required by the A/E, but only for the limited purpose of checking for conformance with the design conception and the information expressed in the Contract Documents. This review shall not include review of the accuracy or completeness of details, such as quantities, dimensions, weights or gauges, fabrication processes, construction means or methods, coordination of the work with other trades or construction safety precautions, all of which are the sole responsibility of the Contractor. The A/E's review shall be conducted with reasonable promptness while allowing sufficient time in the A/E's judgement to permit adequate review. Review of a specific item shall not indicate that the A/E has reviewed the entire assembly of which the item is a component. The A/E shall not be responsible for any deviations from the Contract Documents not brought to the attention of the A/E in writing by the Contractor. The A/E shall not be required to review partial submissions or those for which submissions or correlated items have not been received.

21.0 PROJECT RECORD DOCUMENTS

21.1 Maintenance of Documents:

A. Maintain at jobsite one (1) copy of: Contract Drawings; Specifications; Addenda; Reviewed Shop Drawings; Change Orders; Other Modifications to Contract; Field Test Records.

B. Maintain documents in clean, dry, legible condition.

C. Do not use record documents for construction purposes.

D. Make documents available at all times for inspection by the A/E and the Owner.

21.2 Recording:

A. Label each document "PROJECT RECORD DOCUMENTS" in printed letters.

B. Keep record documents current.

C. Do not permanently conceal any work until required information has been recorded.

D. "Project Record Documents" Drawings: Legibly mark to record actual construction:

1. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.

2. Field changes of dimension and detail.
3. Changes made by Change Order or Field Order.
4. Details not on original Contract Drawings.

E. Specifications and Addenda: Legibly mark each Section to record:
1. Manufacturer, trade name, catalog number, and Supplier of each product and item of equipment actually installed.
2. Changes made by Change Order or Field Order.

21.3 Submittal:

A. Prior to each pay request, present project record documents for review by the A/E. Documents shall be annotated as required herein to include those portions of work of which payment is requested. Failure to have properly maintained Project Documents will be considered as incomplete work.

B. At Contract close-out, deliver "Project Record Documents" record documents to the A/E. Provide two (2) copies of the Contract Drawings; one (1) copy of other required record documents.

C. Accompany submittal with transmittal letter containing:
1. Date.
2. Project title and number.
3. Title and number of each "Project Record Documents" drawing.
4. Signature of Contractor or his authorized representative.

22.0 CONTRACT CLOSEOUT

22.1 General: Comply with requirements stated in Conditions of the Contract and in Specifications for administrative procedures in closing out the Work.

22.2 Substantial Completion:

A. When the Contractor considers a portion of the Work is substantially complete, he shall submit to the A/E a written notice that the Work, or designated portion thereof, is substantially complete and a list of items to be completed or corrected.

B. Within a reasonable time after receipt of such notice, the A/E will make an inspection to determine the status of completion.

C. Should the A/E determine that the Work is not substantially complete:
1. A/E will promptly notify the Contractor in writing, giving the reasons therefor.
2. The Contractor shall remedy the deficiencies in the Work, and send a second written notice of substantial completion

to the A/E.

3. A/E will reinspect the Work.
4. When the A/E concurs that the Work is substantially complete, he will:
   a. Prepare a Certificate of Substantial Completion accompanied by Contractor's list of items to be completed or corrected, as verified and amended by the A/E.
   b. Submit the Certificate to Owner and Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.
   c. Request the Contractor to make closeout submittals.

22.3 Contractor's Closeout Submittals to the A/E:

A. Evidence of compliance with requirements of governing authorities and all Certificates of Inspection.

B. At Contract close-out, deliver "Project Record Documents" record documents to the A/E. Provide two (2) copies of the Contract Drawings; one (1) copy of other required record documents.

C. Evidence of Payment and Release of Liens: To requirements stated in the Conditions of the Contract.

22.4 Final Inspection:

A. When the Contractor considers the Work is complete, he shall submit written certification that:
   1. Contract Documents have been reviewed.
   2. Work has been inspected for compliance with Contract Documents.
   3. Work has been completed in accordance with Contract Documents.
   4. Equipment and systems have been tested in presence of the Owner's representative and are operational.
   5. Work is completed and ready for final inspection.
   6. Project Record Documents are completed and submitted to the A/E for acceptance.

B. A/E will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.

C. Should the A/E consider that the Work is incomplete or defective:
   1. A/E will promptly notify the Contractor in writing, listing the incomplete or defective work.
   2. The Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to the A/E that the Work is complete.
   3. A/E will reinspect the Work.

22.5 Final Adjustment of Accounts:

A. Submit a final statement of accounting to the A/E.

B. Statement shall reflect all adjustments to the Contract Sum:

1. The Original Contract Sum.
2. Additions and deductions resulting from:
   a. Previous Change Orders.
   b. Unit Prices.
   c. Deductions for uncorrected Work.
   d. Deductions for liquidated damages.
   e. Deductions for reinspection payments.
   f. Other adjustments.
3. Total Contract Sum, as adjusted.
4. Previous payments.
5. Sum remaining due.

C. A/E will prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.

22.6 Final Application for Payment: The Contractor shall submit the Final Application for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

***

SECTION 01635 - SUBSTITUTION PROCEDURES

PART 1: GENERAL

1.1 Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 Summary:

A. Section includes administrative and procedural requirements for substitutions.

B. Related Sections:

1. Division 1 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
2. Division 2 through 16 sections for specific requirements and limitations for substitutions.

1.3 Definitions:

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 Submittals:

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use copy of form provided in the Project Manual.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable. The burden of proof of the merit of the proposed substitute is upon the proposers.
   a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
   b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
   c. Detailed comparison (point by point) of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as

performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

1) Detailed comparison (point by point) must be included in all substitution request documentation submitted for review by the A/E.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

e. Samples, where applicable or requested.

f. Certificates and qualification data, where applicable or requested.

g. List of similar installations for completed projects with project names and addresses and names and addresses of A/Es and owners.

h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

i. Research reports evidencing compliance with building code in effect and indicated UL or documented testing methods.

j. Construction Schedule (After Contract Execution): Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

k. Construction Schedule (After Contract Execution): Cost information, including a proposal of change, if any, in the Contract Sum.

l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.

m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. A/E's Action:

a. Prior to the Bid Date: If necessary, A/E will request additional information or documentation for evaluation within ten (10) working days of receipt of a request for substitution. The A/E will notify the contractor/supplier of acceptance or rejection of proposed substitution within ten (10) working days after receipt. All submittal requests that have been submitted properly and accepted will be included in an addendum.

1) Forms of Acceptance: Signed "Contractor/Supplier Substitution Required Form, Addendum, Change Order, Construction Change Directive, or A/E's supplementary instructions for minor changes in the work.
2) The A/E's decision of approval or disapproval will be final.

b. After Contract Execution: A/E will notify Contractor of acceptance or rejection of proposed substitution during construction within fifteen (15) working days of receipt of request, or seven (7) working days of receipt of additional information or documentation, whichever is later.
1) Forms of Acceptance: Signed "Contractor/Supplier Substitution Required Form, Addendum, Change Order, Construction Change Directive, or A/E's supplementary instructions for minor changes in the work.
2) Use product specified if A/E does not issue a decision on use of a proposed substitution within time allocated.
3) The A/E's decision of approval or disapproval will be final.

1.5 Quality Assurance

A. The contractor represents that he has personally investigated the proposed substitution and determined that it is equal or superior in all respects to that specified.

B. The contractor represents that he will provide the same warranty for the substitution that he would for that specified.

C. The contractor certifies that the cost data presented is complete and includes all related costs under this Contract but excludes costs under separate contracts, and any additional A/E redesign costs, as well as waives all claims for additional costs related to the substitution which subsequently become apparent.

D. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

E. Bidders/Contractor is advised that any acceptable substitution that requires a change or modifications to other parts of the project shall be his responsibility including any additional cost required thereof. Any cost associated for other parts of the projects due to a substitution shall be the responsibility of the Contractor.

1.6 Procedures: Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2: PRODUCTS

2.1 Substitutions – Pre-Bid

A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than fourteen (14) working days prior to the date for receipt of bids.

1. Conditions: A/E will consider Supplier's / Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, A/E will return requests without action, except to record noncompliance with these requirements:

a. Request submitted through a general contractor that has picked up a complete set of bidding documents for the project. Substitutions by a sub-contractor, material supplier, manufacturer's representative, etc. not submitted through a general contractor will be returned without action.

b. Requested substitution is consistent with the Contract Documents and will produce indicated results.

c. Substitution request is fully documented as outlined under submittals and properly submitted on required form.

d. Requested substitution is compatible with other portions of the Work.

e. Requested substitution provides specified warranty.

B. Substitutions for Convenience: A/E will consider requests for substitution if received within fourteen (14) working days prior to the date for receipt of bids. Requests received after that time will be rejected.

1. Conditions: A/E will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, A/E will return requests without action, except to record noncompliance with these requirements:

a. Request submitted through a general contractor that has picked up a complete set of bidding documents for the project. Substitutions by a sub-contractor, material supplier, manufacturer's representative, etc. not submitted through a general contractor will be returned without action.

b. Requested substitution does not require extensive revisions to the Contract Documents.

c. Requested substitution is consistent with the Contract Documents and will produce indicated results.

d. Substitution request is fully documented as outlined under submittals and properly submitted on required form.

e. Requested substitution is compatible with other portions of the Work.

f. Requested substitution provides specified warranty.

2.2 Substitutions – After Contract Execution

A. In the interest of keeping the project on schedule, the A/E will not continuously and exhaustively review proposed substitutes for each specification section. The A/E will review **only one (1)** proposed substitution per product per specification section. If that proposed substitution is rejected for any reason, the contractor shall use the product specified.

B. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than fifteen (15) days prior to time required for preparation and review of related submittals.

1. A/E will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, A/E will return requests without any action, except to record noncompliance with these requirements.
   a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
   b. Substitution request is fully documented as outlined under submittals herein and properly submitted on required form.
   c. Requested substitution will not adversely affect Contractor's construction schedule.
   d. Requested substitution has received necessary approval of authorities having jurisdiction.
   e. Requested substitution is compatible with other portions of the Work.
   f. Requested substitution has been coordinated with other portions of the Work.
   g. Requested substitution provides specified warranty.
   h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

C. Substitutions for Convenience: A/E will consider requests for substitution.

1. Conditions: A/E will consider the Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, A/E will return requests without action, except to record noncompliance with these requirements.
   a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to A/E for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
   b. Requested substitution does not require extensive revisions to the Contract documents.
   c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
   d. Substitution request is fully documented as outlined under submittals and properly submitted on the required form.

e. Requested substitution will not adversely affect Contractor's construction schedule.

f. Requested substitution has received necessary approvals of authorities having jurisdiction.

g. Requested substitution is compatible with other portions of the Work.

h. Requested substitution has been coordinated with other portions of the Work.

i. Requested substitution provides specified warranty.

j. If the requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

* * *

CONTRACTOR / SUPPLIER SUBSTITUTION REQUEST FORM

(Section to be completed by Contractor / Supplier)

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph : _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Installer: _____ Address: _____ Phone: _____

History: ☐ New product ☐ 2-5 years old ☐ 5-10 yrs old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

_____

_____

☐ Point-by-point comparative data attached - **REQUIRED BY A/E FOR REVIEW OF THE REQUEST.**

Reason for substitution request: _____

_____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

_____

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

CONTRACTOR / SUPPLIER SUBSTITUTION REQUEST FORM
(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to the specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

Fax: _____

Email: _____

Attachments: _____

SECTION TO BE COMPLETED BY A/E:

A/E's REVIEW AND ACTION

☐ Substitution approved - Provided all Contract Documents requirements are met.
☐ Substitution approved as noted.
☐ Substitution rejected - Does not meet Contract Documents - Use specified materials.
☐ Substitution Request received too late – Not Approved. Received less than fourteen (14) working days prior to Bid Date. Insufficient time in accordance with R.S. 38:2295.
☐ Substitution rejected – Insufficient information submitted to make determination.
  ☐ Submit model or catalog numbers.
  ☐ Submit information following Specification format in enough detail to make comparison to product specified.

Signed by: Date:

Additional Comments: _____

SECTION 01730: OPERATING AND MAINTENANCE DATA

1.1 Related Documents: The general provisions of the Contract, including the Conditions of the Contract (General, Special, and other Conditions, Division 0) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 General:

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

B. Instruct Owner's personnel in the maintenance of products and in the operation of equipment and systems.

1.3 Quality Assurance: Preparation of data shall be done by personnel trained and experienced in maintenance of products and in the operation of equipment and systems.

1.4 Form of Submittals:

A. Prepare data in the form of an instructional manual for use by Owner's personnel.

B. Format:

1. Size: 8 1/2 inches x 11 inches.
2. Paper: White, for typed pages.
3. Text: Manufacturer's printed data, or neatly typewritten.
4. Drawings: Provide reinforced punched binder tab, bind in with text. Fold larger drawings to the size of the text pages.
5. Provide fly-leaf for each separate product, or each piece of operating equipment. Provide typed description of product; and major component parts of equipment. Provide indexed tabs.
6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List title of Project, identity of separate structure as applicable, identity of general subject matter covered in the manual.

C. Binders: Commercial quality three-ring binders with durable and cleanable plastic covers. When multiple binders are used, correlate the data into related consistent groupings.

1.5 Contents of Manual:

A. Neatly typewritten table of contents for each volume, arranged in a systematic order.

1. Contractor, name of responsible principal, address, and telephone number.
2. A list of each product required to be included, indexed to the content of the volume.

3. List, with each product, the name, address, and telephone number of subcontractor or installer, maintenance contractor, as appropriate. Identify the area of responsibility of each and identify the local source of supply for parts replacement.
4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.

B. Product Data: Include only those sheets which are pertinent to the specific product. Annotate each sheet to clearly identify the specific product or part installed and the data applicable to the installation. Delete references to inapplicable information.

C. Drawings: Supplement product data with drawings as necessary to clearly illustrate relations of component parts of equipment and systems, control and flow diagrams. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation. Do not use Project Record Documents as maintenance drawings.

D. Written text, as required to supplement product data for particular installation. Organize in a consistent format under separate headings for different procedures. Provide a logical sequence of instructions for each procedure.

E. Provide a copy of each warranty, bond, and service contract issued. Provide information sheet for Owner's personnel, giving proper procedures in the event of failure and instances which might affect the validity of warranties or bonds.

1.6 Manual for Materials and Finishes:

A. Content, for Architectural Products, Applied Materials, and Finishes:
1. Manufacturer's data, giving full information on products. Catalog number, size, composition. Color and texture designations. Information required for re-ordering special manufactured products.
2. Instructions for Care and Maintenance: Manufacturer's recommendation for types of cleaning agents and methods. Cautions against cleaning agents and methods which are detrimental to the product. Recommended schedule for cleaning and maintenance.

B. Provide complete information for products specified in the respective sections of Specifications.

1.7 Manual for Equipment and Systems:

A. Content, for Each Unit of Equipment and Systems (as appropriate):
1. Description of Unit and Component Parts: Function, normal operating characteristics, and limiting conditions. Performance curves, engineering data, and tests. Complete nomenclature and commercial number of all replaceable parts.

2. Operating Procedures: Start-up, break-in, routine, and normal operating instructions. Regulation, control, stopping, shut-down, and emergency instructions. Summer and winter operating instructions. Special operating instructions.
3. Maintenance Procedures: Routine operations. Guide to "trouble-shooting". Disassembly, repair, and reassembly. Alignment, adjusting, and checking.
4. Servicing and lubrication schedule. List of lubricants required.
5. Manufacturer's printed operating and maintenance instructions. Original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
6. As-installed control diagrams and description of sequence of operation by controls manufacturer.
7. Each contractor's coordination drawings and as-installed color coded piping diagrams.
8. Charts of valve tag numbers, with the location and function of each valve.
9. Other data as required under pertinent sections of Specifications.

B. Content, for Each Electric and Electronic System (as appropriate):
1. Operating characteristics, and limiting conditions. Performance curves, engineering data, and tests. Complete nomenclature and commercial number of replaceable parts.
2. Circuit directories of panelboards. Electrical service. Controls. Communications.
3. As-installed color coded wiring diagrams.
4. Operating Procedures: Routine and normal operating instructions. Sequences required. Special operating instructions.
5. Maintenance Procedures: Routine operations. Guide to "trouble-shooting". Disassembly, repair, and reassembly. Adjustment and checking.
6. Manufacturer's printed operating maintenance instructions.
7. Other data as required under pertinent sections of Specifications.

C. Prepare and include additional data when the need for each data becomes apparent during instruction of Owner's personnel.

D. Provide complete information for products specified in the respective section of Specifications.

1.8 Submittal Schedule:

A. Submit one (1) copy of preliminary draft of proposed format and outline of contents prior to start of work. A/E will review draft and return copy with comments.

B. Submit one (1) copy of completed data in final form 15 days prior to anticipated date of Substantial Completion. Copy will be returned with comments.

C. Submit three (3) hard copies and one (1) electronic copy on CD of approved data in final form at Contract Closeout.

1.9 Instruction of Owner's Personnel:

A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in the operation, adjustment, and maintenance of all products, equipment, and systems.

B. Operating and maintenance manual shall constitute the basis of instruction. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

* * *

DIVISION II

TECHNICAL SPECS

SECTION 201

"CLEARING AND GRUBBING"

PART 1. DESCRIPTION:

All work shall be in accordance with the requirements of Section 201 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2. MATERIAL:

NONE

PART 3. MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 201-01-00100 "CLEARING AND GRUBBING" paid per LUMP SUM.

* * *

DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 202

"REMOVING OR RELOCATING STRUCTURES AND OBSTRUCTIONS"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 202 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

None

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 202-01-00100 "REMOVAL OF STRUCTURES AND OBSTRUCTIONS" paid per LUMP SUM.

ITEM 202-01-00200 "REMOVAL OF EXISTING PUMP STATION" paid per LUMP SUM.

ITEM 202-02-06060 "REMOVAL OF CONCRETE CATCH BASINS AND INLETS" paid per EACH.

ITEM 202-02-06080 "REMOVAL OF COMBINATION CURB AND GUTTER" paid per LINEAR FOOT.

ITEM 202-02-32140 "REMOVAL OF PIPE (STORM DRAIN) (VARIOUS SIZES)" paid per LINEAR FOOT.

ITEM 202-02-32500 "REMOVAL OF PORTLAND CEMENT CONCRETE PAVEMENT (VARIABLE THICKNESS)" paid per SQUARE YARD.

* * *

DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 203

"EXCAVATION AND EMBANKMENT"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 203 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

This item consists of the excavation of any material necessary for construction or other miscellaneous excavation as described in the governing specifications. Select material from this item as approved by the project Engineer, shall be used for materials of this section. It shall be placed and spread to the grades as required. The Contractor shall remove all excavated material, which is unsuitable, from the site. There will be no direct payment for handling excavated material, select or unsuitable.

PART 2: MATERIALS:

Materials shall be in accordance with the requirements of Section 203 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended, and as follows:

A. Backfill:
   1. Nonpaved Areas: Backfill shall be usable excavated material acceptable to Engineer. Backfill shall be compacted to at least 90% of maximum density for the depth of the backfill.
   2. Paved Areas: Backfill shall be granular material conforming to Subsection 1003.07 or 1003.08 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended. Reference Section 723 for payment of granular material. Density shall be 97% of maximum dry density (ASTM D698A).

B. Fill Material: Fill material from off-site borrows shall consist primarily of medium plastic to highly plastic clays or silty clays (CL or CH material according to the Unified Soils Classification System). It should be free of wood, organic matter and other deleterious material. It should have a Plasticity index (PI) of at least 15 and a Liquid Limit of at least 35. The fill material shall be approved by A/E before use. All backfill shall be placed as a "semi-compacted" fill in accordance with Corps of Engineers Specifications (Manual LMVSP-GS-001,

Section 3).

C. Topsoil: For final grading of areas adjacent to structure, use existing. Provide topsoil from off-site borrows when on-site topsoil:

A. Is not sufficient to complete the work.
B. Does not meet the requirements set forth below, or
C. Is deemed unsuitable by A/E.

Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, trash or other material over 1-1/2 inches diameter. Topsoil shall be free from viable plants and plant parts. Topsoil shall also be free from debris, noxious weeds, toxic substances, or other materials harmful to plant growth. Topsoil shall have a minimum PI of 4, a maximum PI of 12, a pH of 5.5-8.0, a minimum organic content of 2%, and shall be capable of supporting adequate vegetation. Pump sand may not be used for topsoil under any circumstances.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 203-01-00100 "GENERAL EXCAVATION (NET SECTION)" paid per CUBIC YARD.

ITEM 203-03-00100 "EMBANKMENT (NET SECTION)" paid per CUBIC YARD.*

ITEM 203-08-00100 "GEOTEXTILE FABRIC" paid per SQUARE YARD.

ITEM 203-10-00100 "CLEAN/REGRADE EXISTING DITCH" paid per LINEAR FOOT.

*ITEM 203-03-00100 to be used as needed and determined in field for structural backfill behind reinforcing wall and sheet pile wall at suction and discharge basins.

* * *

DIVISION II

TECHNICAL SPECS

SECTION 204

"TEMPORARY EROSION CONTROL"

PART 1. DESCRIPTION:

The work required by this Section shall consist of constructing and maintaining temporary erosion control features that satisfy the terms and conditions of the Storm Water Pollution Prevention Plan (SWPPP) and the National Pollution Discharge Elimination System (NPDES) General Permit. The SWPPP shall be comprised of Section 204 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, and latest revisions, or as amended herein.

PART 2. GENERAL:

The Contractor, by signing this contract, certifies under penalty of law that he understands and will abide by the terms and conditions of the Storm Water Pollution Prevention Plan (SWPPP) and the National Pollution Discharge Elimination System (NPDES) General Permit that require the discharges from construction sites to be managed to prevent pollutants from entering waters of the United States in accordance with the Environmental Protection Agency's (EPA) regulations for storm water discharges with respect to 33 U.S.C. #1342 (Sections 402(p) and 405 of Public Law 100-4).`

Temporary erosion control will ensure economical, effective and continuous control of erosion and water pollution throughout the life of the contract. The Contractor shall prevent the transmission of soil particles and pollutants into streams, canals, lakes, reservoirs or other waterways. In addition, the Contractor shall note that work may be simultaneously in progress on adjacent sites of other components of the site. The Contractor shall be responsible for coordinating his SWPPP with the SWPPP for adjacent sites.

The Contractor will submit an erosion control plan to the Engineer before beginning clearing or earthwork operations. The plan shall indicate the items to be used and the coordination of this work with the scheduling of clearing and earthwork.

PART 3. MATERIAL:

The Contractor shall provide all necessary materials and equipment necessary to complete all work associated with this item.

PART 4. MEASUREMENT AND PAYMENT:

All costs associated with this item of work including design, labor, equipment or materials required by this section shall be made under:

ITEM 204-01-00100 "TEMPORARY EROSION CONTROL" paid per LUMP SUM.

* * *

DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 302

"CLASS II BASE COURSE"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 302 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Stone or recycled portland cement concrete in accordance with Section 1003.03.1 and 1003.03.2 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

Density requirements shall be a minimum of 95.0% maximum dry density (ASTM 1557A).

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 302-01-00100 "CLASS II BASE COURSE" paid per CUBIC YARD.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 402

"TRAFFIC MAINTENANCE SURFACING"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 402 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 402 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 402-01-00100 "TRAFFIC MAINTENANCE (AGGREGATE) (VEHICULAR MEASURE)" paid per CUBIC YARD.

* * *

DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 502

"ASPHALT CONCRETE MIXTURES"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 502 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 502 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 502-01-00100 "ASPHALTIC CONCRETE (WEARING COURSE) (2")" paid per TON.

ITEM 502-05-00001 "SAW CUTTING ASPHALTIC CONCRETE PAVEMENT" paid per INCH- LINEAR FOOT.

* * *

DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 509

"MILL ASPHALT PAVEMENT"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 509 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 509 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 509-01-00100 "COLD PLANING ASPHALT PAVEMENT" paid per SQUARE YARD.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 510

"ASPHALT CONCRETE PAVEMENT PATCHING, WIDENING AND JOINT REPAIR"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 510 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 510 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 510-01-00255 "PAVEMENT PATCHING (15" MINIMUM THICKNESS)" paid per SQUARE YARD.

* * *

DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 601

"PORTLAND CEMENT CONCRETE PAVEMENT"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 601 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

Pavement shall have a broom finish.

PART 2: MATERIALS:

Materials shall be in accordance with the requirements of Section 601 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended. Use Type B concrete. Use polyurethane sealant joint sealer. The joint sealers shall be in accordance with Section 1005.02 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

For high early strength concrete; materials shall be in accordance with Section 602.08 of the Louisiana Standard Specifications for Roads and Bridges, 2016 edition. Per this section, the concrete shall be Type B, D or E complying with Section 901. An approved set-accelerating admixture shall be added to achieve 4,000 PSI @ 3 days. This admixture must comply with Subsection 1011.02. Please see the Master Proportion Table for Portland Cement Concrete, Table 901-3 for the mix design specifications for Type B, D and E concrete.

PART 3: MEASUREMENT AND PAYMENT:

There will be no tolerance for thickness deficiencies. Delete references to payment adjustments. No adjustment of the unit price will be made for work not in full compliance with the specifications. All work must meet the requirements of 100% payment. Owner reserves the right to require the removal and replacement of pavement that does not meet requirements.

Payment for this work will be as noted.

ITEM 601-01-00100 "PORTLAND CEMENT CONCRETE PAVEMENT (8" THICK)" paid per SQUARE YARD.

ITEM 601-16-00100 "SAW CUTTING PORTLAND CEMENT CONCRETE PAVEMENT" paid per INCH-LINEAR FOOT.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 602

"PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 602 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

None

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 602-05-03160 "FULL DEPTH PATCHING OF JOINTED CONCRETE PAVEMENT (9" THICK)" paid per SQUARE YARD.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 701

"CULVERTS AND STORM DRAINS"

PART 1. DESCRIPTION:

All work shall be in accordance with the requirements of Section 701 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2. MATERIAL:

A. Reinforced Concrete Pipe shall conform to ASTM Designation C-76, Class III, pipe, Type 3 joint, as per Section 1016.02 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

B. Reinforced Concrete Pipe Arch in accordance with Section 1016.03 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended. Concrete pipe arch shall conform to ASTM C-506. All joints of pipe greater than 43-inch round and equivalent arch pipe shall be banded with metal straps on three sides in accordance with manufacturers' requirements.

C. Corrugated Metal Pipe 24-inch or larger diameter shall have 12-gauge thickness and 18-inch or smaller diameter shall have 14-gauge thickness. All corrugated metal pipe shall have Type 2 joints and be bituminous coated or polymer coated. If work is in Jefferson Parish, corrugated metal pipe shall be polymer coated unless otherwise noted. Binding shall be in accordance with ASTM A-885-88.

D. Filter Cloth, Joint Wrapping shall conform to requirements of Section 1019 of the Louisiana Standard Specifications noted in the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

E. Lumber shall conform to requirements of Section 1014 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

F. PVC Pipe (Plastic Yard Drain Pipe) in accordance with Section 1006 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

G. Concrete Joints - A pipe puller device shall be used to seat concrete pipe joints. Joints that are not seated a minimum of 75% of the depth of the joint will not be acceptable.

PART 3. MEASUREMENT AND PAYMENT:

Payment for this work will be as noted. Payment for each item listed below shall include all materials and work associated with the materials as listed in Part 2 above. Bedding material and granular material and backfill will be included in these items.

ITEM 701-03-01041 "STORM DRAIN PIPE (24" RCP)" paid per LINEAR FOOT.

ITEM 701-03-01061 "STORM DRAIN PIPE (30" RCP)" paid per LINEAR FOOT.

ITEM 701-03-01081 "STORM DRAIN PIPE (36" RCP)" paid per LINEAR FOOT.

ITEM 701-04-01040 "STORM DRAIN PIPE (24" RCPA)" paid per LINEAR FOOT.

ITEM 701-04-01060 "STORM DRAIN PIPE (30" RCPA)" paid per LINEAR FOOT.

ITEM 701-04-01080 "STORM DRAIN PIPE (36" RCPA)" paid per LINEAR FOOT.

ITEM 701-04-01120 "STORM DRAIN PIPE ARCH (48" EQUIV. RCPA)" paid per LINEAR FOOT.

ITEM 701-14-00100 "CLEANING EXISTING STORM DRAINAGE PIPE" paid per LINEAR FOOT.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 702

"MANHOLES, JUNCTION BOXES, CATCH BASINS AND END TREATMENTS"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 702 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 702 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

Bedding material shall be Stone, Sand/Stone, or Sand/Gravel, and be in accordance with the requirements of Section 726 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended. Compact all bedding material to 75% of relative density.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will include all excavation, 12-inch minimum bedding, backfill, and other incidentals required for the work.

Payment for this work will be as noted.

ITEM 702-03-00010A "CATCH BASIN" paid per EACH.

ITEM 702-03-00010B "CATCH BASIN (VERTICAL)" paid pear EACH.

ITEM 702-03-00010C "TEE INLET" paid per EACH.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 705

"FENCES"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 705 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 705 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 705-04-00100 "24' ROLLING CHAIN LINK GATE" paid per EACH.

ITEM 705-06-00100 "CHAIN LINK FENCE (6-FOOT HEIGHT)" paid per LINEAR FOOT.

ITEM 705-08-05040 "6-FOOT DOUBLE GATES FOR CHAIN LINK FENCE (6-FOOT HEIGHT)" paid per EACH.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 706

"CONCRETE WALKS, DRIVES & INCIDENTAL PAVING"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 706 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Materials shall be in accordance with the requirements of Section 706 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended. Use Class M concrete. Use polyurethane sealant joint sealers. The joint sealers shall be in accordance with Section 1005.02.2 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 706-03-03500 "INCIDENTAL CONCRETE PAVING (6" THICK)" paid per SQUARE YARD.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 707

"CURBS AND GUTTERS"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 707 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 707 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 707-01-00100 "CONCRETE CURB (BARRIER OR MOUNTABLE)" paid per LINEAR FOOT.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 711

"RIPRAP"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 711 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 711 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be noted.

ITEM 711-01-04020 "RIPRAP (55 LB., 24" THICK)" paid per SQUARE YARD.

ITEM 711-01-05000 "RIPRAP (130 LB., 24" THICK)" paid per SQUARE YARD.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 713

"TEMPORARY TRAFFIC CONTROL"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 713 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

This item includes but is not limited to providing all necessary signs and barricades shown in the plans and in accordance with the "Manual on Uniform Traffic Control Devices", as well as all signs, barricades, blinking lights, or other necessary traffic control devices required by Section 713 above, or other governing specifications of this project.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 713 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended, and other sections of these specifications.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 713-01-00100 "TEMPORARY SIGNS AND BARRICADES" paid per LUMP SUM.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 714

"SODDING"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 714 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 714 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 714-01-00100 "SLAB SODDING" paid per SQUARE YARD.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 720

"EROSION CONTROL SYSTEMS"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 720 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 720 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 720-01-01000 "EROSION CONTROL SYSTEM" paid per LUMP SUM.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 722

"FIELD LABORATORIES"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 722 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 722 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 722-01-00100 "PROJECT SITE LABORATORY (EQUIPPED)" paid per EACH.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 723

"GRANULAR MATERIAL"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 723 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 723 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 723-01-00100 "GRANULAR MATERIAL (NET SECTION)" paid per CUBIC YARD.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 727

"MOBILIZATION"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 727 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

None

PART 3: MEASUREMENT AND PAYMENT

Payment shall be in accordance with Table 727-1 in Section 727 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended. CN & CPCK railroad permits execution shall be included in this pay item.

Payment for this work will be as noted.

ITEM 727-01-00100 "MOBILIZATION AND DEMOBILIZATION" paid per LUMP SUM.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 728

"JACKED OR BORED PIPE"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 728 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Steel casing pipe for E80 railroad loading.

PART 3: MEASUREMENT AND PAYMENT

The work under this item will be paid in addition to payment for transmission pipe. Payment for this work shall include all excavation, bedding, materials, labor, equipment, backfill and incidentals to accomplish work as noted.

*ITEM 728-01-00001 "42" STEEL CASING (0.625" WALL THICKNESS) (JACK OR BORE) (CN RAILROAD CROSSING)" paid per LINEAR FOOT.

*ITEM 728-01-00002 "60" STEEL CASING (0.844" WALL THICKNESS) (JACK OR BORE) (CPKC RAILROAD CROSSING)" paid per LINEAR FOOT.

*Railroad permit shall be obtained by the contractor and inspection fees and any other expenses shall be paid by the contractor. The permit will be initiated by Engineer. The contractor will be responsible for performing the following tasks and any other associated work per railroad requirements:

- Sheetpile design parameters for jack and bore pit,
- Horizontal directional drill (HDD) pressures,
- Settlement monitoring plan,
- General construction procedures and recommendations, and
- Insurance payment.

See attached Appendix "A" for CN Railroad Crossing Requirements.
See attached Appendix "B" for CPKC Railroad Crossing Requirements.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 729

"PERMANENT SIGNS"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 729 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 729 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 729-19-00100 "DEAD END ROAD INSTALLATION" paid per EACH.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 731

"RAISED PAVEMENT MARKERS"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 731 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

Work consists of furnishing and placing raised pavement markers at the locations shown on the plans or as directed, and in conformance with MUTCD, Section 731 as above, plan details and these specifications.

PART 2: MATERIALS:

A. Markers shall conform to Section 731 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended. The same product shall be used throughout the project. Markers shall be the specified class, type, color, size and shape.

B. Adhesive: Adhesive for placing raised pavement markers shall conform to Section 1017 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended. See Section 1015 for bituminous adhesive with the following characteristics:
Specific gravity 1.80
Weight/Cubic Foot. . . . . 50 kg.
Softening point. . . . . 105C (+/- 5)
Pouring temperature. . . . . 210C (+/- 10)
Bitumen content. . . . . minimum 25%
. . . . . maximum 30%
Filler . . . . . 80% passing #200 sieve

C. Manufacturer's sample and specifications must be approved by Department of Public Works Traffic Engineer prior to installation. A one-year warranty shall be required. Raised pavement markers which become loose or damaged must be replaced for one year after installation.

D. Application of markers will not be permitted when there is moisture on the surface. Surfaces on which markers are to be applied shall be cleaned of all materials that would reduce the bond of adhesive. Surfaces shall be cleaned by blast cleaning or other approved methods; however, blast cleaning equipment used on asphaltic surfaces must be provided with positive cutoff controls, and cleaning

operations shall be performed by approved cleaning methods that satisfactorily clean the surface without damaging pavement. Surfaces shall be maintained in a clean condition until placement of markers.

E. Surfaces on which markers are to be placed shall be blown dry immediately prior to marker placement. Markers shall be applied to surfaces with adhesive in accordance with the manufacturer's recommendations. Adhesive bed area shall be equal to the bottom area of marker, and adhesive shall be applied in sufficient quantity to cause excess adhesive to be forced out around the perimeter of the marker. Voids in markers with an open grid pattern on bottom shall be filled with adhesive during placement. Temperature of adhesive shall be maintained as required by the manufacturer.

F. If a standard set adhesive is used, application of markers will not be permitted at ambient temperatures of less than 50 degrees F. If a rapid set adhesive is used, application of markers will be permitted at ambient temperatures between 35 degrees F and 50 degrees F, provided adhesive is adequately heated to obtain proper viscosity for mixing and application, and provided adhesive is identified as a rapid set type on container labels and Certificates of Delivery.

G. Markers shall be placed prior to permanent striping.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 731-02-00100 "REFLECTORIZED RAISED PAVEMENT MARKERS" paid per EACH.

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DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 732

"PLASTIC PAVEMENT MARKINGS"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 732 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

Work consists of furnishing and placing reflective pavement markings of hot applied thermoplastic or preformed cold applied plastic at the locations shown on the plans or as directed, and in conformance with the "Manual on Uniform Traffic Control Devices", latest Edition, as amended and Section 732 as above, plan details and these specifications.

PART 2: MATERIALS:

A. Thermoplastic marking material and/or preformed plastic marking material and construction requirements shall conform to Section 732 as in Part 1 above.

B. Thermoplastic markings: Thermoplastic marking material shall be a plastic compound reflectorized by internal and external application of glass beads, all conforming to Sub-Section 1015.10 and 1015.13 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended. Width, thickness and color of markings shall be as specified. Thermoplastic material shall be delivered in containers of sufficient strength to permit normal handling during shipment and transportation without loss of material. Approved heat-degradable containers that can be placed in heating kettles along with the plastic material will be permitted. Each container shall be clearly marked to indicate color of material, process batch number, name of manufacturer and date of manufacture. Glass beads used in drop-on application to molten plastic shall be shipped in bags of multi-ply paper or burlap with a polyethylene liner, strong enough to permit handling without damage, and having a capacity of 50 pounds of beads. Bags shall be sufficiently water-resistant so that beads will not become wet or caked in transit.

C. Equipment for Thermoplastic Markings: Materials shall be applied to pavement by either spray or extrusion methods. Equipment shall provide continuous mixing and agitation of material. Conveying parts

of equipment between main material reservoir and discharge mechanism shall prevent accumulation and clogging. Parts of equipment which come in contact with the material shall be easily accessible for cleaning and maintaining. Mixing and conveying parts shall maintain material at the plastic temperature. Equipment shall be capable of producing continuous uniformity in dimensions of stripes. Equipment shall produce varying widths of traffic markings. Glass beads shall be applied to the surface of completed stripes by an automatic bead dispenser attached to the striping machine in such manner that beads are dispensed almost simultaneously at a controlled rate of flow on installed lines. Glass beads shall be equipped with an automatic cut-off control synchronized with cut-off of thermoplastic material. Kettles to hold a minimum of 1,000 pounds of material shall be provided for melting and heating thermoplastic material. Kettles must be equipped with automatic thermoplastic control devices so that heating can be done by controlled heat transfer liquid rather than direct flame, to provide positive temperature control and prevent overheating of material. Applicators and kettles must be equipped and arranged to comply with requirements of the National Board of Fire Underwriters. Applicators shall be maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc. Applicator equipment shall consist of a motorized mobil unit capable of installing traffic stripes either left or right of application unit so that only one lane of traffic will be occupied during installation.

D. In the extrusion method, one side of shaping die shall be the pavement and other sides shall be formed by suitable equipment for heating and controlling flow of material. Extrusion applicators shall produce sharply defined lines and provide means for cleanly cutting off square stripe ends and applying broken lines. Use of pans, aprons, or similar appliances will not be permitted.

E. Weather limitations: Application of markings will not be permitted when there is moisture on the pavement surface nor when the surface temperature is below 50 degrees F.

F. Cleaning of Surfaces: Surfaces on which markings are to be applied shall be cleaned of all materials that would reduce adhesion of plastic marking compound to pavement. Cleaning shall be done by approved methods and surfaces shall be kept clean until placement of markings.

G. Application of Markings: Material shall be installed in specified widths from 4 to 24 inches. Finish lines shall have well defined edges and be free of waviness. Measurements shall be taken as an average throughout any 36-inch sections of line. Longitudinal lines shall be offset approximately 2 inches from construction joints of portland cement concrete pavement.

H. Thermoplastic markings: Thickness of material on pavement shall be not less than 90 mils for lane lines, edge lines, black contrast and gore

markings and not less than 125 mils for crosswalks, stop lines, words and symbol markings. For thermoplastic applied on portland cement concrete pavement, the Contractor shall apply a binder-sealer prior to thermoplastic installation. The binder-sealer shall be that product recommended by the thermoplastic material manufacturer. On other pavement surfaces, if recommended by the material manufacturer, a binder-sealer material shall be applied to the road surface prior to thermoplastic installation. Thermoplastic material shall be installed in a melted state at the temperature recommended by the manufacturer, but not less than 375 degrees F nor more than 450 degrees F. Material shall not scorch or discolor if kept at this temperature for 4 hours.

PART 3: MEASUREMENT AND PAYMENT:

Plastic Pavement Striping: Each category of plastic striping will be measured by the linear foot of roadway striped, complete in place.

Legends and Symbols shall be measured per each complete in place.

Payment for this work will be as noted.

ITEM 732-01-01000 "PLASTIC PAVEMENT STRIPING (4" WIDTH) (THERMOPLASTIC 90 MIL)" paid per LINEAR FOOT.

ITEM 732-01-01020 "PLASTIC PAVEMENT STRIPING (6" WIDTH) (THERMOPLASTIC 90 MIL)" paid per LINEAR FOOT.

ITEM 732-01-01040 "PLASTIC PAVEMENT STRIPING (8" WIDTH) (THERMOPLASTIC 90 MIL)" paid per LINEAR FOOT.

ITEM 732-03-02000 "PLASTIC PAVEMENT STRIPING (BROKEN LINE) (4" WIDTH) (THERMOPLASTIC 90 MIL)" paid per MILE.

ITEM 732-04-01080 "PLASTIC PAVEMENT LEGENDS AND SYMBOLS (ARROW-TURN)" paid per EACH.

* * *

DIVISION II

TECHNICAL SPECS

SECTION 739

"HYDRO-SEEDING"

PART 1. DESCRIPTION:

All work shall be in accordance with the requirements of Section 739 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2. MATERIAL:

Material shall be in accordance with the requirements of Section 739 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3. MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 739-01-00100 "HYDRO-SEEDING" paid per ACRE.

* * *

DIVISION II

TECHNICAL SPECS

SECTION 740

"CONSTRUCTION LAYOUT"

PART 1. DESCRIPTION:

All work shall be in accordance with the requirements of Section 740 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2. MATERIAL:

NONE

PART 3. MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 740-01-00100 "CONSTRUCTION LAYOUT" paid per LUMP SUM.

* * *

DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 802

"STRUCTURAL EXCAVATION, BACKFILL AND EARTH RETAINING SYSTEMS"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 802 and 807 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

It will include furnishing and installing sheet piles, and any incidentals necessary to accomplish this item.

Sheet piles shall be as shown on the plans.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 802 and 807 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3: MEASUREMENT AND PAYMENT:

No measurement or Direct Payment will be made for any sheet pile tie back systems, structural metals, or other incidentals to the work. Also, no direct payment will be made for any temporary bracing required for installation of sheeting or tie back system. The cost for these items shall be included in the price bid for the sheet piles. Payment for sheet piles and related work will be made at the contract unit price per square foot under:

ITEM 802-02-00100 "PERMANENT SHEETING (STEEL)" paid per SQUARE FOOT.

ITEM 802-03-00100 "TEMPORARY SHEETING (STEEL)" paid per SQUARE FOOT.

* * *

DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 804

"PILES"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 804 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

The Contractor shall furnish and drive the necessary test piles at location designated by the Engineer. He shall also furnish and install the necessary uplift piles at the selected test pile(s) together with beams and accessories as required to resist a reaction equal to twice the design load specified.

Test loading shall not begin until 14 days after driving. Pile(s) to be tested shall be selected by Engineer.

The Contractor shall load the test pile to the yield point of the soil in accordance with the requirements of the local Building Code. Apply the load by means of a hydraulic jack acting directly on the head of the pile. All materials required for testing shall be furnished and installed by the Contractor. The testing laboratory shall furnish and install the hydraulic jack and perform the actual load testing.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 804 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted.

ITEM 804-01-00200 "PRECAST CONCRETE PILES (14")" paid per LINEAR FOOT.

ITEM 804-05-00200 "PRECAST CONCRETE TEST PILES (14")" paid per EACH.

ITEM 804-09-00200 "STATIC LOAD TEST (PRECAST CONCRETE PILES) (14")" paid per EACH.

* * *

DIVISION II

TECHNICAL SPECIFICATIONS

SECTION 805

"STRUCTURAL CONCRETE"

PART 1: DESCRIPTION:

All work shall be in accordance with the requirements of Section 805 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

PART 2: MATERIALS:

Material shall be in accordance with the requirements of Section 805 of the Louisiana Standard Specifications for Roads and Bridges, 2016 Edition, as amended.

Provide a Class 1, ordinary surface finish.

PART 3: MEASUREMENT AND PAYMENT:

Payment for this work will be as noted. NOTE: All steel reinforcement shall be included in the cost of concrete pay item.

ITEM 805-01-00100 "CLASS A1 REINFORCED CONCRETE (PUMP STATION SLABS & WALLS)" paid per CUBIC YARD.

ITEM 805-01-00300 "CLASS A1 CONCRETE (BENT CAP)" paid per CUBIC YARD.

ITEM 805-01-01000 "CLASS A1 CONCRETE (HEADWALLS)" paid per CUBIC YARD.

ITEM 805-14-00100 "REINFORCED CONCRETE BOX CULVERTS (4' X 4')" paid per LINEAR FOOT.

ITEM 805-14-00200 "REINFORCED CONCRETE BOX CULVERTS (5' X 4')" paid per LINEAR FOOT.

ITEM 805-14-00300 "REINFORCED CONCRETE BOX CULVERTS (10' X 7')" paid per LINEAR FOOT.

* * *

TECHNICAL SPECIFICATIONS

SECTION NS-01

48" DIA. STEEL DISCHARGE PIPE

1.01 DESCRIPTION

This work consists of furnishing and installing the required 48" diameter x 0.50" wall thickness steel discharge pipes conforming to ASTM A-134 Standards, for single straight butt, electric fusion welded pipe as shown on the drawings. Spiral-welded pipe shall NOT be accepted.

1.02 GENERAL

Shop and field welding shall conform to the Standard Specifications of the American Welding Society (AWS), as supplemented by the specifications listed herein. Unless otherwise authorized or specified, welding of structural steel shall be by an electric arch welding process, using a method which excludes the atmosphere from the molten metal.

A. Qualifications of Welders - Welders shall be suitably qualified for the particular type of work to be done. The CONTRACTOR shall certify by name to the ENGINEER the welders and welding operations so qualified, including the date of qualification, code, and procedures under which qualified. Prior qualification may be accepted provided the welder has performed satisfactory work under to code for which qualified within the preceding three months.

B. Workmanship - The CONTRACTOR shall utilize welding procedures compatible with the type of material being worked on, and shall exercise caution to minimize residual stresses and distortions caused by excessive heat. Approval of the CONTRACTOR's welding procedures will not relieve the CONTRACTOR of the responsibility for producing a finished structure meeting all requirements of these specifications.

C. Repairs - Defective weld shall be removed by air carbonate or oxygen gouging to sound meta. The surfaces shall be rewelded in compliance with Article 6.6 of AWS D1.1. Welds that have been repaired shall be re-tested by the same methods used in the original inspection. All costs of repairs and re-testing shall be borne by the CONTRACTOR, except for repair of members cut to remove test coupons which were found to contain acceptable welds.

D. Pipe Welding -

i. All shop or field pipe welds shall be single vee external butt. Line-up clamps shall be used by Contractor to align and position pipe ends to minimize distortion and for dimensional control.

ii. All welders used upon the work of this Contract shall have been tested under the American Welding Society "Standard Qualification Procedure". The Contractor shall certify that such tests were performed while the welder was in his employ.

iii. All welds for use on this portion of the contract shall be composed of multiple passes of "stringer" beads. Stringer beads are herewith defined as a weld bead quickly deposited in a straight line, without any "weave" or rod tip pattern, and without any large puddle. It shall be the equivalent of a 1/4" fillet weld deposited in one pass.

iv. Welding rods used shall be 1/8" and 5/32" DIAMETER, "Fleetweld #5" conforming to the A.W.S. Class E-6010, or as approved equal.

v. Before a new pass of weld is laid upon previously deposited weld, the older weld shall be thoroughly cleaned of slag.

vi. Particular attention shall be given to the edges of the older weld. After the deposition of each rod, the weld shall be peened using an air powered chipping gun with appropriate tool bit. Thus the weld is progressively stress relieved.

1.03 PROTECTIVE COATINGS

A. All interior and exterior surfaces of the discharge pipeline shall receive a two coat epoxy-polyamide system, applied after sand blasting metal surfaces to a "near-white" pre-treatment.

B. All materials specified herein are manufactured by Tnemec Co., Inc., North Kansas City, Missouri. These products are specified to establish standards of quality and are approved for use on this project.

Surface Prep.: SSPC-SP10	Dry Film-Mils
Near-White Blast Cleaning	
1st Coat: Epoxy-Polyamide Primer	4.0 - 6.0
2nd Coat: Epoxy-Polyamide	4.0 - 6.0
3rd Coat: Epoxy-Polyamide	4.0-6.0
Total system =	12.0 -18.0

C. Contractor shall be responsible for preparation of surfaces, application, protection and drying of paint coatings, and for supplying the appropriate tools, tackle, scaffolding, labor and materials necessary to complete the painting work. All painting shall be done strictly in accordance with the paint manufacturer's instructions and shall be performed in a manner satisfactory to the Engineer. Painting shall be done at such times as the Engineer and the Contractor may agree upon in order that clean, dust-free and neat work be obtained. The Contractor shall use one paint manufacturer throughout unless otherwise approved by the Engineer/Owner.

D. All machined surfaces and bolting contact surfaces shall be suitably protected.

1.04 MEASUREMENT

Measurement for the 48" diameter x 0.50" wall thickness welded steel discharge pipe shall be done on a per EACH basis.

1.05 PAYMENT

Payment for the 48" diameter x 0.50" wall thickness welded steel discharge pipe will be made under:

ITEM	DESCRIPTION	UNIT
NS-01	48" DIAMETER WELDED STEEL DISCHARGE PIPE	EACH

****END OF SECTION****

TECHNICAL SPECIFICATIONS

SECTION NS-02

48" DIA. STEEL DISCHARGE PIPE BENDS

1.01 DESCRIPTION

This work consists of furnishing and installing the required 48" diameter x 0.50" wall thickness steel discharge pipe bends as shown on the plans or specified herein.

1.02 MATERIALS

The 48" diameter nominal pipe size and bends shall be long radius elbow butt welding fittings conforming to ANSI B16.9 and B16.28, and shall have a 0.50" wall thickness.

1.03 PROTECTIVE COATINGS

Protective coatings for the discharge pipe bends shall follow the PROTECTIVE COATINGS section for the 48" Dia. Welded steel discharge pipe.

1.04 INSTALLATION

All requirements for pipe welding shall be adhered to when installing welded steel discharge pipe bends. Prior to fabrication shop drawings must be sent to the Engineer for approval. The Contractor shall not transport pipe and fittings to the site without prior acceptance from the Engineer.

1.05 MEASUREMENT

Measurement for the 48" diameter x 0.50" wall thickness steel discharge pipe bends and fittings will be done on an EACH basis.

1.06 PAYMENT

Payment for the 48" diameter x 0.50" wall thickness welded steel discharge pipe bends will be made under:

ITEM	DESCRIPTION	UNIT
NS-02	48" DIAMETER STEEL DISCHARGE PIPE – WELDED BEND AT OUTFALL	EACH

****END OF SECTION****

TECHNICAL SPECIFICATIONS
SECTION NS-03
VERTICAL PROPELLER PUMPS

PART 1: GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install, place in operation and field test three (3), 60,000 gpm vertical propeller pumps, motors and gear reducers.

B. These Specifications are intended to give a general description of what is required, but do not cover all details which will vary in accordance with the requirements of the equipment application. It is, however, intended to cover the furnishing, the shop testing, the delivery and complete installation and field testing, of all materials, equipment and all appurtenances for the complete pumping units as herein specified, whether specifically mentioned in these Specifications or not.

1.02 RELATED WORK

A. Yard piping, valves and appurtenances are included are in a separate division.

B. Concrete work including bases for pumps and pump motors and installation of anchor bolts.

C. Section NS-03(A) Electrical Motors, 3-Phase Horizontal Induction Type.

D. Section NS-03(B) Gear Reducers.

E. Painting,

F. Mechanical piping, valves, pipe hangers and supports

G. Electrical work and motor specifications are included in this section.

1.03 DESCRIPTION OF SYSTEMS

A. Three (3) pumping units are required under this Contract, each of which shall be driven by a squirrel cage induction motor attached to a right angle gear. as specified in this Section. The pumping units shall be located and arranged as shown on the drawings.

B. Each pumping unit will take suction from the clear well with an arrangement and water level variation as shown on the Drawings.

C. All working parts of the pumps and motors such as bearings, wearing rings, shaft, sleeves, etc., shall be standard dimensions built to limit gauges or formed to templates, such that parts will be interchangeable between like units and such that the Owner may, at any time in the future, obtain replacement and repair parts for those furnished in the original machines. All parts shall be properly stamped for identification and location in the machines as shown on the Assembly Drawings in the Instruction books furnished.

1.04 QUALIFICATIONS

A. To assure unity of responsibility, the pumps and motors shall be coordinated and furnished by the pump manufacturer. The Contractor shall assume full responsibility for the satisfactory installation and operation of the entire pumping systems including pumps, motors, and controls as specified. The pump manufacturer shall be ISO 9001-2015 and 14001-2015 certified.

B. The equipment covered by these Specifications are intended to be standard units of proven ability as manufactured by a competent organization having long experience in the production of such equipment. A single manufacturer shall furnish units specified herein. The pumps furnished shall be designed, constructed and installed in accordance with the best practice and methods, and shall operate satisfactorily when installed. Pumps shall be manufactured in accordance with the Hydraulic Institute Standards, except where otherwise specified herein.

C. All equipment furnished under this Specification shall be new and unused and shall be the standard product of manufacturers having a successful record of manufacturing and servicing the equipment and systems specified herein for a minimum of five (5) years.

1.05 SUBMITTALS

A. Copies of all materials required to establish compliance with the specifications shall be submitted. Submittals shall include at least the following:

1. Certified shop and erection drawings showing all-important details of construction, dimensions and anchor bolt locations.

2. Descriptive literature, bulletins, and/or catalogs of the equipment.

3. Data on the characteristics and performance of each pump shall be provided. Data shall include guaranteed performance curves, based on actual shop tests of similar units, which show that they meet the specified requirements for head, capacity, efficiency, NPSHR, and horsepower. Curves shall be submitted on 8-1/2-inch by I I-inch sheets; at as large a scale as is practical. Curves shall be plotted from no flow at shut off head to pump capacity at minimum specified total head. Catalog sheets showing a family of curves will not be acceptable. Curves shall be plotted for both minimum and maximum speed. The minimum head system curve shall also be plotted on the submittal.

4. The total weight of the equipment including the weight of the single largest item.

5. A complete total bill of materials of all equipment.

6. A list of the manufacturer's recommended spare parts to be supplied in addition to those specified in paragraph 1.07, with the manufacturer's current price for each item. Include gaskets, packing, etc., on the list. List bearings by the bearing manufacturer's numbers only.

7. Complete motor data.

8. Copies of all factory test results, as specified in PART 2 - PRODUCTS of this Section of the Specifications.

B. Design Data

1. Complete motor performance data shall be furnished.

C. Test Reports

1. A schedule of the date of shop testing and delivery of the equipment to the job site.

2. Description of pump factory test procedures and equipment.

3. Copies of all inspection reports, as specified in Part 3 of this Section.

D. Operation and Maintenance Data

Complete operating and maintenance instructions shall be furnished for all equipment included under these specifications as provided in Section 01730 The maintenance instructions shall include troubleshooting data and full preventative maintenance schedules, and complete spare parts lists with ordering information.

E. In the event that it is impossible to conform to certain details of the specifications due to different manufacturing techniques, describe completely all non-conforming aspects.

1.06 OPERATING INSTRUCTIONS

A. Operating and maintenance manuals shall be furnished. The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, etc. that are required to instruct operation and maintenance personnel unfamiliar with such equipment.

B. A factory representative of all major component manufacturers, who has complete knowledge of proper operation and maintenance, shall be provided for two (2) days to

instruct representatives of the Owner and the Engineer on proper operation and maintenance. With the Owner's permission, this work may be conducted in conjunction with the inspection of the installation and test run as provided under PART 3. If there are difficulties in operation of the equipment due to the manufacturer's design or fabrication, additional service shall be provided at no cost to the Owner.

1.07 TOOLS AND SPARE PARTS

A. One (1) set of all special tools required for normal operation and maintenance shall be provided. All such tools shall be furnished in a suitable steel tool chest complete with lock and duplicate keys.

B. The pump manufacturer shall furnish the spare parts for each component of the pumping systems listed in the respective paragraphs of PART 2 - PRODUCTS paragraph 2.02 (D). The manufacturer shall furnish a complete list of recommended spare parts necessary for the first five- (5) years of operation of the pumping system.

C. Spare Parts shall be properly bound and labeled for easy identification without opening the packaging and suitably protected for long term storage.

1.08 PRODUCT HANDLING

A. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.

B. All equipment and parts must be properly protected against any damage during a prolonged storage period at the site.

C. Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Engineer.

D. Finished surfaces of all exposed pump openings shall be protected by wooden blanks strongly built and securely bolted thereto.

E. Finished iron or steel surfaces not painted shall be properly protected to prevent rust and corrosion.

F. After hydrostatic or other tests, all entrapped water shall be drained prior to shipment, and proper care shall be taken to protect parts from the entrance of water during shipment, storage and handling.

G. Each box or package shall be properly marked to show its net weight in addition to its contents.

1.09 WARRANTY

A. All equipment supplied under this section shall be warranted for a period of one (1) year by the Contractor and the pump manufacturer. Warranty period shall commence on the date of Owner acceptance, as outlined in Division 1.

B. The equipment shall be warranted to be free from defects in workmanship, design and materials. If any part of the equipment should fail during the warranty period, it shall be replaced in the machine(s) and the unit(s) restored to service at no expense to the Owner.

C. The manufacturer's warranty period shall run concurrently with the Contractor's warranty period. No exception to this provision shall be allowed.

PART 2 -PRODUCTS

2.01 GENERAL

A. The pumping units required under this section shall be complete including suction barrels and pumps with proper alignment and balancing of the individual units. All parts shall be so designed and proportioned as to have liberal strength, stability, and stiffness and to be especially adapted for the service to be performed. Ample room for inspection, repairs and adjustment shall be provided.

B. All necessary anchor bolts, nuts and washers shall be furnished and installed by the Contractor. Anchor bolts, nuts and washers shall be 316 stainless steel. A molybdenum disulfide anti-seize agent shall be supplied for use with all stainless-steel bolts.

C. Stainless steel nameplates giving the name of the manufacturer, the rated capacity, head, speed and all other pertinent data shall be attached to each pump.

D. Each pumping unit and its driving equipment shall be designed and constructed to withstand the maximum turbine run-away speed of the unit due to back flow through the pump with the maximum TDH specified available at the pump discharge flange. The maximum reverse runaway speed shall not exceed 120 percent of the design pump maximum operating speed. A statement of compliance with this requirement must be furnished with the Shop Drawings submittal.

2.02 PUMPS

A. General

1. The pumps shall be of the vertical propeller axial flow type.

2. The pumps shall be built to standard dimensions such that parts will be interchangeable between like units and the same manufacturer shall supply all units.

3. The pumps shall be manufactured by
   A. MWI or approved equal.

B. Performance Requirements:

1. When operating at the maximum output speed of the motor, each pump shall have a characteristic performance curve, which meets all the minimum conditions listed in Table 11214-lA. The pumps and drive motors shall be capable of operating satisfactorily under the full range of conditions as defined by Table 11214-lA

2. Each pump shall be capable of continuous adjustable speed operation over the speed range from 100 percent to 90 percent of pump design speed. There shall be no significant change in vibration and noise level over the entire listed range of speed and flow of the pumping system.

3. Maximum motor speeds shall not exceed that listed in Table 11214-A to satisfy the specified hydraulic duty requirements. The pump design speed shall be the maximum output speed of the motor furnished, when operating at the pump's design capacity and head at 60 Hertz on utility power (full motor speed). All pumps shall have identical propeller sizes.

4. With the pumping units operating at full motor speed, the maximum brake horsepower required by the pumps shall not exceed the maximum horsepower listed in Table 11214-lA. If the pumping units require more than the maximum horsepower listed in Table 11214-lA. at the motor output shaft at any full motor speed operation point between primary and secondary discharge head, they will be evaluated further by the Engineer and Owner.

5. Certified Factory Tests:

   a. Factory testing in accordance with the standards of the Hydraulic Institute shall be required for all pumps. All testing required determining acceptance of individual pumps should be witnessed by a representative of the Engineer and/or Owner. +he Contractor shall include in his price a sum sufficient to reimburse the Engineer and/or Owner and or for all reasonable expenses, which the Engineer and/or Owner will incur in order to witness the test. Expenses include airfare, automobile expenses, lodging, meals, and parking, tolls, or Car Rental costs and the Engineer's and/or Owner's time. The sum shall include repeat visits, if required, and shall be deducted from payments due the Contractor by the Owner.

   b. Certified pump performance curves shall be submitted, including head, capacity, brake horsepower, and pump efficiency for each pump supplied.

c. All electronic transducers, meters, gauges, and other test instruments shall be calibrated in accordance with the frequency listed in the Hydraulic Institute Standards. Copies of calibration data shall be provided. Differential pressure type flow meters, such as Venturi shall have been calibrated within 5 years. Mechanical variation of the meter throat diameter will be accepted as verification of calibration validity.

d. All pumps shall be tested at full speed and complete staging through the specified range of flow, and head/capacity/efficiency curves plotted. During each test, the pump shall be run at each head condition for sufficient time to accurately determine discharge, head, power input, and efficiency. Pump efficiency as defined herein will include all head losses from the bowl assembly entrance, bowl assembly, pump column, and discharge head. The test shall take place on the pump manufacturing owned facility located in the continental US.

e. If any pump tested fails to meet any specification requirement it will be modified until it meets all specification requirements. If any pump tested fails to meet the efficiency requirements at any of the listed flow or head conditions listed in Table 11214-lA. and all reasonable attempts to correct the inefficiency and unsuccessful, the pump(s) shall be replaced with unit(s), which meet the specified requirements.

C. Pump Construction

1. The connection of the output shaft of the gear to the head shaft shall be made with a flanged adjustable coupling. The flanged adjustable coupling shall make propeller adjustments. This is not required if the pumps use a hollow shaft motor.

2. The pump shall be furnished with a suitable, integral fabricated ASTM A-36 steel- mounting ring of adequate design with registered fit to match the mounting dimensions of the drive motor.

3. The discharge head shall be a segmented, fabricated steel construction of ASTM A-36 steel, 1/2-inch minimum thickness and of the below base type and shall be not less than 42" with a 150 lb. flat faced flanged discharge connection conforming, dimensionally, to ANSI/AWWA A21.15/Cll5. The packing gland access openings shall be of adequate size to allow for packing adjustment and replacement and shall be protected by expanded metal screens constructed of 316 stainless steel.

4. Incorporated in the fabrication of the discharge head shall be a suitable pump support base not less than 2 inch in thickness of standard ANSI B16 B2 flanged dimensions to support both the pump and the motor. The flange bolting shall be in accordance with the requirements of ANSI B16 B2.

5. The discharge head will be fitted with a bronze tension nut assembly.

6. The pump head shaft shall be constructed of ASTM A-276 416 or 17-4 P.H. stainless steel alloy.

7. The pump column shall be constructed of **ASTM** A-36 steel, not less than 42" inches in diameter and not less than Schedule 20, flanged at each end. The column shall mate with the pump bowl assembly and the discharge head with fits to assure correct alignment. Maximum column length segments shall be 10 feet.

8. The pump enclosed oil lubricated line shaft shall be constructed of ASTM A-276 416 Stainless Steel Alloy and its diameter determined as described in 2.02 C.5 above but in no case shall it be less than the minimum diameter listed in Table 11214-lA. The enclosing tube connector bearings shall be of an ASTM B505 C93200 bronze construction. The enclosing tube shall be schedule 80, 316SS in sections not more than 5 feet in length.

9. The line shaft couplings shall be of the threaded type constructed of Stainless Steel and of such design that no threaded parts, which could cause "galling", are interconnected. Alternate constructions must be of a design acceptable to the Engineer.

10. The pump propeller shall be a maximum of 4-blades and of the axial flow type constructed of **AISI 316SS**. The impellers shall be attached to the shaft by means of a 316 Stainless Steel Fastener.

11. The pump bowls shall be constructed of **ASTM** A242 low alloy steel having a minimum tensile strength of 70,000 psi. The pump bowls shall be of sufficient thickness to withstand stresses and strains at full operating pressure. The bowls shall be designed and manufactured with open and smooth water passages to assure efficient, reliable operation.

12. The suction case bearings and all intermediate bowl bearings shall be constructed of ASTM B-584 alloy 932 or 836 bronze.

13. Pump Coating: All portions of the column and pump discharge head not exposed to view, except for the interior of the bowls, shall have an interior and an exterior coating of high build modified epoxy of 6 to 8 mils dry thickness, compatible with the pump service. Surface preparation shall be in accordance with the coating manufacturer's recommendations.

D. Motor:

1. The pump shall be supplied with a motor HP as listed in the data tables. The motors shall also be provided per the requirements of Section - Vertical Propeller Pump Motors.

Table 11214-IA
PUMPING UNIT DESIGN REQUIREMENTS
DRAINAGE PUMP

Item	Design Conditions
Maximum Motor Speed (rpm)	1200
Motor to be Supplied (hp)	250Hp
Rated pumping Temperature	76°F
Number of Pumps	3
Column and Discharge Size (inches) (minimum)	48"
Minimum Pump Shaft Diameter (inches)	3.75"
Minimum Line Shaft Diameter (inches)	3.75"
Design Capacity (gpm)	60,000
Minimum TDH at Design Capacity (feet)	10
Minimum Bowl Efficiency at Design Capacity (%)	77.0%

PART 3: EXECUTION

3.01 INSTALLATION

A. Install the pumps per manufacturer's installation instructions.

B. Install motor baseplate in accordance with the pump and motor manufacturer's recommendations.

C. Visual and Mechanical Inspection

1. Inspect for physical damage.
2. Compare equipment nameplate information with single line diagram and report any discrepancies.
3. Inspect for proper mounting, grounding, connection, and lubrication.
4. Inspect for unusual mechanical or electrical noise or signs of overheating during initial test run.

PART 4: MEASUREMENT AND PAYMENT

4.01 Measurement for the pumps and motors will be done on a per EACH basis.

4.02 Payment

Payment will be made under:

ITEM	DESCRIPTION	UNIT
NS-03	(135 CFS) VERTICAL AXIAL-FLOW DRIAINAGE PUMP & APPURTENANCES WITH 250 4P-TEFC HORIZONTAL ELECTRIC MOTOR AND APPURTENANCES	EACH

TECHNICAL SPECIFICATIONS

SECTION NS-03(A)

ELECTRIC MOTORS, 3-PHASE HORIZONTAL INDUCTION TYPE

PART 1: GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

NEMA MG-1-2011
IEEE Std 112-2004
ASTM B117-97

1.2 SYSTEM DESCRIPTION

These specifications describe the functional requirements and minimum standards to be applied to each of the pump motors required to operate the pumps described in NS-03(B). The motors shall be conservatively rated to assure a quality product. Efficiencies will be reviewed and evaluated as secondary to need for utmost reliability. The motor shall be horizontal constructed to drive the pump through a right angle gear for the pumps. Parts shall be available from suppliers that manufacture components in the United States. Each motor shall be supplied by the pump manufacturer as an integral package with his pump. All components of all items specified herein, shall be of American manufacture and assembly, and shall have parts that are available from suppliers that stock components in the United States.

1.3 SCOPE

This specification covers NEMA frame horizontally mounted, TS Shaft, 3-phase, squirrel cage, AC induction motors. That are totally enclosed fan cooled, 250 HP, 460 V

1.4 STANDARD SERVICE CONDITIONS

Motors conforming to this specification shall be suitable for operation in accordance with their rating under the following service conditions.

A. Ambient temperature in a range of -29°C to 40°C (-20°F to 104°F).

B. Maximum altitude of 1000 meters (3300 feet) above sea level.

C. Indoor or outdoor installations.

D. Inverter duty rated with a VFD controller.

1.5 SUBMITTALS

Submit the following:

A. Shop Drawings:

Motors

Six (6) copies of equipment foundation dimensions; outline drawings with weights, nameplate data, and details showing method of mounting and anchoring the motor. Contracting Officer's approval shall be obtained in writing prior to the commencement of manufacture of motors.

B. Product Data: Insulated Windings

A detailed description of and specification for the manufacturing process, the materials and the insulating varnish or compound used in insulating the windings shall be submitted to the Engineer for approval before manufacture of the motors is commenced. If, in the opinion of the Engineer, the insulation proposed is not of the quality specified and if the methods of manufacture are not considered to be in accordance with best modem practice, the motors will not be accepted. Six (6) copies of motor design curves and Six (6) copies of motor speed-torque curves, as specified, shall be submitted.

C. Test Reports:

Starting Capabilities

Six (6) copies of certified test reports, when available, of test previously performed on motors of each type and size specified or calculated data to substantiate the motor's capability to conform to the specified requirements.

D. Factory Tests

Six (6) copies of test reports recording all data obtained during the tests specifies shall be provided to the Contracting Officer for each motor used. Test reports shall include performance curves indicating the results of paragraph COMPLETE TEST. The base value shall be given whether ANSI or IEEE standard system is used.

E. Certificates:

Power Factor and Efficiency

Certification of guaranteed value of power factor and efficiency for full load, ¾ full load, and ½ full load.

F. Factory Test

Six (6) certified copies of the results of a "Complete Test" for duplicate equipment will be accepted in lieu of the "Complete Test" as specified in subparagraph COMPLETE TEST for equipment of the respective rating and type. No substitute will be accepted for the "Check Test."

G. Operation and Maintenance Data Instructions

Six (6) copies of complete instructions for the proper installation, inspection, and maintenance of the machines provided for this particular service. Instruction manuals shall be submitted to the Engineer not later than the date the equipment is shipped from the manufacturer's plant. The instructions shall include a cross-sectional drawing indicating the major component parts of the motor and the procedure for disassembly.

1.6 QUALITY ASSURANCE

A. Corrosion Prevention and Finish Painting

The equipment provided under these specifications will be subjected to severe moisture conditions and shall be designed to render it resistant to corrosion from such exposure. The general requirements to be followed to mitigate corrosion are specified below. Any additional special treatment or requirement considered necessary for any individual items is specified under the respective item. However, other corrosion-resisting treatments that are the equivalent of those specified herein may, with the approval of the Contracting Officer, be used.

B. Fastenings and Fittings

Where practicable, all screws, bolts, nuts, pins, studs, springs, washers, and other similar fittings shall be of corrosion-resisting material or shall be treated in an approved manner to render them resistant to corrosion.

C. Corrosion-Resisting Materials

Corrosion-resisting steel, copper, brass, bronze, copper-nickel, and nickel-copper alloys are acceptable corrosion-resisting materials.

D. Corrosion-Resisting Treatments

Hot-Dip galvanizing shall be in accordance with ASTM A 123/A 123M or ASTM A 153/A 153M as applicable. Other corrosion-resisting treatments may be used if approved by the Contracting Officer.

E. Frames

Motor frames, end bells, covers, conduit boxes, and any other parts, if of steel, and if they will be coated during the process of insulting the windings, shall be cleaned of rust, grease, millscale, and dirt, and then treated and rinsed in accordance with manufacturer's standard process. If any of the above-listed parts are not coated during the process of insulating the windings then, in addition to the above, they shall be given one coat of primer and then two coats of manufacturer's standard moisture-resistant coating, processed as required.

F. Cores

The assembled motor core shall be thoroughly cleaned and then immediately primed by applying a minimum of two coats of a moisture-resisting and oil-resisting insulating compound. Air gap surfaces shall be given a minimum of one coat.

G. Shafts

Exposed surfaces of motor shafts shall be cleaned of rust, grease, and dirt and, except for bearing surfaces, given one coat of a zinc molybdate or equivalent primer and two coats of a moisture- proof coating, each cured as required. Shafts of a corrosion-resisting steel may be used in lieu of the above treatment.

H. Finish Painting

Finish painting of all equipment shall be in accordance with the standard practice or recommendation of the manufacture, as approved by the Engineer.

1.7 PREPARATION FOR SHIPMENT:

A. Shipment:

The motor shall be shipped with the rotor blocked inside the stator to prevent damage to the bearings. The motor shall be securely mounted on a skid or pallet of ample size. The skid mounting and boxing shall be done in a manner which will prevent damage to the motor and its auxiliary accessories during loading and shipment. All power and control terminal boxes shall be shipped completely installed in final position on motor housing. Provide suitable bracing for all terminal boxes to prevent damage from

vibration in shipment.

All small parts and loose materials shall be boxed and included with the shipment. The manufacturer shall be required to provide information and description of eye bolts, slings, other devices, tools and equipment, as used in the unloading and handling of the motors.

The Contractor through the pump machinery supplier and through the motor manufacturer, shall furnish all special tools required to complete assembly or disassembly of the motor. This requirement shall include any grossly oversized or specially dimensioned tools of any kind. Any special attachments or fixtures will be treated in a similar manner.

PART 2: PRODUCTS

2.1 NAMEPLATES

Nameplate data shall include rated voltage, rated full-loaded amperes, rated horsepower, service factor, number of phases, RPM at rated load, frequency, code letter, locked-rotor amperes, duty rating, insulation system designation, and maximum ambient design temperature. Motor nameplate horsepower shall be equal to or greater than the maximum load imposed by the driven equipment.

2.2 MOTORS

A. Rating

The two (2) 250 hp minimum electric motors to be furnished under this contract shall be 1200 RPM, 460 volt, 3 phase 60 hertz, TEFC, Horizontal, induction type and shall be constructed with Class F Insulation.. Motors shall be U.S. Motors or approved equal.

B. Coordination

Pump Manufacturer shall coordinate horsepower requirements as well as speed requirements for the pump he has selected. In no case, shall the horsepower be less than that specified herein nor the speed be greater than that specified for the pumps in Section NS-03.

C. Starting Torque

The pump and motor unit shall be provided with the starting torque characteristics and sustained horsepower rating to satisfy the pump operating conditions as identified in section NS-03(B) conditions 1 thru 3 considering all losses and to comply with all the requirements of this specification, but in no case shall the starting torque be less than

60 percent of full-load torque. Breakdown torque shall be not less than 200 percent of full-load torque.

D. Service Factor

The motor shall have a continuous service factor of 1.15 times the nameplate. The nameplate horsepower will be available at 80 degrees C rise by resistance with a 40 degree C ambient temperature.

E. Efficiency, Power and Amps maximums for each motor shall be as follows:

Load Efficiency	Power Factor	Amps
4/4		
¾		
½		
¼		

F. Starting Condition

The starting condition, KVA per horsepower, when started at full voltage shall conform to NEMA Code "G". The motors will be soft start furnished by the Switchgear Manufacturer through the Electrical Contractor. Design of the motor and pump combination shall be based upon the worst case condition of either across the line or 65% voltage tap reduced voltage starting. Evaluation shall be part of submittal for approval of motors.

G. Noise

All motors shall operate at a noise level less than 84 decibels A-weighted mean sound pressure level (dBA). The specified noise limit applies for a reference distance of one meter for free-field conditions.

H. Duty Cycle

Each motor, when operating at rated voltage and frequency and on the basis of the connected pump load inertia Wk2 and the speed-torque characteristics of the load during starting conditions as furnished by the pump manufacture, shall be capable of performing on a continuous basis the following motor duty cycle without injurious temperature rise. A starting information nameplate setting forth the starting capabilities shall be provided on each motor. This nameplate shall also include the minimum time at standstill and the minimum running time prior to an additional start. The number of starts per hour shall conform to the limitations ofMG-1-20.43 and MG-1-12.50 of NEMAMG-1.

I. Mounting

Horizontal motor shall be supplied with base, soleplate and jack screws for mounting on the El. 10.00 deck.

J. Coating

The motor exterior shall have all grease, rust or scale cleaned from the surface and painted with a suitable primer followed by two coats of the manufacturers standard paint for outdoor environment. The color shall be Manufacturer's Standard ASA-61 Gray to match pump.

K. Lifting Lugs

Means for lifting the complete motor with an overhead crane by the use of wire rope slings without the use of spreaders of special rigging tools shall be provided. The bearing surface of the lifting means shall be free of sharp edges.

L. Control Wiring

The motor manufacturer shall route all motor mounted control device wiring, which terminates at the control terminal box, in flexible liquid tight conduit mounted perfectly parallel and perpendicular to vertical and horizontal axis of motor frame. Liquid tight conduit shall be secured to motor frame with approved one hole straps and fastened by 316 stainless steel machine screws in drilled and tapped holes.

M. Accessory Leads and Boxes

Terminal leads for motor winding space heaters, thermistors and any other auxiliary equipment shall be brought into conveniently located terminal boxes provided with terminal blocks for extension by others. The terminal boxes shall be drip-proof and treated with an tropical coating. All auxiliary wiring shall be stranded copper conductors with 600-volt flame-retardant insulation, except temperature detector leads may be in accordance with the manufacturer's standard practice. All wiring and terminals shall be properly identified.

2.3 ELECTRICAL REQUIREMENTS

A. Motors shall operate successfully under running conditions at rated load with variation in the voltage or the frequency not exceeding the following conditions:

1. +/-10% rated voltage at rated constant volts/hertz ratio except for specific torque boost situations.
2. Motors shall operate successfully under running conditions at rated load and volts/ hertz ratio when the voltage unbalance at the motor terminals does not

exceed one percent.

B. Operating Characteristics - With rated volts/hertz ratio applied under standard service conditions, motor performance shall be as follows for critical operating characteristics:
   1. Torques - Motors shall meet or exceed the minimum locked rotor (starting) and breakdown torques specified in NEMA Standard MG1 Part 12 for Design B for the rating specified when on sine wave power.
   2. Currents - Locked rotor (starting) currents shall not exceed 600 percent of rated (full-load) current.
   3. Efficiency - Motor efficiency will be determined according to NEMA standard MG1 Part 12, IEEE Test Procedure 112 Method B, using accuracy improvement by segregated loss determination including stray load loss measurements.
   4. Temperature Rise - The temperature rise, by resistance, shall meet Class F requirements at 1.15 service factor.

C. Service Factor and Ambient - Standard motors shall be rated for a 1.15 service factor on sine wave power in a 40°C ambient.

D. Insulation

   1. Special anti-fungal tropical treatment shall be provided. Insulife 2000 insulation system or equal, two dips and bakes.

E. Grounding Provisions

   1. Grounding lug in main conduit box.

   2. Grounding terminal on frame.

2.3 MECHANICAL REQUIREMENTS

A. Enclosures

   1. Motors shall be totally enclosed fan cooled (TEFC).

   2. Material - Motor frame and end shields shall be cast iron. Fan covers will be constructed of cast iron . The installation will be outdoors on a concrete deck above a water-filled basin with brackish water - expect a damp, outdoor, semitropical environment with high concentrations of salt at 100% relative humidity for extended time periods. All units shall receive tropical protection to meet the conditions of this environment.
      a. Motor ventilation openings shall have 316 stainless steel screens to prevent insect entry, particularly the nest-building wasps. The Class F

insulation shall be completed with non-hygroscopic materials and bonded together with epoxy resins.

B. Bearings

Motors shall be supplied with grease lubricated anti-friction ball bearings. The minimum bearing life for all motor bearings shall be a minimum B-10 bearing life of 100,000 hours.

C. Ventilating Fans - shall be corrosion resistant, non-sparking material.

D. Terminal Box

The main terminal box shall be sized to house power factor correction capacitors and shall in addition, provide ample space to properly join and insulate motor leads, capacitor leads and external leads with an underside point of entry for the feeder leads. The box shall be located to avoid interference with cooling air passages. The capacitors shall be grouped with an easily removable dust cover over the bushings and fuses. The placement of this cover shall conceal all exposed parts of the corrective capacitor system. The cover to the terminal box shall be side hinged with two large captured thumb screw wing bolts to secure the cover closed. Box shall be drip proof, cast iron with a coating for a tropical environment. There shall also be a hasp for lock on this cover. Should capacitors not fit in the terminal box, a free standing, enclosed, fused 5 kv power factor correction capacitors with conduit and wiring back to the Main Terminal Box will be accepted as an alternative.

Insulated terminal leads shall receive a treatment equal to that of the motor winding. Leads shall be brought out of the stator frame and shall be provided with terminal lugs for connection to the motor supply wiring.

E. Fasteners

All screws, nuts, bolts, pins, studs, washers and other similar fittings shall be 316 stainless steel. All metal surfaces both internal and external shall be painted or varnished for maximum protection from corrosion.

F. Motor Shaft- Stainless Steel (303 or 304)

G. External Paint- shall be mill and chemical duty paint, capable of passing a 500 hours salt spray test in accordance with ASTM B1 7 test method.

H. Motor Vibration - Velocity shall peak at 0.15 IPS.

I. Accessory Conduit Box: NEMA type 4 enclosure to terminate leads of accessories such as space heaters and thermostats.

K. Space Heaters

Space heaters shall be of the metal-sheathed cartridge type, and raise the inside motor temperature a minimum of 6 degrees C above the ambient temperature. The space heaters shall be sing]e phase 110/220 volt built into the motor frame with leads wired to terminals in the control terminal box.

L. Thermal Protection

1. Bearings: 1 RTD type per bearing, 100 ohm platinum

2. Windings: Two resistance temperature detectors RTD's shall be provided per phase/6 in stator slots between coils, wired to a terminal block in the control terminal box. The sensing elements shall be platinum type, 3 wire, 100 ohms at O degrees C.

M. Vibration Detector: Provide a vibration switch, Robertshaw 366A8 type or equal.

N. Winding Treatment

Special fungus treatment shall be provided for all windings, connections, lashings and other materials susceptible to fungus growth.

2.4 WRENCHES, TOOLS, AND SPECIAL EQUIPMENT

Provide all nonstandard and special equipment required for dismantling, reassembly, and general maintenance of the motor units. Provide one complete set of lifting attachments such as detachable eyebolts or special slings for handling various parts with a hoist.

2.5 FACTORY TESTS

One motor selected at random by the Engineer, shall be given the complete and vibration test. The remainder of the motors shall be given a check test and winding space heater test.

A. Complete Test

Test per IEEE Standard 12, method B, dynamometer test. Test full-load heat run, percent slip, no- load current, full-load current, locked rotor current, lock rotor torque, breakdown torque (calculated), efficiency and power factor at 100%, 75%, and 50% full load, insulation resistance per IEEE Standard 43, winding resistance and high potential.

B. Vibration Test

Test at three points on the drive end and three points on the opposite drive end in

accordance with NEMA MG-1 Part 7.

C. Check Test

Test the no-load current, locked rotor current, winding resistance high potential tests.

D. Winding Space Heater Test

Each winding space heater unit shall be tested at the factory for successful operation and dielectric strength.

PART 3: EXECUTION (Not Applicable)

PART 4: MEASUREMENT AND PAYMENT

4.01 There shall be no direct payment for this item. Payment shall be included in ITEM NO. NS-03 "(135 CFS) VERTICAL AXIAL-FLOW DRAINAGE PUMP & APPURTENANCES WITH 250 4P-TEFC HORIZONTAL ELECTRIC MOTOR AND APPURTENANCES" paid per EACH.

END OF SECTION

TECHNICAL SPECIFICATIONS

SECTION NS-03(B)

GEAR REDUCERS

PART 1: GENERAL

1.01 SUMMARY OF WORK INCLUDED

A. The work provided herein consists of furnishing, testing and installation of three (3) identical right angle gear drive speed reducers for the three (3) vertical pumps, complete with all accessories as specified herein.

B. Definitions and standard practices shall be as defined and set forth by the American Gear Manufacturers Association (AGMA).

C. The following paragraphs describe the minimum requirements for one gear reducer drive, but these requirements shall apply to all gear reducer drives furnished under this contract. The gear reducer drive will be used to transmit the power from the electric motor to the vertical pump as indicated on the drawings and specified herein. The drive shall be adequately designed and conservatively rated to provide a reliable, efficient, smooth, and quiet running unit under all operating conditions. The unit shall be furnished complete in every respect, with all items of equipment ready for operation.

D. The gear drive shall be a hollow shaft, single reduction, spiral bevel right angle type, speed reducer with horizontal input shaft from the motor, vertical downward output shaft to the pump, dry well construction to prevent oil leakage, with thrust bearing and anti-reverse backstop, DERAN Model M26A, or Engineer approved equal, built to AGMA standards, and made to drive vertical drainage pumps.

E. The gear shall be the product of a manufacturer, with a proven service record with this type and size of gear of not less than ten (10) years of operation at 1200 hours per year, at a minimum of three-quarter (3/4) rate load as a pump driver.

F. The Contractor shall be responsible for the proper sizing of the gear which shall be furnished as an integral part of the pumping package.

1.02 RELATED WORK

A. SECTION NS-03 – VERTICAL PROPELLER PUMPS

B. SECTION NS-03(A) – ELECTRICAL MOTORS, 3-PHASE HORIZONTAL INDUCTION TYPE

1.03 REFERENCES

A. ASTM AMERICAN SOCIETY FOR TESTING MATERIALS

B. ASME AMERICAN SOCIETY FOR MECHANICAL ENGINEERS

C. ANSI AMERICAN NATIONAL STANDARDS INSTITUTE

D. AWAA AMERICAN WATER WORKS ASSOCIATION

E. ASA AMERICAN STANDARDS ASSOCIATION

1.04 SYSTEM PERFORMANCE

A. Horsepower Rating: The gear drive shall be capable of transmitting 100% of the maximum horsepower required by the pump at the highest head condition on a continuous basis. A minimum service factor of 1.5 shall be used in the gear drive unit design at this horsepower rating.

B. Ratio: The overall reduction ratio shall be such as to properly match the motor speed with the pump speed. The maximum input speed is 1200 RPM. The output speed shall be that required by the pump. The exact pump speed and gear ratio shall be determined by the Contractor through the pump machinery supplier.

C. Gear Efficiency: The gear drive shall have an overall efficiency of not less than 97%.

1.05 SUBMITTALS

A. All submittals shall comply with requirements of Section 01300.

B. The Contractor shall submit for the Engineer's review, dimensional drawings, and other technical information on the right angle gear drive to verify compliance with the specifications and drawings, which shall at least include the following:

1. Manufacturer and Model No. of gear drive.
2. Gear Ratio
3. Horsepower rating at 1.5 service factor
4. Efficiency at rated horsepower
5. Thermal rating of gear drive at rated horsepower
6. Type of lube oil system in gear drive
7. Type of gears, method of cutting and finishing, and finished Rockwell hardness.
8. Type of bearings and B-10 life rating.
9. Downthrust capacity of thrust bearing at B-10 life of 50,000 hrs.
10. Weight of complete gear assembly
11. Dimensional drawings of the gear drive assembly, including bolt pattern of hold down flange, and material description of all components.
12. Certified statement of gear quality and Rockwell C hardness of finished gears (to be submitted after gear is manufactured).
13. Calculations for B-10 life of thrust bearing.
14. Calculations for U-Joint size.
15. Details, dimensional drawings and material descriptions of the input and output shaft couplings.

16. Operation and maintenance manuals including dimensional drawings, parts list, lubrication and maintenance requirements, disassembly and repair instructions, and operating instructions.

1.6 INSTALLATION, OPERATION AND MAINTENANCE DATA

A. Six (6) Bound Installation-Operation-Maintenance Manuals shall be furnished containing complete information relating to installation, operation, lubrication adjustment, routine and special maintenance, repair, etc., including drawings, parts lists, handling weights, and performance data.

1.7 QUALITY ASSURANCE

A. The gear manufacturer shall conduct a full speed run of the gear before shipment in order to check the operation, balance, lubrication system, backstop device and noise level. The Engineer reserves the right to witness these tests. Fourteen (14) days notice of the tests shall be given to the Engineer.

1.8 SHIPPING AND PROTECTION

A. All openings shall be sealed with plastic caps, plugs or films. The gear drive and any accessories shall be mounted on a skid and boxed. The skid mounting and boxing shall be done in a manner which will prevent damage to the gear drive and any accessories during loading unloading, storage and subsequent handling. Weatherproof covers shall be provided to protect the gear reducer during shipment.

1.9 COORDINATION

A. The rotation of the gear drive reducer output shaft shall be determined by the design rotation of the motor and the required rotation of the pump and motor and shall be chosen by the Contractor through the pumping unit supplier.

1.10 SPECIAL TOOLS

A. The gear manufacturer shall furnish all "special" tools required to completely assemble, disassemble or maintain the gear reducer. "Special" tools are any grossly oversized or specially dimensioned tools of any kind, any special attachments or fixtures, or any other similar items.

1.11 QUALITY ASSURANCE

A. The gears to be supplied in the section will be the product of one manufacturer. The manufacturer will be a member of AGMA and be the owner of the facility where these units will be produced and must have a minimum of 10 years manufacturing gears of this type. A reference list will be provided with projects of like size gears. The list will include owners name, phone number and email address with contact person. The manufacturing facility must be located inside the continental US.

B. The equipment furnished shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with approved drawings, specifications, engineering data, and/or recommendations furnished by the equipment manufacturer.

C. The manufacturer shall warehouse all replacement parts inside the continental US. These parts shall be readily available for shipment to the Owner.

PART 2: PRODUCTS

2.01 MATERIALS AND COMPONENTS

A. Housing: The housing shall be of close-grained cast iron, cast steel, ductile iron or fabricated steel. Welded fabrications shall be heat treat stress relieved before any machining. The housing shall be so constructed as to provide rigid stability that maintains precise alignment of gears and shafts. Lifting lugs shall be provided. Flanged and screwed connections shall be provided as required.

B. Gears: Gears shall be spiral bevel type precision cut from alloy steel, carburized and hardened then precision hard cut, lapped or ground for optimum tooth contact. Each gear shall be statically and dynamically balanced. Maximum pitch line velocity shall be 4000 f.p.m. Gear precision shall be AGMA Quality 9 or better, and surface hardness shall be 58 Rockwell C or higher. Final surface finish of gear teeth shall be 16 RMS or better.

C. Shafting: All shafting shall be of heat-treated alloy steel, conservatively sized, with a precision ground surface for bearings and gears. Alloy steel bar or forgings shall be used on the pinion gear which shall be integral with the pinion shaft if ratio is greater than 40:1 which shall have a minimum diameter of 3.749". Individual shafts and gearing shall be statically and dynamically balanced along the axial and radial axis to ISO 6.3 or 4w/N tolerances. The output shaft shall have a minimum diameter of 3.749".

D. Bearings: All bearings shall be anti-friction, ball or roller type, oil lubricated, and designed for a B-10 life of 50,000 hours based on the loads imposed at the highest operating load condition of the pump. The output shaft thrust bearing shall be a · tapered or spherical roller type thrust bearing, located above the final drive gear, and have a thrust rating capable of supporting the weight of the pump rotating elements plus the highest hydraulic thrust load produced by the pump at the highest head condition. The thrust bearing shall have a minimum B-10 life of 50,000 hours.

E. Backstop: The shaft shall have a self-actuated anti-reverse backstop device mounted in front of the outboard bearing to prevent reverse rotation of the pump, gear, and motor during backflow. The torque produced by the pump during backflow shall be determined based on a discharge pool elevation of +8.0' NAVD 88, a suction pool elevation of -2.0' NAVD 88, and the pump thrust on back flow being a minimum of 80% of the thrust in the forward flow direction at the same pool-to-pool heads. A minimum service factor of 1.5 shall be used in the backstop unit design. The backstop shall be a a type with cylindrical rollers on inclined cam planes, Form sprag type or Engineer approved pin type, oil lubricated, and capable of not less than I 0,000 stops at the design conditions without undue wear or other indications of failure. Torque shall be transmitted directly to

the gear housing.

F. Cooling: The gear drive will be air cooled. A vertically mounted heat exchanger will be mounted directly below the vertical fan. The vertical fan will rotate with the vertical output shaft.

1. The gear shall have a horizontal fan which rotates with the input shaft. The fan shall be guarded.

G. Noise Level: Noise measured 3 feet from the gear case shall not exceed 87 decibels and shall be in accordance with AGMA 914.B04.

H. Lubrication: The gear drive shall be equipped with a complete self-contained lubrication system. Forced feed lubrication shall be provided for the gear meshes, bearings, backstop and all other moving parts of the reducer (except when submerged in oil) by a positive displacement, gear type, integrally mounted pump which shall be gear driven from the output shaft assembly of the gear. Oil pressure and temperature gages shall be provided to monitor the status of the lubrication system. In addition, an oil pressure switch and temperature switch shall be provided to alarm and shut down the motor in the event of loss of oil pressure or high oil temperature in the gear drive. A Murphy VS94 Vibration Switch will be mounted to shut the motor down in the event excessive vibration is encountered. Contractor shall coordinate through the pump manufactured the required flow capacity required to cool the gear should remote radiator cooling be required.

2.02 COUPLINGS

A. Driveshaft/Coupling between motor and gear drive shall be carden-type u-joint type as manufactured by Spicer Driveshaft or engineer approved equal. Driveshaft shall be minimum 4" diameter tube with a minimum operation angle of 3 percent. Length to be selected by contractor but not exceed 100 inches. Driveshaft shall have a minimum 16,000 hr B-10 life and selected with a power factor of 1.5

2.03 FINISHES

A. The exterior of the gear drive shall have any grease, rust or scale cleaned from the surface and painted with a suitable anti-rust metal primer and two coats of the manufacturer's standard paint suited for a corrosive environment. Color to be selected by the Engineer.

B. All interior surfaces shall be thoroughly cleaned and coated in accordance with the manufacturer's standard procedure.

PART 3: EXECUTION

A. SEE PUMP SECTION NS-03 FOR INSTALLATION REQUIREMENTS.

PART 4: MEASUREMENT AND PAYMENT

4.01 There shall be no direct payment for this item. Payment shall be included in ITEM NO. NS-03 "(135 CFS) VERTICAL AXIAL-FLOW DRAINAGE PUMP & APPURTENANCES WITH 250 4P-TEFC HORIZONTAL ELECTRIC MOTOR AND APPURTENANCES" paid per EACH.

END OF SECTION

TECHNICAL SPECIFICATIONS

SECTION NS-04

COMBINATION AIR-RELEASE/VACUUM-BREAK VALVES & APPURTENANCES

1.01 DESCRIPTION

Combination Air Valves shall be automatic float operated valves designed to exhaust large quantities of air during the filling of a piping system and close upon liquid entry. The valve shall open during draining or if a negative pressure occurs. The valve shall also release accumulated air from a piping system while the system is in operation and under pressure. The valve shall perform the functions of both Air Release and Air/Vacuum Valves and furnished as a Single Body Type and, shall have bolted flanged inlets and plain outlets and protective hoods to prevent debris from entering the valve. Flanges shall be in accordance with ANSI B16 for Class 125.

The furnished valve assembly shall have a 6" diameter flange inlet and shall be similar to an APCO Model 1906 Air/Vaccuum combination valve manufactured by DeZURIK or equal. The valve provided shall be rated to operate at a design flow of 60,588 gpm.

1.02 DESIGN

Single Body Valves shall provide a through flow area equal to the nominal size. Floats shall be unconditionally guaranteed against failure including pressure surges. The cover shall be bolted to the body and sealed with a flat gasket. A resilient bumper shall be provided to cushion the float during sudden opening conditions. The resilient seat shall be replaceable and provide drop tight shut off to the full valve pressure rating.

The valve shall have two additional NPT connections for the connection to gauges, testing, and draining.

The Air Release Valve shall have a leverage mechanism consisting of a single pivot arm and a resilient orifice button with sufficient mechanical advantage so that the valve will open under full operating pressure.

The Air/Vacuum Valve shall have a cover fitted to the valve body by means of a machined register to maintain concentricity between the top and bottom guide bushings at all times. The float shall be double guided with a guide shaft extending through the float to prevent any contact with the body. The float shall be protected against direct water impact by an internal baffle bolted to the cover or integrally cast in the body. The seat shall be a minimum of .5 in (12 mm) thick and secured in such a manner as to prevent distortion.

Single Body Combination Valves shall have an expanded outlet to provide full flow area around the guide mechanism. The valve shall have a double guided plug and an adjustable threaded orifice button. The plug shall be protected against direct water impact by an internal baffle. Air release and air/vacuum mechanisms shall be provided as separate units contained within the same body. A stainless steel screened outlet shall be provided. The exterior of the valve shall be coated with a universal alkyd primer.

The valves shall be manufactured and tested in accordance with American Water Works Association Standard (AWWA) C512. When requested, the manufacturer shall provide test certificates, dimensional drawings, parts list drawings, and operation and maintenance manuals.

The selection of APECO 1906 air/vacuum combination valves sill based upon design flow of 60,588 GPM (135 CFS).

1.03 INSTALLATION

The contractor shall supply all materials and labor required to construct the welded steel connection port depicted on the plans for installation of the combination Air-Release/Vacuum-Break Valve.

All bolt hardware, gaskets, etc. shall be provided for proper installation. Contractor shall verify position and location of the Air-Release/Vacuum break valve in the field prior to fabrication and valve installation, and shall verify the location with the Engineer.

1.04 MEASUREMENT

Measurement for the combination air/vacuum valves will be on a per EACH basis.

1.05 PAYMENT

Payment will be made under:

ITEM	DESCRIPTION	UNIT
NS-04	COMBINATION AIR-RELEASE/VACUUM BREAK VALVE & APPURTENANCES	EACH

****END OF SECTION****

TECHNICAL SPECIFCATIONS

SECTION NS-05

METAL STAIRS

1.01 DESCRIPTION

Fabricate and install prefabricated metal stairs and railings.

1.02 REFERENCES

A. Reference Standards

1) American Society for Testing and Materials International (ASTM):
   a. ASTM A36 Standard Specification for Carbon Structural Steel.
   b. ASTM A53 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   c. ASTM A500 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
   d. ASTM A513 Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
   e. ASTM A786 Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy and Alloy Steel Floor Plates.
   f. ASTM A1008 Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened and Bake harden able.
   g. ASTM A1011 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low Alloy with Improved Formability, and Ultra-High Strength.
2) American Welding Society (AWS):
   a. AWS D1.1 Structural Welding Code – Steel.
   b. AWS D1.3 Structural Welding Code – Sheet Steel.
3) American National Standards Institute (ANSI):
   a. ANSI A117.1 Accessible and Useable Buildings and Facilities Standards.
4) The Society for Protective Coatings (SSPC):
   a. SSPC-SP3 Power Tool Cleaning.
   b. SSPC-SP2 Hand Tool Cleaning.
5) National Association of Architectural Metal Manufacturers (NAAMM):
   a. SSPC-SP3 Power Tool Cleaning.
   b. SSPC-SP2 Hand Tool Cleaning.
6) National Ornamental and Miscellaneous Metals Association:
   a. Weld Finish Type(s).
7) American Institute of Steel Construction (AISC):
   a. AISC Manual of Practice.
8) ICC International Building Code:
   a. Chapter 10: Means of Egress.
9) UL 1994 Luminous Egress Path Marking Systems.

1.03 SUBMITTALS

A. General: Submit listed submittals in accordance with Contract requirements.

B. Product data: Submit specified products as follows:
   1) Manufacturer's product data.
   2) Manufacturer's installation instructions.

C. Shop Drawings: Indicate information on shop drawings as follows:
   1) Stair plans, elevations, details, methods of installation and anchoring.
      a. Show members, sizes and thickness, anchorage locations and accessory items.
      b. Furnish setting diagrams for anchorage installation as required.
      c. Include calculations stamped by a civil or structural engineer registered in the State of Louisiana.

D. Samples: Submit as follows:
   1) Two samples of factory tread system 3 inches wide. "IF" tread specified is a manufacturer's System and not otherwise a common "Field Poured Concrete Pan or Common Checker / Smooth plate.
   2) If Photoluminescent Nosing is specified submit integral sample of complete nosing and tread system (3" wide) regardless of tread type.

E. Manufacturer's Storage and Installation Instructions.

G. Submit documentation verifying that components and materials specified in this section are from a single source manufacture approved by this specification.

F. Qualification Statements:
   1) Submit Certificate that manufacturer is a Certified Fabricator with the American Institute of Steel Construction (AISC).

1.04 QUALITY ASSURANCE

A. Qualifications:
   1) Manufacturer:
      a. American Institute of Steel Construction (AISC) Certified Fabricator, having a minimum of 10 years' experience manufacturing components similar to or exceeding requirements specified in scope of project.
      b. Having sufficient capacity to produce and deliver required materials without causing delay in work.
      c. Installer: Acceptable and approved by Stair Manufacturer.

1.05 DELIVERY, STORAGE & HANDLING

A. Delivery and Acceptance Requirements:

   1) Deliver material in accordance projects schedule and in accordance with manufacturer's instructions.

   2) Deliver materials in full truckload quantities in manufacturer's pre-bundled and banded lots with identification labels intact and in sizes to suit project hoisting equipment.

B. Storage and Handling Requirements:

1) Store materials on skids or appropriate planks so material is not in direct contact with the ground and at least 4" above grade. Ensure rain or snow runoff freely flows under material making no contact with product(s).

2) Protect material from adverse conditions. If not stored under roof, tarp accordingly to keep material dry. Inspect material regularly to ensure water is not pooling in stair tread or landing pans, frames, railing, hardware or packaging, etc.

C. Packaging Waste Management:

1) Separate waste materials for refuse and recycling.

2) Remove packaging materials from site and dispose of at appropriate facilities.

3) Collect and separate for disposal paper, plastic, polystyrene, cardboard packing material in appropriate onsite bins for recycling.

4) Fold metal and plastic banding; flatten and place in designated area for recycling.

1.06 METAL STAIRS

A. Design Criteria:

1) Structural Performance of Stairs: Stairs shall withstand the following structural loads without exceeding the allowable design working stress of materials, including anchors and connections. Apply each load to produce the maximum stress in each component:

a. Treads and Platforms of Metal Stairs: Capable of withstanding a uniform load of 100 psf and concentrated load of 300 lbf applied on an area of 4 square inches. Concentrated and uniform loads need not be assumed to act concurrently.

b. Stair Framing: Capable of withstanding stresses resulting from loads specified, in addition to stresses resulting from railing system loads.

c. Limit Deflection of Treads, Platforms and Framing Members: To L/240.

2) Structural Performance of Handrails and Railings: Handrails and railings shall withstand the following structural loads without exceeding the allowable design working stress of materials, including handrails, railings, anchors and connections.

a. Top rail of Guardrail: Capable of withstanding a concentrated load of 200

lbf applied in any direction and a uniform load of 50 psf applied in any direction. Concentrated and uniform loads need not be assumed to act concurrently.

B. Standard Stair and Rail System:

1) Manufacturer's standard prefabricated, pre-engineered straight run stair and landing system, consisting of hot rolled steel sheet risers, treads, landings and structural plate, channel or angle frames, stringers or connection devices with fasteners/supports and railings.

a. Stringers:

i. Steel plate or channel with side mounted and/or top mounted railing frame attachment as detailed on drawings and/or in accordance with manufactures system recommendations.

ii. Minimum thickness or weight as determined by structural design calculations, structural grade steel plate or channel.

2) Risers: Closed riser, minimum 14 gage hot rolled mild steel sheet, sloped maximum 1-½ inches and conforming to Americans with Disabilities Act (ADA) nosing requirements.

3) Treads: Manufacturer's standard tread system, 14 gage minimum hot rolled mild steel sheet or as determined by structural design calculations. All welds on the underside of tread assemblies to be exposed for proper inspection during the service life and/or after seismic, fire, flood, or potentially damaging event. Provide treads as indicated and noted on drawings for each stair.

a. Concrete Pan Filled Tread: Field poured (placed) concrete by concrete finisher trades after stair installation.

b. Checker Plate Tread: Pattern per manufacturer's standard.

c. Quiet Tread: Factory applied sound absorption material bonded to underside of tread and intermediate landing surface for checker plate tread systems.

d. Bar Grating and/or Traction Tread perforated tread systems for industrial stairs included in this section.

4) Landings: A combination of structural plate, channel and angles for the frame with 1 ½" B-36 Composite Floor Decking x 20 gage and 10 gage (minimum) bent sheet lateral pour stops. Decking to be attached to frame by plug welding or other mechanical means provided recommended and engineered by the stair manufacturer.

a. Flight and landing assemblies fabricated by the stair manufacturer shall be connected by splined "Twist-Off" tension control bolts, grade to be A325 & A490 as engineered and specified by the stair manufacturer.

b. All pre-tensioning methods are to be conformant to the AISC Steel Construction Manual, Chapter 16; Section #3 Bolted Parts. Subsection 3.2.1 "pre-tensioned joints and related sections noted thereafter".

5) Additional Fastener and Supports: Sized by the manufacturer to meet structural design criteria. If hanger rod connections are applicable to any of the landing connections, they shall be threaded rod type, size and grade as determined by stair manufacturer's structural design calculations.

6) Railings: Design style as shown on drawings for each stair, selected from manufacturer's standard pre-fabricated, pre-engineered rail styles.

a. Multi-Strand Horizontal Rail: 1.5" x 1.5" x 11 gage HSS Top Line(s) and Posts with 1.25" I.D. pipe Mid Line and Hand Grab with 0.187" x 1.25" flat bar bracket. Weld Preparation to equal National Ornamental & Misc. Association (NOMMA) #3 or better.

b. Picket Rail: 1.5" x 1.5" x 11 gage HSS Top and Bottom Line Frame and Posts with 1.25" I.D. pipe Hand Grab with 0.187" x 1.25" flat bar bracket and 0.5" Square Bar Pickets spaced not more than 4" on center. Weld Prep to equal NOMMA #3 or better.

c. Mesh Rail: 1.5" x 1.5" x 11gage HSS Top and Bottom Line Frame and Posts with 1.25" I.D. pipe Hand Grab with 0.187" x 1.25" flat bar bracket and 8 gage x 2" x 2" Square Wire Mesh (crimped or welded per manufacturer's standard if not noted) with continuous 12 gage U-shaped receiver edging. Weld Prep to equal NOMMA #3 or better.

d. Rod Rail: .75" x 2" Flat Bar Frame and Posts with 1.25" I.D. pipe Hand Grab with .50" round bar bracket and .50" Round Bar Horizontals. Round bar shall continuously pass through intermediate posts for sections under 16 feet. Weld Prep to equal NOMMA #2 or better.

e. Cable Rail: .75" x 2" Flat Bar Frame and Posts with 1.25" I.D. pipe Hand Grab with .50" round bar bracket and 0.187" Stainless Steel connecting hardware and Wire Rope threaded continuously from end to end of each rail section, but not continuing to the next rail assembly (Hardware and Wire Rope can be Galvanized if noted). Weld Prep to equal NOMMA #2 or better.

f. Glass Panel Rail: 1.5" x 1.5" x 11 gage HSS Top and Bottom Line Frame and Posts with 1.25" I.D. pipe Hand Grab with 0.187" x 1.25" flat bar bracket with 0.375" Tempered Glass Panels. Glass Panels shall insert into 4'-0" sections of rail frame between posts (maximum) and be securely

held into place with 2" x 2" brackets placed near each corner of panel. Weld Prep to equal NOMMA #2 or better.

g. Wall Rail: 1.25" I.D. pipe with pressed steel wall rail bracket with giving proper distance between face of wall and inside face of wall rail assembly.

h. Hand Grabs: 1.25" I.D. pipe Code Conforming 34" to 38" above plane of nosings and wrapped continuously past space between flights with pre-formed bend(s) which shall be field fitted with weld prep to equal NOMMA #1.

i. Barrier Gates: Manufacturers standard swing gate assembly with steel spring hinges and rubber bumper between space that barrier gate and rail post termination intersect. Fabricated from Hollow Structural Steel (HSS) or pipe stock.

7) Stringer Rail Mounting:

a. Structural Plate Stringer: Railings to be Side Mounted. Rail Frame: In-Line or Side assembly, see drawings.

b. Structural Channel: Railing to be Top Mounted to channel flange or Side Mounted with railing post knife-blade steel plate connection extender to be received inside the channel flanges below the top flange. Rail Frame: In-Line or Side Assembly.

8) Materials:

a. Steel Shapes and Plates: To ASTM A36.

b. Steel Pipe: To ASTM A53 Type E or S, Grade B.

c. Steel Tubing:

i. Structural Use: To ASTM A500, Grade B or C.

ii. Non-Structural Use: To ASTM A513, hot rolled or coiled rolled (mill option).

d. Steel Sheet:

i. Structural Use: To ASTM A1011 (hot rolled), Checker Plate ASTM A786.

ii. Non-Structural Use: To ASTM A786, ASTM A1008.

e. Fasteners: As recommended by manufacturer.

f. Welding Rods: In accordance with AWS code and AWS filler metal

specifications.

9) Fabrication:

a. Use same material finish as parts being joined. Use stainless steel between dissimilar metals and non-corrosive fasteners at exterior connections or joints.

b. Provide fasteners of sufficient strength to support connected members and loads, and to develop full strength of parts fastened or connected.

c. Construct stair and rails with all components necessary for support and anchorage, and for a complete installation.

10) Finishes:

a. Rails, flights, landings and other stair components: Remove oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or other foreign matter from steel surface in accordance with SSPC-SP2 and/or SSPC-SP3.

b. Shop Primer: Immediately after fabrication and cleaning, spray apply primer to dry film thickness recommended by the primer manufacturer, but not less than 2.0 mil thickness. Apply one coat High Solids Red Oxide Anticorrosive Primer meeting SSPC-15 Paint.

c. Post Delivery: Primer coating offers minimal protection against rust and corrosion during transport and while stored at project site. Proper handling and care before during and after installation shall be taken to maintain effectiveness of primer coating prior to receiving final coats of finish paint.

1.07 EXAMINATION

A. Verification of conditions: The Erector installing the Steel Stair System(s) shall verify that conditions of substrates previously installed under sections or contracts are acceptable for product installation in accordance with manufacturer's instructions prior to metal stair and railing installation.

1) Inform General Contractor of unacceptable conditions.

2) Proceed with installation after unacceptable conditions have been remedied.

1.08 PREPARATION

A. Ensure structure being connected to is stable, and complete enough in the construction phase to commence the installation of the Steel Stair System(s).

B. Remove all construction debris from work area and properly barricade the stair shaft(s) from general construction traffic while the Steel Stair System is being installed. Do not allow general construction traffic to use the stairs until all flight and landing frames are securely connected, and temporary railing is in place per approved OSHA guidelines or permanent railing is installed.

1.09 INSTALLATION

A. Coordinate installation of metal stairs and railing with the General Contractor.

B. Coordinate metal stairs and railings installation with the work of other trades for proper time and sequence to avoid construction delays.

C. Install stairs, landings and handrails in accordance with manufacturer's instructions. Install square, plumb, straight, and true to line and level, with neatly fitted joints and intersections.

D. Minimum Tolerances:

1) Maximum variation of vertical alignment = 0.25" per floor, non-accumulative.

2) Maximum differential of true elevation bench mark(s) = › 0.50" per floor, non-accumulative.

E. Field Fitting:

1) Do not cut or alter stair system assemblies or structural components without written authorization.

2) Field welding and joining shall conform to AWS D1.1 and AWS D1.3.

3) Grind and remove weld splatter. Prepare welds the same as the manufacturers for item being fitted, except that continuous rail wraps to be ground smooth. Touch-up shop-primed areas with same primer as used by stair system manufacturer.

1.10 ADJUSTING

A. Upon completion of stair(s) installation remove all tools, debris and surplus materials from the stair shaft(s).

B. Remove any debris from stair assemblies which was acquired during transit and storage, leave ready for final finish coat preparation by the painting contractor.

1.11 WASTE MANAGEMENT

A. Coordinate recycling of waste materials.

B. Collect recyclable waste and dispose of or recycle field generated construction waste created during demolition, construction or final cleaning.

C. Place waste in approved and appropriate job site recycling containers.

1.12 MEASUREMENT

All work in this section for Steel Pipe Handrails and Assemblies shall be paid per Linear Foot. All work in this section for Steel Stairs and Grating shall be paid per Lump Sum. All items necessary to construct the steel pipe handrail and assemblies and the steel stairs and grating shall be included in the costs for the per linear foot and lump-sum price item bid, respectively.

1.13 PAYMENT

Payment will be made under:

ITEM	DESCRIPTION	UNIT
NS-05A	GALVANIZED WELDED STEEL PIPE HAND RAIL ASSEMBLIES & APPURTANCES	LINEAR FOOT
NS-05B	GALVANIZED WELDED STEEL STAIRS AND GRATINGS	LUMP SUM

****END OF SECTION****

TECHNICAL SPECIFCATIONS

SECTION NS-06

MISCELLANEOUS METAL

1.01 DESCRIPTION

A. Furnish all labor, materials, equipment and incidentals required and install covers, grates, frames, manhole rungs, catch basin castings, stairs, railings and other miscellaneous metal as shown on the drawings and specified herein. The miscellaneous metal items include, but are not limited to, the following:

1. Anchors or anchor bolts except those specified to be furnished with all equipment.
2. Cast iron frames, covers, grates.
3. Steel plates, angle frames, plates, and miscellaneous angles and channels as shown on the drawings.
4. Metal required for pipe penetrations through walls.

1.02 COORDINATION

A. The work of this section shall be completely coordinated with the work of other sections. Verify at the site both the dimensions and work of other trades adjoining items of work in this section before fabrication and installation of items herein specified.

B. Furnish to the pertinent trades all items included under this section that are to be built into the work of other sections.

1.03 SHOP DRAWINGS

Detail drawings, as provided for in the General Conditions and Shop Drawings and Submittal Data Section, showing sizes of members, method of assembly, anchorage, and connection to other members shall be submitted to the Engineer for approval before fabrication.

1.04 FIELD MEASUREMENTS

Field measurements shall be taken at the site to verify or supplement indicated dimensions and to insure proper fitting of all items.

1.05 REFERENCE SPECIFICATIONS

Unless otherwise specified, materials shall conform to the following:

Carbon Structural Steel	ASTM A36
Welded and Seamless Steel Pipe	ASTM A53
Gray Iron Castings	ASTM A48, Class 30
Galvanizing, general	ASTM A123
Galvanizing, hardware	ASTM A153

Galvanizing, assemblies	ASTM A386
Aluminum (extruded shapes)	ASTM B209, 6063 T5 (Alum. alloy)
Aluminum (extruded pipe)	ASTM B209, 6063 T6 (Alum. alloy)
Aluminum Sheet and Plate	ASTM B209, 6061 T6 (Alum. alloy)
Bolts and Nuts	ASTM A307
Stainless Steel Bolts, Bars, Shapes	AISI, Type 302
Stainless Steel Plate and Sheet	AISI, Type 304
Welding Rods for Steel	AWS Spec. for Arc Welding

1.06 ANCHORS, BOLTS, AND FASTENING DEVICES

A. Anchors, bolts, etc., shall be furnished as necessary for installation of the work of this section.

B. The bolts used to attach the various members to the anchors shall be the sizes shown or required.

C. Wedge anchors shall be an imperial-sized steel threaded stud with an integral cone expander and a three-segment expansion clip. The stud shall be manufactured from carbon steel unless specified as stainless and the expansion clip shall have two undercutting embossments per segment and be manufactured from 316 stainless steel. The anchor shall have been tested and qualified for performance in cracked concrete per ACI 355.2 and ICC-ES AC193. Material shall be as noted on the drawings. If not listed, galvanized steel.

1.07 STEEL ITEMS

A. Galvanized steel grating shall be fabricated as shown. Angle frames for hatches, beams, grates, etc., shall be furnished complete with welded strap anchors attached. Furnish all miscellaneous aluminum shown but not otherwise detailed.

B. Sleeves shall be steel or cast iron pipe in walls and floors with end joints as shown on the drawings. All pipe sleeves shall have center anchor around circumference as shown.

C. Miscellaneous steel pipe for sleeves and lifting attachments and other uses as required shall be Schedule 40 pipe fabricated according to the details as shown on the drawings.

D. Miscellaneous steel shall be fabricated and installed in accordance with the drawings and shall include; angles, support brackets, splice plates, anchor bolts; and any other miscellaneous steel called for on the drawings and not otherwise specified.

1.08 CAST IRON FRAMES AND COVERS

A. Heavy duty manhole frame and cover shall be as manufactured by East Jordan Iron Works, Inc., Pattern V1503 standard size or approved equal. Covers to have letters "SEWER" or "DRAIN" embossed on top, as required.

B. Valve Boxes

Valve boxes shall be of strong, tough even-grained cast iron. Valve boxes shall be two-part screw type adjustable with covers having the word "SEWER" or "WATER" embossed on top as applicable. Valve boxes shall be screw type with drop a lid, unless otherwise specified.

C. Catch Basins

Catch basin frames and covers shall be Vulcan Foundry No. V-4311-1 or approved equal, unless otherwise shown on the Drawings.

1.09 FABRICATION

A. All miscellaneous metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability.

B. Connections and accessories shall be of sufficient strength to safely withstand stresses and strains to which they will be subjected. Steel accessories and connections to steel or cast iron shall be steel, unless otherwise specified. Threaded connections shall be made so that the threads are concealed by fitting.

C. Welded joints shall be rigid and continuously welded or spot welded as specified or shown. The face of welds shall be dressed flush and smooth. Exposed joints shall be close fitting and jointed where least conspicuous.

D. Welding of parts shall be in accordance with the Standard Code for Arc and Gas Welding in Building Construction of the AWS and shall only be done where shown, specified, or permitted by the Engineer. All welding shall be done only by welders certified as to their ability to perform welding in accordance with the requirements of the AWS Code. Component parts of built-up members to be welded shall be adequately supported and clamped or held by other adequate means to hold the parts in proper relation for welding.

E. Welding of aluminum shall conform to the applicable provisions of the AA-30 for aluminum structures. The general recommendations and regulations of AWS D1.1 as applicable shall apply to welded aluminum.

F. Castings shall be of good quality, strong, tough, even-grained, smooth, free from scale, lumps, blisters, sand holes, and defects of any kind which render them unfit for the service for which they are intended. Castings shall be thoroughly cleaned and will be subjected to a hammer inspection in the field by the Engineer. All finished surfaces shown on the drawings and/or specified shall be machined to a true plane surface and shall be true and seat at all points without rocking. Allowances shall be made in the patterns so that the thickness specified or shown shall not be reduced in obtaining finished surfaces. Castings will not be acceptable if the actual weight is less than 95 percent of the theoretical weight computed from the dimensions shown. The Contractor shall provide facilities for weighing castings in the presence of the Engineer showing true weights, certified by the supplier.

G. All steel finish work shall be thoroughly cleaned, by effective means, of all loose mill scale, rust, and foreign matter before shipment and shall be given one shop coat of primer compatible with finish coats specified in Painting Section after fabrication but before shipping. Paint shall be applied to dry surfaces and shall be thoroughly and evenly spread and well worked into joints and other open spaces. Abrasions in the field shall be touched up with primer immediately after erection.

H. Galvanizing, where required, shall be the hot-dip zinc process after fabrication. Following all manufacturing operations, all items to be galvanized shall be thoroughly cleaned, pickled, fluxed, and completely immersed in a bath of molten zinc. The resulting coating shall be adherent and shall be the normal coating to be obtained by immersing the items in a bath of molten zinc and allowing them to remain in the batch until their temperature becomes the same as the bath. Coating shall be not less than 2 oz. per sq. ft. of surface.

1.10 INSTALLATION

A. All steel surfaces to come in contact with exposed concrete shall receive a protective coating of an approved heavy bitumastic troweling mastic applied in accordance with the manufacturer's instructions prior to installation.

B. Where aluminum contacts a dis-similar metal, apply a heavy brush coat of zinc-chromate primer followed by two coats of aluminum metal and masonry paint to the dis-similar metal.

C. Where aluminum contacts concrete, apply a heavy coat of approved alkali resistant paint to the concrete.

1.11 MEASUREMENT

All work in this section for Miscellaneous Steel Work shall be measured per Lump Sum. All work for hoist with framing and cover shall be installed per the drawings and work shall be measured per Lump Sum.

1.12 PAYMENT

Payment will be made under:

ITEM	DESCRIPTION	UNIT
NS-06-01	MISCELLANEOUS STEEL WORK	LUMP SUM
NS-06-02	HOIST WITH FRAMING AND COVER	LUMP SUM

****END OF SECTION****

SECTION NS-07: PRODUCT SPECIFICATION -TRASH RAKE

PART 1: GENERAL

1.1 Outline:

A. The Trash Rake debris removal system is for cleaning vegetation and other debris from the canal located upstream of a pump station intake. This product specification provides the design and performance criteria for a continuously operated, chain driven, front-cleaning, front-return trash rake designed to eliminate the need for underwater drive components. The trash rake consists of a number of interchangeable units capable of operating independently of each other. The trash rake includes all auxiliary equipment and accessories necessary for a complete and fully functional debris removal system.

B. The Trash Rake can mounted directly on the pump station intake structure. The submerged end of each existing trash rake unit is supported on a continuous sill plate located upstream of the intake structure. The drive end of each existing trash rake unit is supported on a steel beam spanning on the intake basin walks and slab. The Trash Rake units are inclined about 45 to 60 degrees from the horizontal.

1.2 References: The edition of the publications of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. See the various paragraphs for the specified standard. In the case of a conflict between the requirements of this section and those of the listed document, the requirements of this section shall prevail.

A. American Bearing Manufacturers Association (ABMA):
   1. ANSUABMA 9, Load Ratings and Fatigue Life for Ball Bearings
   2. ANSUABMA 7, Shaft and Housing Fits for Radial Ball an4 Roller Bearings
   3. ANSUABMA 11, Load Rating and Fatigue Life for Roller Bearings
   4. ANSUAMBA 13, Rolling Bearing Vibration and Noise

B. American Institute of Steel Construction (AISC):
   1. Code of Standard Practice for Steel Buildings and Bridges
   2. Specification for the Design, Fabrication and Erection of *Structural* Steel for Buildings, with Commentary
   3. Manual of Steel Construction

C. American National Standards Institute (ANSI)

D. American Society for Testing and Materials (ASTM):
   1. ASTM A36, Specifications for Structural Steel
   2. ASTM A53, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless

3. ASTM Al23, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
4. ASTM Al 53, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
5. ASTM Al67, Standard Specification for Stainless and Heat-Resisting Chromium Steel Plate, Sheet and Strip
6. ASTM A276,Standard Specification for Stainless Steel Bars and Shapes
7. ASTM A500, Specification for Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
8. ASTM A501 , Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
9. ASTM A572, Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
10. ASTM A992,Specification for Structural Steel Shapes
11. ASTM F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
12. ASTM F594, Standard Specification for Stainless Steel Nuts

E. American Welding Society (AWS):
1. AWSD1.1, Structural Welding Code - Steel
2. AWSD1.6,Structural WeldingCode - StainlessSteel
3. ANSI/AWS D14.1,Specification for Welding of Industrial and Mill Cranes and Other Material Handling Equipment

F. International Building Code (IBC)

G. National Electrical Manufacturers Association (NEMA}:
1. NEMA MG- I, Motors and Generators
2. NEMA MG-2, Safety Standard and Guide for Selection, Installation and Use of Electric Motors and Generators

H. National Fire Protection Association (NFPA)

1.3 Submittals: Design information to be submitted are as follows:

A. Technical Data:
1. Layout and shop drawings which are dimensioned and scaled, with complete bill of material including part descriptions, part numbers, material specifications, electrical and control specifications, etc., shall be furnished for the following equipment:
   a. Bar screens.
   b. Chain driven, front-cleaning, front-return type mechanical trash rake units.
   c. Ancillary equipment and components.
2. At a minimum the technical data shall include the following:
   a. Structural design calculations which clearly indicate the debris loading assumptions, rake requirements, and hydraulic loading assumptions.

b. Rake performance data including debris loading assumptions, system capacity, operating speeds, lift capacity, etc.
c. Disposal facility requirements.
d. Electrical and control system data and schematics.
e. Structural design calculation and detailed drawings for any required additions and modifications to the trash rake bridge.

3. The shop drawings shall clearly indicate the size, type, material and tolerances for all mechanical and structural components and members.

B. Operation and Maintenance Manuals shall include, at a minimum, the following:
1. Installation instructions, including procedures for system startup and shutdown Component catalog information.
2. Service sheets for all system components.
3. Spare parts list of each equipment component, with a description of each item, manufacturer, catalog number, serial number and other information required to order an exact replacement.
4. Replacement parts data, including serial numbers.

C. Operational Field Test Report

D. Installation and Erection Manual

1.4 Qualifications: The manufacturer of the trash rake system shall have the following minimum qualifications to be considered an acceptable manufacturer to provide, install, and service the equipment specified in this Contract:

A. Experience: The equipment manufacturer supplying the design and fabrication services for the project shall have been in the business of designing and fabricating the specific type of trash rake system specified herein for a minimum of five (5) years from the date of the submittal. The manufacturer shall have completed a minimum of ten (I 0) similar installations over that time period all of which are currently in service as constructed. The manufacturer shall provide a minimum of five (5) references of projects that the manufacturer has provided trash rake systems of equal or larger size. These project references shall include the name and telephone number of the owner's representative who has direct knowledge of the performance of the manufacturer. The reference must indicate an acceptable performance by the manufacturer to be considered by this Contract.

B. Technical Support: The Engineering Department and outside Professional Engineers support the project design, perform the required tests, and provide field supervision of the installation.

C. Service: The Service Department is capable of providing immediate response (24-hour notice), to service calls. This includes skilled

technicians and mechanics that can diagnose and repair the equipment supplied.

1.5 Product Qualification: The rakes and conveyance equipment are from a product line that has been used in similar applications and is backed with after-sales service from factory-direct engineering representatives. Spare parts shall be readily available and be "off-the-shelf' from the manufacturer of the equipment. To facilitate this components for the equipment provided are not custom fabricated specifically for the project and are standard components used as part of the specific equipment product line.

1.6 Manufacturer Certification: Upon request, a letter signed by an individual with authority to bind the company and certifying that the manufacturer agrees to conform and comply with all of the requirements of the project specification. All exceptions to the requirements of this specification, including those addressed by compliance submittals, shall be clearly stated in the certification letter.

1.7 Installation and Erection Manual: The manufacturer shall submit, no later than at the time of delivery, the Installation and Erection Manual describing the procedures to be followed in erecting, assembling, installing, and testing the rake and conveyance equipment. The manual shall include such things as alignment procedures, bolt torque values, permissible clearances, permissible shaft misalignment, bearing clearances, etc.

1.8 Warranty: The manufacturer will warrant the EQUIPMENT, MATERIALS and PRODUCTS specified in this SECTION against defective materials and workmanship with a standard (5) year warranty from the date of Substantial Completion, and as described in the General Terms and Conditions of the contract.

PART 2: PRODUCTS

2.1 General: Design, furnish and install an engineered trash rake system complete with all mechanical, structural, electrical, and monitoring and control components. The trash rake equipment shall remove debris accumulated on the trash rack and convey it to the disposal area as shown on the Contract Drawings. The trash rake system shall be suitable for outdoor service.

A. Product Substitutions: All products provided shall be in conformance with the project specification, any exceptions to any of the stated requirements shall be approved by the customer.

B. Intake Design: The trash rake system equipment and support structures shall be mounted and secured to the trash rake bridge or designated structure. The equipment shall be positioned on the upstream side and shall be limited to the area shown on the Contract Drawings. The minimum clear bridge width between the debris conveyance equipment and other obstructions shall be maintained.

C. Member Sizing: Where structural member sizes have been indicated, the member sizes shall be considered to be the minimum acceptable. All members shall be properly sized for the intended application.

D. Safety: All trash rake system equipment shall comply with the applicable provisions of the Federal Occupational Safety and Health Administration (OSHA) standards. The equipment shall be provided with safety devices such as coupling guards, zero speed switches, emergency shutdown pull string and mushroom push-buttons.

E. Load Limiting Device: The trash rake units shall be supplied with load limiting devices that shut down the rake and signal an alarm condition back to the control panel when the pull force on the rake units exceeds the setting of the load limiting device.

F. Removal and Reinstallation: The trash rake system is to be capable of being removed from service to allow access to the bar screen. The trash rake equipment requires minimal dismantling to facilitate this maintenance requirement and is designed for easy reinstallation. No cutting or welding is required to remove and/or reinstall the rake system.

G. Service Life: The trash rake system is designed to provide a minimum of twenty-five (25) years of reliable service under the loading conditions and operation described herein.

H. The trash rake system shall be manufactured by D&J Machinery or approved equal.

2.2 Performance: The trash rake will satisfy the following performance requirements:

A. Head Loss: The trash rake shall prevent a build-up of debris on the rack that will cause a head loss in excess of one (I) foot across the bar screen at the pump station design capacity, for an assumed extreme loading event.

B. Debris Loading: Under normal operation the debris will consist of floating and submerged aquatic and wetland vegetation. This vegetation may vary from tall grasses, reeds and other aquatic plants such as hydrilla, to floating leafy plants such as water hyacinth. The rate of loading will vary seasonally as well as with discharge conditions. During a flood event there is the possibility of larger objects and materials included with the debris load. This debris could be upland vegetation, including small trees and brush, as well as man-made items such as lumber, tires, containers, etc.

C. Handling Capacity: The trash rake and its conveyance equipment will be capable of collecting and conveying the debris described above in a cycle time that will result in a head loss across the bar screen that does not exceed the maximum allowed. Because of debris loading rate variability, the cycle time shall be capable of adjustment to optimize the rake's performance. The maximum debris volume (loose) shall be assumed to be 0. 1 % of the pump station design

capacity. The density of the collected debris screenings shall be assumed to be 35 pounds per cubic foot (pct) dry and 65 pcfwet.

D. Lift Capacity: Each trash rake unit shall be designed for a minimum continuous lift capacity of 6,000 pounds of debris on the bar screen.

E. Wind Loading: Wind loads on the trash rake system equipment and support structures shall be determined in accordance with ASCE 7-10 and modified as noted below for critical facilities.

1. The ultimate design wind speed shall be obtained from Other Structures (ASCE 7-10). The calculated velocity pressure (qz or qh) shall be multiplied by 1.13 to increase the nominal mean recurrence interval (MRI) to 200 years.
2. The design for wind loading shall be based on Exposure Category C.
3. The debris rake and ronveyance equipment shall also be designed to operate without loss of effectiveness during periods with sustained winds ofup to 70 mph.
4. A written certification from a Louisiana licensed Professional Engineer that the system proposed for use is capable of satisfying the wind load requirements specified herein.

2.4 Trash Rakes / Bar Screens:

A. General: The Bar Screen is designed as an integrated component within the framework of the trash rake.

B. Bar Spacing: The clear spacing of the bars will not be less than one (1) inch, and not more than four (4) inches. The maximum flow velocity through the bar screens will be two (2) feet per second when calculated at the design flow of the pump station.

C. Head Loss: The design head loss through a clean bar screen will not exceed two (2) inches at the pump station's rated capacity. In addition, the hydraulic design of the trash rake system will assume a 50%blocked screen with a maximum of twelve (12) inches head loss across the trash rack at the pump station's rated capacity.

D. Structural Design: The structural design of all components w i II be in accordance with the AISC Manual of Steel Construction and A \VS 14. I

1. Design Loads: The design will address all live and dead loads with a minimum of 25% increase in live loads to address impact loads caused by the operation of the trash rake system. The bar screen will be designed for a minimum hydrostatic loading corresponding to a five (5) foot differential head across the screen where the low water elevation is equal to the pump's low water shut off elevation (-3.25). The force due to this head differential w i II be applied across the full width of the screen. Each lifting lug will be designed to withstand a load of no less than three (3) times the dead weight of the bar screen.

2. Minimum Bar and Component Size: All structural members will have a minimum thickness of 0.375 inches. The vertical collection bars will have a minimum depth of five (5) inches.
3. Allowable Stresses: Allowable stress for the bar screen's structural elements will not exceed those stated in AISC Manual of Steel Construction and will also not be higher than the following percentages of the minimum yield strength ofthe materials used:
    a. Tension (on net section at holes): 40%
    b. Bending (tension and compression on extreme fibers of members): 55%
    c. Shear (on gross section of member): 35%
    d. Bearing on contact area of machine surfaces: 70%
    e. Stress concentration factors shall be used where applicable.

E. Flow Induced Vibration: The bar screen will be designed to prevent resonant vibrations induced by flow through the screen. The laterally unsupported lengths of the vertical bars and other members shall limit the natural frequency of the screen when submerged and subject to flow to not less than 2. 5 times the vortex shedding frequency. Fixed supports shall be assumed for the calculation of the natural frequency of the screen. The average net flow velocity through the screen will be increased 50% to account for flow concentration. The Strouhal number will be NS = 0.14 + 0.01 (d/t), where d = bar depth and t = bar thickness.

F. The trash rake system wiII be capable of cleaning vegetation and other debris across the entire width of the canal. Each rake unit is designed to deposit collected screenings on the service bridge. The trash rake system is designed to clean continuously mm bottom to top for the entire width of trash rack.

G. The rake units will be inclined 46 to 60 degrees from the horizontal. The nominal width of each mechanical rake unit shall be between four (4) and twelve (12) feet. Final configuration will be determined by the Contract Drawing details.

H. Elevations and Dimensions:
1. The nominal width of each bar screen shall be determined by each project criteria.
    a. All elevations are referenced to NAVD 88.
    b. Elevations and dimensions will be field verified.

I. All parts of the mechanism shall be amply proportioned for all stresses that may occur during erection, fabrication, and intermittent or continuous operation.

J. The mechanical rake assembly shall be a chain and drag mechanism utilizing slats mounted at a predetermined spacing on the drive chains. The slats shall be 3/4-inch thick UHMW polypropylene strips with a machined profile matching the bar screen spacing. The slats shall be backed with stainless steel channels or other stainless steel sections for additional strength. Each slat shall be designed to

accommodate a uniform debris load equivalent to 1200 pounds while limiting deflection to no more than U360.

K. The rake shall have head sprockets only, with no sprockets, bearings, or similar drive components permanently installed underwater. The head sprockets shall positively engage the chains.

L. The chain links for the drive chain are designed so that they become their own lower sprocket and frame. The chain shall also have the ability to deflect around large objects such as tires, logs, etc. to avoid shutting down the unit. All links are identical and interchangeable, making paddle mounting and spacing configurable to each site's requirements. Chain Link material is 316 stainless steel, Chain Pin material is 304 stainless steel.

M. The driveshaft shall be mounted in adjustable plates or on blocks that can be adjusted with jack bolts to align the chains.

N. A stripper or cutter assembly shall be installed on the raking device to assist in removing debris from the scrapers.

O. Each rake unit shall be equipped with a speed reducer to provide the required output speed.

P. Bearings shall be anti-friction-type, self-aligning and manually lubricated, with a radial load rating as required for the intended service. Underwater bearings of any kind are not acceptable. The layout of the mechanical rake equipment shall allow for easy access to all the major operating parts of the mechanism for maintenance, cleaning and repair. All lubrication fittings that are not easily accessible shall be modified and equipped with tubing to extend the grease fittings to the nearest accessible location for ease of maintenance. All stainless steel tubing and grease fitting shall be rigidly secured with fasteners and clips as required.

Q. All bolted connections in the mounting and support frame for the mechanical rake drive assembly shall be made with a minimum of two bolts.

R. Each rake unit shall operate independently with its own drive unit and controls.

S. Each rake shall be driven with an electrically operated gear motor sized for the intended loads. The electric gear motor can be 1/8 hp to 3/4 hp, single or 3-Phas e, 60 cycle, (voltage may vary per site). Sumitomo integral gear box (or approved equivalent), capable of operating the scrapers and chain at approximately 28+/- inches per minute. AU electric motors shall be totally enclosed, fan cooled, type, suitable for outdoor service and shall be driven by variable frequency drives. All gearboxes shall have a service factor of 2.0.

T. A reversing starter that is properly sized for the required loading shall be provided for each drive motor. The starter shall be mounted within the trash rake main control panel. Sufficient starter contacts shall be provided to open all motor leads when the motor is de-energized. The starter shall be interlocked electrically and mechanically to prevent energizing forward and reverse contactors simultaneously.

U. Each rake in the system shall be controlled from a single central main control panel, either manually or automatically, located inside the trash rake control building, and from local push button stations located at the rake structure. Local push-button stations for controlling rake mechanism shall be mounted in a NEMA 4X enclosures. The main control panel enclosure shall be rated NEMA 12 for indoor use.

2.5 Trash Rake Support Framing:

A. General: Structural steel support framing will be fabricated of carbon steel plate and structural shapes. The main structural frame shall be fabricated from structural grade channel or wide flange sections.

B. Base Plates and Anchors: The structural steel framing shall be equipped with base plates to facilitate anchoring. Each base plate shall be using stainless steel adhesive anchor bolts. The number of anchor bolts, size, orientation and embedment depth shall meet the requirements of the Florida Building Code. All bolted connections shall be made with a minimum of two bolts.

2.6 Materials of Construction: The trash rake, auxiliary equipment and all accessories shall be of all-stainless-steel construction except where otherwise specified below. All materials shall conform to the latest ASTM specification or other listed commercial specifications covering the class or kind of material to be used.

Component	Material
Bar Screen	304L Stainless Steel, ASTM A167 or A276
Trash Rake Mounting and Support Frame	304L Stainless Steel, ASTM A167
Trash Rake Slats	Ultra-High Molecular Weight (UHMW) Polypropylene
Trash Rake Slat Reinforcing Members	304L Stainless Steel, ASTM A167
Chain Links	316 Stainless Steel, ASTM A276
Chain Pins	304 Stainless Steel, ASTM A276
Chain Guides	UHMW Polypropylene
Drive Shaft	416 Stainless Steel, ASTM A276
Sprockets and Sprocket Pins	304 Stainless Steel, ASTM A276
Bolts, Anchors, Fasteners	316 Stainless Steel, ASTM F593
Nuts	316 Stainless Steel, ASTM F594
Gear Reduction Unit Housing	Cast Iron
Bearing Housings	Stainless Steel
Tubing, Clips, Fasteners	316 Stainless Steel
Structural Steel Framing for Support of Bar Screens, and Trash Rakes	304 Stainless Steel

2.7 Debris Removal Control Systems:

A. Operational Control: The operation of the rake and conveyance equipment shall be determined by the position of an "Auto-Off-Manual" selector switch located on the Control Panel. "Auto" mode shall interlock the rake and conveyance equipment with the operation of the pump station pumps and require no operator

interface for proper operation of the system. "Manual" mode shall allow operation of the system, or any of the system components, by an operator while maintaining all safety features and interlocks.

B. Electrical Controls: The electrical control panel for the rake/conveyance equipment shiall be mounted on the inside of the trash rake control building with local controls, disconnects, etc. as required located adjacent to rake equipment on the trash rake bridge. The control panel enclosure shall be rated NEMA type.

C. Local disconnects, enclosures for local controls, etc. shall be rated NEMA type 12. The controls for the trash rake system shall be integrated into a single control panel. All equipment shall be interlocked as required to sequence the operation of the individual components and to ensure that the system safety features are continuously enabled.

D. NEMA control boxes and other enclosures shall be provided by the trash screen manufacturer.

2.8 Spare Parts: All spare parts shall be duplicates of the original parts furnished and shall be interchangeable. Spare parts shall be packed in crates. One set of replacement parts for all of the wear components of the rake and conveyance equipment will be furnished. Wear components are defined as those structural, mechanical and electrical components that are subject to replacement due to wear for a cycle time less than the twenty-five-year service life of the debris removal system, excluding motors, drive units and/or consumables.

2.9 Special Tools: "Special tools" required for complete assembly, disassembly, or maintenance of the rake and conveyance equipment will be furnished. Special tools are defined as oversized or specially dimensioned tools, special attachments or fixtures, or any similar items.

2.10 Summary: A summary of the trash rake design information is provided below:

Overall Trash Rake Width – ft*	17’ – 6”
Number of Trash Rake Units	3
Rated Capacity of Pump Station / Gated Spillway, Cubic Feet per Second (CFS)	500 cfs
Minimum Continuous Lift Capacity (Each Trash Rake Unit), LBS	6000
Maximum Bar Screen Clear Spacing, Inches	4
Maximum Water Surface Elevation, Upstream, ft	0.9
Minimum Water Surface Elevation, Upstream, ft	-0.6
Maximum Differential Head Across Bar Screen at Rated Pump Station Capacity, 50% Blocked, Inches	8

PART 3: EXECUTION

3.1 Factory Tests: The manufacturer will conduct all necessary factory performance tests to ensure that the mechanical and electrical operation of the equipment to be supplied is in accordance with the specifications and free of defects prior to shipment. The factory test shall include testing of all functional and control interlocks as well as all safety interlocks. All such tests shall be documented and are supplied to the to the customer upon request.

3.2 Factory Inspections: The customer may make periodic visits to the manufacturer's facility to inspect the fabrication and assembly of the equipment. The manufacturer will have detailed fabrication and assembly drawings available for review upon request. Drawing details shall include all dimensions, tolerances, shaft clearances and bearings. The manufacturer will also have available at the time of the inspections purchase orders, mill orders or shop orders including certified material test reports that indicate components and/or materials to be used in the equipment's manufacture.

3.3 The customer will review these records, drawing details and the unit for compliance with the specifications as well as standard industry practice. The customer will provide a written report to the manufacturer of the inspection that will include those items observed to be in non-compliance with the specifications. It will be the manufacturer's responsibility to ensure that all items are corrected. Re-inspection of the items in non-compliance may be requested by the customer.

3.4 Factory Assembly: All equipment will be completely shop-assembled and aligned prior to shipping. Rotating elements shall be checked for binding. The customer may witness the shop assembly if desired. After completion of the specified factory tests, equipment shall be prepared for shipment with the minimum amount of disassembly. Any components removed for shipping shall be match-marked prior to removal and shipment.

3.5 Storage: All equipment placed in storage shall be stored indoors, protected from the weather, humidity and temperature variations, dirt, dust and other contaminants. The manufacturer will locate and procure all off-site storage that may be required throughout the life of the Contract. All on-site and off-site storage provisions are subject to approval by the customer.

3.6 Installation: Installation, start-up and testing of all equipment and associated construction shall conform to the manufacturer's recommendations, and the installation and erection manual. A manufacturer's field representative will meet with the Owner's representative to provide all necessary guidelines and specifications for installation and testing of equipment supplied. The field representative will also inspect all equipment after installation and prior to start-up. Upon completion of the installation the equipment manufacturer will certify in writing to the customer that the equipment has been installed in accordance with the installation and erection manual.

A. Equipment Leveling: The trash rake/conveyance equipment will be installed and leveled by millwrights experienced in setting and leveling heavy equipment. The field installation crew will level the base plates against the anchor bolt nuts using steel leveling blocks and shims at every bolt location to a maximum tolerance of 0.005 in/ft unless otherwise recommended by the manufacturer. Leveling equipment shall be precision surveying equipment. The void space below equipment base plates shall be filled with non-shrink grout. The grout shall be placed in one continuous operation and in a manner to avoid air entrapment. After the grout has attained the required compressive strength, remove the leveling blocks and shims and torque the anchor bolts to the clamping force. Torque bolts in increments of not more than 25 percent of the final value in an alternating pattern to avoid stress concentration on the grout surface. Void spaces created by the removal of the leveling blocks and shims shall be filled with grout after the anchor bolts have been tightened to their final value.

B. Equipment Alignment: All equipment will be aligned in accordance with the manufacturer's installation and erection manual.

3.7 Field Operating Test:

A. General: All field operating and equipment tests will be performed by the manufacturer and in the presence of the customer. The manufacturer's field representative will be present during all operating tests. The instrumentation and controls subcontractor and/or electrical subcontractor will also be present during all operating tests. The manufacturer will be responsible for the coordination of the various trades and responsible parties for the successful performance of all field tests. Should the tests reveal a design deficiency or a manufacturing error, the problem shall be promptly corrected.

B. Operating Tests: Conduct operational tests as necessary to determine that the performance of equipment and controls is as specified. Tests will consist of placing all equipment in operation and performing functional tests and check-out of all system components.

C. Make all necessary equipment adjustments and corrective work indicated by tests.

D. Submit a written test report of all tests performed and their results to the customer.

3.8 Post Construction Inspections: Sixty (60) Day Check: Recheck equipment for alignment after the equipment has been placed in operation for approximately 60 days. All alignment checks shall be performed by an independent qualified testing consultant with all costs borne by the customer. If the alignment variation exceeds the allowable limits the manufacturer will investigate the cause of the problem and, if it is determined to be a defect with the equipment or its installation, the manufacturer will take all necessary action to correct the problem.

PART 4: MEASUREMENT AND PAYMENT

4.1 Measurement for payment for Bar (Trash) Rack for this item will be on LUMP SUM basis as specified herein.

4.2 Payment: Payment for the work under this section will be made under:

ITEM	DESCRIPTION	UNIT
NS-07	304/316 STAINLESS STEEL TRASH SCREEN	LUMP SUM

TECHNICAL SPECIFCATIONS

SECTION NS-08

DEWATERING

1.01 DESCRIPTION

This section shall include supplying materials, equipment, services, and labor necessary to prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area. The Contractor shall dewater and dispose of the water so as not to cause injury to public or private property, or to cause a nuisance or a menace to the public. It shall be the sole responsibility of the Contractor to have adequate equipment and personnel at the site at all times to comply with these requirements.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Excavation Plan.

B. Excavation, Backfill, Fill and Grading

C. Earth Excavation and Backfill in Trenches

1.03 SUBMITTALS

Prior to beginning dewatering operations, and as a part of the excavation plan, the Contractor shall submit, in writing to the Engineer, his proposed plan to comply with the requirements of this section. Submittal shall contain proposed equipment, methods of conveyance, and discharge point for water removed from excavations.

1.04 INSTALLATION

The Contractor shall install all equipment necessary for dewatering. He shall have on hand, at all times, sufficient pumping equipment and machinery in good working condition and shall have available, at all times, competent workmen for the operation of the pumping equipment. Adequate standby equipment shall be kept available at all times to insure efficient dewatering and maintenance of dewatering operation during power failures.

1.05 PERFORMANCE

The control of groundwater shall be such that softening of the bottom of excavations or formation of unstable conditions during excavation shall be prevented. Dewatering systems shall be designed and operated to prevent erosion of the natural soils. Care shall be taken to prevent disturbance, due to the method of dewatering, of pipe bedding already in place in the trench. The Contractor is fully responsible for maintaining the integrity of previously placed pipe and bedding during dewatering and the release of groundwater.

During excavation, construction of structures, installation of pipelines, placement of the structure and trench backfill, and the placing and setting of concrete, excavations shall be kept free of water. The Contractor shall control surface runoff to prevent entry or collection of water in excavations. The static water level shall be controlled in the vicinity of the excavation to maintain the undisturbed state of the foundation soils and allow the placement of any fill or backfill to the required density. The dewatering system shall be installed and operated so that the groundwater level outside the excavation is not altered to an extent that would damage or endanger adjacent structures or property.

1.06 RELEASE OF GROUNDWATER

The release of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted backfill and prevent flotation or movement of structures, pipelines, and sewers.

1.07 MEASUREMENT AND PAYMENT

There will be no field measurement for any dewatering operations. Dewatering will be paid for on a LUMP SUM basis.

Payment will be made under:

ITEM	DESCRIPTION	UNIT
NS-08	DEWATERING OPERATIONS	LUMP SUM

****END OF SECTION****

Section NS-09

Prefabricated Electrical Equipment Building

PART 1 – GENERAL

1.1 Provide all labor, equipment and materials to furnish and install prefabricated portable steel building where shown on the drawings.

1.2 Related work Specified Elsewhere.

A. Electrical service supply and connection.

B. Site/Foundation work.

C. Unloading, placement, installation and anchoring.

D. Plumbing and piping.

1.3 Quality Assurance

A. Structures shall be the product of a manufacturer with a minimum of 15 years documented experience in the design and fabrication of portable steel buildings.

B. Prefabricated electrical equipment building shall be manufactured by Portable King Building System or approved equal.

C. Prefabricated buildings by manufacturers other than the one approved shall submit sufficient data to enable approval to be given. As a minimum: Design drawings and /or calculations, applicable certifications, catalog information, and color samples showing equal range of variety.

D. Electrical devices factory installed within the prefabricated building shall be UL listed.

1.4 References

A. Upon request, the prefabricated building manufacturer shall provide the locations and owners of three (3) similar buildings that have been in service more than three (3) years. This will allow the architect/owner to inspect on site and obtain a statement from the owners on the quality of workmanship (fit and finish).

1.5 Submittals

A. Upon award of order, manufacturer shall prepare and submit copies of shop drawings as required for each different building required for this project. Drawings shall include elevations, section, floor plan, electric schedule, service entrance locations, and anchor clip detail.

B. Color charts illustrating available colors and patterns for specified finishes shall be submitted to owner for prompt selections.

C. Warranty documents.

D. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

PART 2 – PRODUCTS

2.1 Product Construction

Building shall be of welded steel construction with all intersecting welded connections ground smooth. Overall height to be as indicated on drawings. Model number to be Durasteel PC ***Model PC1612 – JS00001447 R1*** as manufactured by Porta-King Building Systems or approved equal.

A. Structural corners and uprights to be 2"x2"x.120 structural ASTM A500 Grade B welded tubing.

2.2 Wall and Ceiling Panels

Wall panels shall be 14 gauge galvanized steel on exterior and 16 gauge galvanized steel on interior. Wall panels to be mechanically fastened to framework to allow field replacement of damaged panels. Overall wall thickness shall be 2". Ceiling to be a steel finished composite panel, painted to match total building.

A. Provide R-13 wall insulation and R–30 ceiling insulation.
B. Plywood to Support Wall Mounted Equipment.

2.3 Finish

All interior and exterior surfaces shall be electrostatically painted with rust inhibitive epoxy primer and shall have a finish coat of air-dry industrial acrylic paint. Building to be painted one color, as selected from standard acrylic finishes.

2.4 Floor Structure

Floor structure to be an integral part of the building with 1 ½" solid waterproof insulating core fit tight against panels and fastened to bottom structural base frame.

A. Finished floor shall be maintenance-free aluminum treadplate floor covering.
B. Standard 6" X 12" Floor Access Cutout
C. Standard 3" Welded Anchor Tabs
D. Reinforced Base Fram

2.5 Doors

Doors to be 3068 HM Steel, 1 ¾" tubular construction and half-glazed. Bottom portion to include smooth painted steel, 2ea.

A. Swing door to swing outward and shall include level lockset with key.

B. ADA compliant door shall include lever lockset and hydraulic door closer.

C. Option 6068 HM Steel Door w/lite

D. Windows to be glazed with 3/16" clear tempered safety glass.

E. Windows in doors to be glazed with 3/16" tinted tempered safety glass.

2.6 Electrical
Electrical service to include singe phase, 100 amp capacity load center with main breaker, pre-wired in conduit, with one 230v circuit and four 115v circuit capacity – provide two spare circuits. Conduits and electrical boxes and fixtures to be surface mounted. All electric work shall be in compliance with the National Electrical Code. All electrical components shall bear the UL label.

A. Furnish two 115v duplex outlet, and one 230v single outlet.

B. Lights to be LED type fixture with acrylic lens and 2 3 way wall switch.

C. Include one Thru-Wall HVAC unit ***230V, 12,000C/10,600HH BTU.***

2.7 Exterior Roof
Exterior waterproof roof with 3" overhang and 6" high fascia.

A. Lifting Lugs on Roof

B. Full length White Downspouts

PART 3 – EXECUTION

3.1 General
Install prefabricated buildings on a flat and level concrete pad in accordance with the manufacturer's placement drawings. Position units over the utility stub-ups; verify building is level and anchor (Anchors are supplied on site, by others. Comply with local codes).

PART 4 – MEASUREMENT AND PAYMENT

4.1 Payment will be made at the contract unit price per Lump Sum for complete materials and installation for the Prefab Electrical Equipment Building.

ITEM NS-09 "PREFAB ELECTRICAL EQUIPMENT BUILDING" paid per LUMP SUM.

DIVISION II

TECHNICAL SPECIFICATIONS

SECTION NS-10

"EXPLORATORY EXCAVATION (0" – 8' DEEP)"

PART 1: DESCRIPTION:

This work consists of excavating at points of potential conflict to determine the exact location, pipe types, and pipe sizes of existing utilities. Approval to proceed shall be in accordance with locations noted on the plans or obtained from Engineer at locations not noted.

PART 2: MEASUREMENT AND PAYMENT:

Payment will be made at the contract unit price for each excavated area up to ten (10) feet long, no more than twice the width of the utility trench wide, and up to eight (8) feet deep as noted.

ITEM NS-10 "EXPLORATORY EXCAVATION (0" – 8' DEEP)" paid per EACH.

* * *

SECTION NS-22: CURE-IN-PLACE LINING FOR STORM DRAINAGE PIPE

PART 1 - GENERAL

1.1 REQUIREMENTS:

A. The Work within this Section consists of the installation and testing of cured-in-place pipe (CIPP). The CIPP shall provide a structurally sound, joint-less and water-tight new pipe within a pipe. The Contractor is responsible for proper, accurate and complete installation of the CIPP.

B. The finished liner shall extend over the installation length in a continuous, tight fitting, watertight pipe-within-a-pipe and shall be fabricated from materials which, when installed, will be chemically resistant to withstand internal exposure to domestic sewage.

C. Neither the CIPP system, nor its installation, shall cause adverse effects to any of the Owner's facilities or processes. The use of the product shall not result in the formation or production of any detrimental compounds or by-products at the treatment facilities. The Contractor shall test and monitor the levels of by-products produced as a result of the installation operations. The Contractor shall conduct installation operations and schedule cleanup in a manner to cause the least possible obstruction and inconvenience to traffic, pedestrians, businesses, and property owners or tenants.

1.2 INSTALLER EXPERIENCE AND QUALIFICATIONS:

A. The Contractor's staff experience shall meet as a minimum the following requirements. The inability to document such experience may be grounds for rejecting the proposed installer's staff.

1. CIPP Contractors shall have a minimum of three (3) years of active continuous experience installing CIPP liners in pipe of similar size, length and configuration as proposed in the project. In addition, Contractor shall have successfully installed at least 1,000,000 feet of CIPP liner product applications. Of this 1,000,000 feet, 250,000' of this installed footage will have been installed within the State of Louisiana.

1.3 PERFORMANCE WORK STATEMENT:

A. The Contractor shall submit, before any lining WORK is performed, to the Owner a Performance Work Statement (PWS) which clearly defines the CIPP product delivery in conformance with the requirements of these contract documents. The PWS shall contain at a minimum the following:

1. A detailed installation plan describing:

a. All preparation work (cleaning operations, pre-CCTV inspections, by-pass pumping, and traffic control).

b. Installation procedure and method of curing.

c. Service reconnection.

d. Quality control and testing to be performed.
e. Post-CCTV inspection.
f. Warrantees.
g. Description of the proposed CIPP lining technology.

2. A detailed plan for identifying all active service connections prior to, and in advance of, mainline installation. The Contractor will assume all costs associated with improper or inadequate verifications of active service or lateral connections. No compensation will be paid for remedying reinstatement of inactive laterals or for time delays due to improper or inadequate active service verifications.
3. The qualifications of the Contractor.
   a. Name, business address and telephone number
   b. Personnel names, experience, and certifications for Field Superintendent, CIPP lead Installer, Lateral Cutter, Boiler Technician, and Lead CCTV NASSCO PACP Certificated Inspector to be directly involved with this project. The Contractor shall sign and date the information provided and "certify that to the extent of his knowledge, the information is true and accurate, and that the supervisory personnel will be directly involved with and used on this project". Substitutions of personnel and/or methods will not be allowed without written authorization of the Owner.
   c. Specialty technicians shall be certified by the equipment manufacturer and/or its authorized representative. Certifications shall be submitted to the Owner/Professional.
4. Proposed manufacturer's technology data shall be submitted for all CIPP products and all associated technologies to be furnished.
5. All tools and equipment required for a complete installation of the CIPP.
   a. Clearly describe all equipment including proposed back-up equipment to be furnished for this project.
   b. Identify redundant tools and equipment to be kept on the job site in the event of equipment breakdown.
   c. The Contractor shall outline the mitigation procedure to be implemented in the event of key equipment failure during the installation process for the CIPP.
6. A detailed description of the Contractor's proposed procedures for the removal of any existing blockages in the pipeline that may be encountered during the cleaning process.
7. Detailed public notification plan for stage notification to residences affected by the CIPP installation.
8. An odor control plan that will ensure that project specific odors will be minimized at the project site and surrounding area.

9. Outline specific repair or replacement procedures for potential defects that may occur in the installed CIPP. Repair or replacement procedures shall be as recommended by the CIPP system manufacturer and shall be submitted prior to any Work.
    a. Repairable defects that may occur in the installed CIPP shall be specifically defined by the Contractor based on the manufacturer's recommendations, including a detailed step-by-step repair procedure, resulting in a finished product meeting the requirements of the specifications.
    b. Un-repairable defects that may occur to the CIPP shall be clearly defined by the Contractor based on the manufacturer's recommendations, including a recommended procedure for the removal and replacement of the CIPP.

1.4 REFERENCES:

A. Codes, Specifications, and Standards

1. Codes, specifications, and standards referred to by number or title shall form a part of this specification to the extent required by the references thereto. Latest revisions shall apply, unless otherwise shown or specified.
2. All American Society for Testing and Materials (ASTM) Standards noted below shall be to the latest revised version.

D543 – Standard and Practice for Evaluating the Resistance of Plastics to Chemical Reagents

D638 – Standard Test Method for Tensile Properties of Plastics

D790 – Standard Test Methods for Flexural Properties of Un-reinforced and Reinforced Plastics and Electrical Insulating Materials

D792 – Standard Test Methods for Density and Specific Gravity of Plastics by Displacement

D2122 – Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

D2837 – Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials

D2990 – Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics

D3567 – Standard Practice for Determining Dimensions of Fiberglass (Glass-FiberReinforced Thermosetting Resin) Pipe and Fittings

D3681 – Standard Test Method for Chemical Resistance of "Fiberglass (Glass Fiber Reinforced Thermosetting Resin) Pipe and Fittings

D5813 – Standard Specification for Cured-in Place Thermosetting Resin Sewer Pipe

F1216 – Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Inversion and Curing of a Resin-impregnated Tube

F1743 – Standard Practice for Rehabilitation of existing pipelines and conduits by pulled-in-place installation of cured-in-place thermo setting resin pipe

F2019 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured-in-Place Thermosetting Resin Pipe (CIPP)

F2599 – The Sectional Repair of Damaged Pipe By Means of An Inverted Cured-In-Place Liner.

1.5 RESPONSIBILITY FOR OVERFLOWS AND SPILLS:

A. It shall be the responsibility of the Contractor to schedule and perform his work so as to result in no overflows or spills of sewage or combined sewage from the system. If sewage flows are such that they interfere with the Contractor's ability to perform work, the Contractor shall be responsible for scheduling his work during low flow periods or provide bypass pumping.

B. In the event of overflows caused by the Contractor's work activities, the Contractor shall immediately take appropriate action to contain and stop the overflow, clean up the spillage, disinfect the area affected by the spill, and notify the Owner and all necessary regulatory agencies in a timely manner.

C. Contractor will indemnify and hold harmless the Owner for any fines or third-party claims for personal or property damage arising out of a spill or overflow that is fully or partially the responsibility of the Contractor. Should fines subsequently be imposed as a result of any overflow for which the Contractor is fully or partially responsible, the Contractor shall pay all such regulatory and other fines and all of the Owner's legal, engineering, and administrative costs in defending such fines and claims associated with the overflow.

1.6 SHOP DRAWINGS AND SUBMITTALS

A. Submittals shall be submitted to the Owner for review and acceptance prior to construction in accordance with the General Conditions and specifications. Submittals shall include the following:

1. Performance Work Statement shall be provided with a table of contents and tabbed sections.

2. Product:
   a. A list of projects from the Contractor that total a minimum of 1,000,000 linear feet of liner installed in the United States and 250,000 linear feet installed in the State of Louisiana. An Excel spread sheet shall be included listing as a minimum the name of projects, diameters of mains, linear footage of mains, completion date, contract amount, name of owner, address, contact person, and phone number.
   b. Fabric tube – manufacturer and description of product components.
   c. Flexible membrane (coating) material and recommended repair (patching) procedure if applicable.
   d. Raw resin data – manufacturer and description of product components for all resin types.
   e. Manufacturer's shipping, storage and handling recommendations for all components of the CIPP system.
   f. All MSDS sheets for all materials to be furnished.
   g. Tube wet-out and cure method including:
      1) A complete description of the proposed wet-out procedure for the proposed technology
      2) Contractors wet out facility will be located within 100 miles of Jefferson Parish's central government office located at South Clearview Pkwy, Jefferson, LA.
      3) The manufacturer's recommended cure method for each diameter and thickness of CIPP liner to be installed including the curing medium and the method of application

3. Quality Control Plan:
   a. Defined responsibilities of the Contractor's personnel for assuring that all quality requirements are met. These will be assigned by the Contractor to specific personnel.
      Proposed procedures for quality control, product sampling and testing shall be defined and submitted as part of the Plan.
   b. Proposed methods for product performance controls, including the method of and frequency of product sampling and testing both in raw material form and cured product form.

c. Inspection forms and guidelines for quality control inspections shall be prepared in accordance with the standards specified within this specification.
d. The manufacturer shall furnish a check list containing key elements of the CIPP installation criteria that is important for the Owner to ensure that quality control and testing requirements are performed in accordance with these specifications.

4. Engineering design calculations shall be submitted in a timely fashion prior to construction, in accordance with the Appendix of ASTM F-1216. All calculations shall include data that conforms to the requirements of these specifications.
   a. The manufacturer shall certify as to the compliance of its materials to the values used in the calculations.
5. Certified copies of test reports of factory tests required by the applicable standards.
6. Manufacturer's installation instructions and procedures.
7. CIPP Installation Record (Shot Record) to include shot number and corresponding location of each scheduled installation, design thickness, actual thickness delivered to the site, pipe diameter and length.
8. Manufacturer's detailed procedures for repairing liners that have been installed incorrectly or that have failed during installation.
9. Sampling procedures and locations for obtaining representative samples of the finished liner.
10. Sampling tests for compliance by an independent laboratory shall be made according to the applicable ASTM specification and the manufacturer's quality control program.

B. A final certificate of compliance with this specification shall be provided by the manufacturer for all lining material furnished. Test results of resin associated with 10,000hr test results shall be submitted to the engineer, reviewed and approved prior to starting any work.

1.7 WARRANTY:

A. The materials used for the project shall be certified by the manufacturer for the specified purpose. The Contractor shall warrant the liner material and installation for a period of one (1) year. During the Contractor warranty period, any defect which may materially affect the integrity, strength, function and/or operation of the pipe, shall be repaired at the Contractor’s expense in accordance with procedures in these specifications and as recommended by the manufacturer.

B. On any work completed by the Contractor that is defective and/or has been repaired, the Contractor shall warrant this work for an additional one (1) year.

1.8 DELIVERY, STORAGE, AND HANDLING:

A. The Contractor shall be responsible for the delivery, storage, and handling of products. No products shall be shipped to the job site without the approval of the Owner.

B. Keep products safe from damage. Promptly remove damaged products from the job site. Replace damaged products with undamaged products.

PART 2 - PRODUCTS

2.1 GENERAL

A. The materials used shall be designed, manufactured, and intended for sanitary sewer pipe relining and the specific application in which they are used. The materials shall have a proven history of performance in drainage pipe relining and rehabilitation.

B. Pipe lining products pre-approved by the Owner include: Insituform Technologies (CIPP Liner), BLD Services, LLC (United Felts/INTERPLASTICS COR78 and COR78 resin) or approved equal. All products must meet the specification herein and will require approval prior to installation.

C. All materials, shipped to the project site, shall be accompanied by test reports certifying that the material conforms to the ASTM listed herein. Materials shall be shipped, stored, and handled in a manner consistent with written recommendations of the CIPP system manufacturer to avoid damage. Damage includes, but is not limited to, gouging, abrasion, flattening, cutting, puncturing, or ultra-violet (UV) degradation. On site storage locations, shall be approved by the Owner. All damaged materials shall be promptly removed from the project site at the Contractor's expense and disposed of in accordance with all current applicable agency regulations.

D. The finished pipe liner in place shall be fabricated from materials which when complete are chemically resistant to and will withstand internal exposure to domestic sewage having a pH range of 5 to 11 and temperatures up to 150ºF.

E. Take all necessary field measurements of the existing pipe (including diameter, ovality and length) prior to manufacturing liners.

F. The minimum length shall be that deemed necessary by the Contractor to effectively span the distance from the inlet to the outlet of the pipe unless otherwise specified. The Contractor shall verify the lengths in the field before manufacturing.

2.2 STRUCTURAL REQUIREMENTS

A. Each CIPP shall be designed to withstand internal and/or external loads as dictated by the site and pipe conditions. The CIPP design shall assume no bonding to the original pipe wall.

B. The Contractor must have performed long-term testing for flexural creep of the CIPP pipe material installed by his company. Such testing results are to

be used to determine the long-term, time dependent flexural modulus to be utilized in the product design. The long-term modulus shall not exceed 50 percent of the short-term value for the resin system and shall be verifiable through testing. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in the CIPP design.

C. The Contractor shall submit, prior to installation of the lining materials, certification of the compliance with these specifications and/or the requirements of the CIPP system. Certified material test results shall be included that confirm that all materials conform to these specifications. Materials not complying with these requirements will be rejected.

D. The design thickness of the CIPP shall be arrived at using standard engineering methodology as found in ASTM F1216 and the physical properties. In no case shall the finished thickness of the cured liner be less than 4.5 millimeters. The required cured structural CIPP wall thickness shall be based, as a minimum, on the physical properties described below:

The CIPP system felt and resin composite shall have the minimum physical properties given below and in accordance with the guidelines in the appendix of the latest version of ASTM F1216.

1	Design Life:	50 years
2	Pipe Diameters:	Per Contract Documents
3	Ovality:	2%
4	Pipe Condition:	Fully deteriorated
5	External Water:	ground surface
6	Flexural Strength:	4,500 psi
7	Short Term Flexural Modules:	250,000 psi
8	Reduction Factor:	50%
9	Long Term Flexural Modules:	125,000 psi
10	k Enhancement Factor:	7
11	Soil Modules:	1,000 psi
12	Soil Density:	120 pcf
13	Highway Live Load:	AASHTO HS20-44
14	Safety Factor:	2 minimum
15	Min. Thickness(=<10”):	6 mm
16	Min. Thickness (>10”) :	7.5 mm
17	If calculations require thicker wall round to the next higher multiple of 0.5 mm.	

Minimum Physical Properties

Property	Standard	Cured Composite per ASTM F1216 (PSI)
Flexural Strength (short term)	ASTM D790	4,500
Flexural Modulus of Elasticity (short term)	ASTM D790	250,000

E. When multiple layers are present, the layers of the finished CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or such that the knife blade moves freely between the layers. If separation of the layers occurs during testing of the field samples, new samples will be cut from the work. The composite of the materials will, upon installation inside the host pipe, exceed the minimum test standards specified by the American Society for Testing Methods. Any reoccurrence may be cause for rejection of the work.

2.3 CURED-IN-PLACE LINER

A. Fabric

1. The Contractor shall determine the minimum tube length necessary to effectively span the designated run between manholes. The Contractor shall verify the lengths in the field prior to ordering and prior to impregnation of the tube with resin, to ensure that the tube will have sufficient length to extend the entire length of the run. The Contractor shall also measure the inside diameter of the existing pipelines in the field prior to ordering liner so that the liner can be installed in a tight-fitted condition.
2. The tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F-1216, ASTM F1743, or ASTM D5813. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe, and stretch to fit irregular pipe sections.
3. The wet out tube shall have a relatively uniform thickness that when compressed at installation pressures will equal or exceed the calculated minimum design CIPP wall thickness.
4. The flexible tube shall be fabricated to a size that when installed will neatly fit (minimum 99.75%) the internal circumference of the existing drain lines. Allowance shall be made for circumferential stretching during insertion so that the final cured product is snug against the wall of the host pipe.
5. The outside layer of the tube shall be coated with an impermeable, flexible membrane that will contain the resin and allow the resin impregnation (wet out) procedure to be monitored. The outer layer

(coated layer) shall be stitched where the two ends of the circular material form a tube, with an extruded seam covering the stitched seam. Solvent weld/chemical bond seams will not be allowed.

6. The tube shall contain no intermediate or encapsulated elastomeric layers. No material shall be included in the tube that may cause delamination in the cured CIPP. No dry or unsaturated layers shall be evident.
7. The wall color of the interior pipe surface of CIPP after installation shall be a relatively light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.
8. Seams in the tube shall be stronger than the non-seamed felt material.
9. The tube shall be marked for a distance at regular intervals along its entire length, not to exceed five feet. Such markings shall include the Manufacturers name or identifying symbol.
10. Unless otherwise specified, the Contractor will use a polyester filter felt tube and a resin and catalyst system compatible with the inversion process and having the minimum physical properties for the cured pipe per manufacturer's requirements.

B. Resin:

1. The resin system shall be a corrosion resistant polyester or vinyl ester resin and catalyst system or epoxy and hardener system that when properly cured within the tube composite, meets the minimum requirements of ASTM F1216, ASTM F1743 or F2019, and manufacturer's requirements.
2. The resin used shall not contain non-strength enhancing fillers.
3. The resin shall produce a CIPP that will comply with the structural and chemical resistance requirements of the specification.
4. The Contractor is responsible for ensuring that the appropriate resin is used for optimal adherence to the existing pipe materials and note what CIP materials will be used for lining through each type of material in their submittals and how this will be tracked prior to installation. If a section of gravity main piping to be lined consists of multiple pipe materials, the contractor is responsible for ensuring a type of resin is used which will provide optimal adherence to all pipe materials at no additional cost to the Owner. It should be assumed that the full length of each section of liner must meet the advanced resin requirements if one section or segment of the piping requires an upgraded resin to ensure optimal adherence to the piping material.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prior to any lining of a pipe so designated:

1. It shall be the responsibility of the Contractor to remove all internal debris and clean the existing drain line in accordance with the recommendations of the liner manufacturer prior to installation of the liner.
    a. Preparation of the interior surface shall be accomplished by a thorough high-pressure water-jet cleaning. The pipe shall be left free of all loose sand, rock, or other deleterious materials. Any roots in the pipe shall be either removed or cut off flush with the interior.
    b. If conditions such as broken pipe and major blockages are found that will prevent proper cleaning or where additional damage would result if cleaning is attempted or continued, the Contractor shall notify the Owner immediately. The Owner will determine what course of action will be taken to complete the project.
    c. Precautions shall be taken by the Contractor to ensure that no damage or flooding of public or private property is caused by the cleaning operation.
    d. The Owner shall inspect the prepared pipe for cleanliness and smoothness before the Contractor is authorized to proceed with pipe lining operations.
2. Certified PACP personnel trained in locating breaks, and obstacles by closed circuit television shall perform inspection of existing drain lines. The interior of the line shall be carefully inspected in any condition that may prevent proper installation of the liner pipe into the lines. Such conditions shall be noted so they can be corrected. A digital data video and a suitable log shall be prepared by the Contractor during the Work and provided to the Owner a minimum of two weeks prior to liner installation.
3. The Contractor shall provide for the flow of storm water around the section.
    a. Flow control shall be exercised as required.
    b. During the review, testing and installation portion of the operation, flows shall be shut off in order to properly install the cured-in-place pipe lining. The upstream end shall be constantly monitored for degree of surcharging. After the installation is complete, flows shall be restored to normal level.
    c. During a bypass operation, the pump shall be manned continuously; the Contractor shall maintain the pump and

bypass equipment; and shall be responsible for any damages to public or private property due to the malfunction of same.

4. The Contractor shall clear the line of obstructions. If inspection reveals an obstruction that cannot be removed by conventional cleaning equipment, then the Owner shall be notified immediately.
5. Do not install liner if ground water temperatures and/or ambient temperatures are excessive or do not meet the manufacturer's recommendations for the product installation procedures.
6. Traffic Control: The Contractor shall provide all traffic control measures required for the safety of the public, workers and equipment during the Work and in accordance with FDOT, the City or County, and the Owner.
7. The Contractor shall provide critical backup equipment to insure that the lining operation progresses without interruption. Required backup equipment shall include at a minimum 1 additional CCTV camera system.

3.2 INSTALLATION OF LINER

A. The CIPP liner shall be installed and cured in the host pipe per the manufacturer's specifications as described and submitted in the Performance Work Statement. CIPP installation shall be in accordance with the applicable ASTM Standards with the following modification:

1. Prior to installation and as recommended by the manufacturer remote temperature gauges or sensors shall be placed inside the host pipe to monitor the temperatures during the cure cycle. Liner and/or host pipe interface temperature shall be monitored and logged during curing of the liner.
2. The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing heat source. Another such gauge shall be placed between the impregnated reconstruction tube and the pipe invert at the remote manhole to determine the temperatures during cure. The resin manufacturer shall recommend temperature in the line during the cure period.
3. The wet-out tube shall be positioned in the pipeline using the method specified by the manufacturer. Care should be exercised not to damage the tube as a result of installation. The tube shall be inverted through an existing manhole or approved access point and fully extend to the next designated manhole or termination point. Sufficient excess resin will be provided to insure excretion into cracked pipe and/or joints of the host pipe after curing.
4. After inversion is completed, the Contractor shall supply suitable heat source and recirculation equipment. The equipment shall be capable of delivering the heat source throughout the section uniformly to raise the temperature above the temperature required to affect a cure of

the resin. This temperature shall be determined by the resin/catalyst system employed. Temperatures shall be monitored and recorded throughout the installation process to ensure that each phase of the process is achieved at the manufacturer's recommended temperature levels. Copies of these records shall be given to the Owner at the completion of each installation.

5. Curing shall be accomplished by utilizing the appropriate medium in accordance with the manufacturer's recommended cure schedule. The curing source input and output temperatures shall be monitored and logged during the cure cycles if applicable. The manufacturer's recommended cure method and schedule shall be used for each line segment installed, and the liner wall thickness and the existing ground conditions with regard to temperature, moisture level, and thermal conductivity of soil, per ASTM Standards as applicable, shall be taken into account by the Contractor.
6. For heat cured liners, if any temperature sensor or multiple sensors do not reach the temperature as specified by the manufacturer to achieve proper curing or cooling, the installer can make necessary adjustments to comply with the manufacturer's recommendations. The system computer should have an output report that specifically identifies each installed sensor station in the length of pipe, indicates the maximum temperature achieved and the sustained temperature time. Each sensor should record both the maximum temperature and the minimum cool down temperature and comply with manufacturer's recommendations.
7. For UV cured liners, all light train sensor readings, recorded by the tamper proof computer, shall provide output documenting the cure along the entire length of the installed liner. The cure procedure shall be in accordance with the manufacturer's recommendation as included in the performance work statement.
8. Temperatures and curing data shall be monitored and recorded by the Contractor throughout the installation process to ensure that each phase of the process is achieved as approved in accordance with the CIPP system manufacturer's recommendations.
9. The Contractor shall immediately notify the Owner of any delays taking place during the insertion operation. Such delays shall possibly require sampling and testing by an independent laboratory of portions of the cured liner at the Owner's discretion. The cost of such test shall be borne by the Contractor and no extra compensation will be allowed. Any failure of sample tests or a lack of immediate notification of delay shall be automatic cause for rejection of that part of the Work at the Owner's discretion.
10. Initial cure shall be deemed to be completed when inspection of the exposed portions of cured pipe appear to be hard and sound and the

remote temperature sensor indicates that the temperature is of a magnitude to realize an exotherm. The cure period shall be of a duration recommended by the resin manufacturer, as modified for the cured-in-place inversion process, during which time the recirculation of the heat source and cycling of the heat exchanger to maintain the temperature continues. Contractor shall retain a resin-impregnated sample (wick) to provide verification of the curing process taking place in the host pipe.

11. The Contractor shall cool the hardened pipe to a temperature below 100°F before relieving the static head in the inversion standpipe. Cool-down may be accomplished by the introduction of cool water into the inversion standpipe to replace water being drained and disposed per the approved pre-treatment plan. Care shall be taken in the release of the static head so that a vacuum will not be developed that could damage the newly installed pipe.
12. If the pipe liner fails to make a tight seal due to broken or misaligned pipe at both ends, the Contractor shall apply a seal at that point.
13. The temperature of water discharged to the drainage system from processing liners shall not exceed 100°F maximum or the level allowed by State or Local standards. When draining water, care shall be exercised not to create a vacuum in the line.

3.3 POST INSTALLATION

A. Defects

1. The liner shall be continuous and free of all visual and material defects except those resulting from pre-lined conditions (such conditions shall be brought to the attention of the Owner prior to lining).
2. There shall be no damage, deflection, holes, delaminating, uncured resin or other visual defects in the liner.
3. The liner surface shall be smooth and free of waviness throughout the pipe.
4. No visible leakage through the liner will be allowed.
5. Any defects located during the inspection shall be corrected by the Contractor to conform to the requirements of the specifications and to the satisfaction of the Owner.
6. Repairable defects that may occur in the installed CIPP shall be specifically defined by the Contractor based on manufacturer's recommendations, including a detailed step-by-step repair procedure, resulting in a finished product meeting the requirements of these contract specifications.
7. Un-repairable defects that may occur to the CIPP shall be clearly defined by the Contractor based on the manufacturer's recommendations, including a recommended procedure for the

removal and replacement of the CIPP.

B. Portions of any piece of liner material removed during installation shall be available for inspection and retention by the Owner.

3.4 TESTING

A. The physical properties of the installed CIPP shall be verified through field sampling and laboratory testing. All testing shall be furnished by the Contractor. All materials testing shall be performed at the Contractor's expense, by an independent third party laboratory that is familiar with testing procedures of CIPP materials. All tests shall be in accordance with applicable ASTM test methods to confirm compliance with the requirements in these documents.

B. The Contractor shall pay for all testing included in this section

C. The Contractor shall provide samples for testing from the actual installed CIPP liner. The Contractor shall determine sampling location and procedures to ensure representative samples are obtained from the finished liner, subject to the approval by the Owner. The contractor shall provide removable sizing sleeves, when possible, to collect liner samples, which accurately replicate the host pipe diameter.

1. A minimum of 1 sample shall be taken of the first segment installed or as directed by the Owner.
2. A sample shall be cut from a section of cured liner that has been inverted or pulled through a like diameter pipe which has been held in place by a suitable heat sink such as sandbags.
3. All curing, cutting, and identification of samples shall be witnessed by the Owner's representative.

D. Tests of the samples shall be conducted in accordance with ASTM standards.

1. Short term flexural properties: The initial tangent flexural modulus of elasticity and flexural strength shall be measured in accordance with test methods in ASTM D790.
2. CIPP wall thickness shall be determined in a manner consistent with ASTM D5813, section 8.1.2. Thickness measurements shall be made in accordance with the practice in ASTM D3567 for ASTM D5813, section 8.1. Deduct from the measured values the thickness of any plastic coating or CIPP layer not included in the structural design of the CIPP. The average thickness shall be calculated using all measured values and shall meet or exceed the minimum design thickness. The minimum wall thickness at any point shall not be less than 87.5% of the approved specified thickness.

E. The installed CIPP thickness shall be measured for each liner shipment to the job site. If the CIPP thickness does not meet that specified in the contract and submitted as the approved design by the Contractor, then the liner shall be repaired or removed.

3.5 ACCEPTANCE

A. Liner

1. It is the intent of these specifications that the completed liner with all appurtenances shall be essentially equivalent in final quality and appearance to new sewer installation.
2. The finished liner shall be continuous over the entire segment between two ends and homogenous throughout.
3. The finished liner shall be fully rounded and as free as commercially practicable from visible defects, including but not limited to damage, deflection, holes, delamination, ridges, cracks, uncured resin, foreign inclusions or other objectionable defects.
4. Where a defect in the liner requires removal of a section of the liner in the Owner's opinion, the Contractor shall make all repairs as required by the Owner and shall install a segmental liner, compatible with the liner, to accomplish a continuous finished liner. The minimum required length of the liner will be to remedy the defective area as well as overlapping the area for at least 3 feet on each side of the defect, unless termination at the end of the pipe.

B. Defects: Any defect which will or could affect the structural integrity, strength of the lining, flow impairment, or leaks shall be repaired as outlined below or in accordance with the approved repair or replacement procedures as recommended by the CIPP system manufacturer. The repair or replacement of the defects will be at the Contractor’s expense. Repair or replacement of defects shall include an extended warranty at no cost to the Owner for an additional year after the defect was repaired or replaced.

1. Leaks
    a. There shall be no visible infiltration through the liner. Contractor shall repair any visible leaks and the repair method shall be approved by the Owner.
2. Wrinkles/Fins
    a. Wrinkles outside the flow line of the pipeline:
        (1) Wrinkles/fins in height up to a maximum of 5% of the inside diameter of the host pipe are acceptable
        (2) Wrinkles/fins over 5%, particularly those of a longitudinal configuration, may be acceptable and should be evaluated, by the project engineer for acceptance, on a case-by-case basis.
    b. Wrinkles in the flow line:
        (1) Wrinkles/fins projecting more than 5% into the flow that are generally longitudinal in their orientation may be deemed acceptable by the Owner on a case-by-case basis by considering any potential operation and maintenance issues that would result from their being left in place.

(2) Wrinkles/fins in the lower third or flow line of the finished CIPP (based upon the depth of flow) that are generally circumferential in their orientation should not exceed 0.5-inches, whichever is smaller.

(3) Acceptability of larger wrinkles/fins meeting this characterization shall be, on a case-by-case basis by the Owner with consideration given to potential operations and maintenance issues that would result from their being left in place.

c. Repair when wrinkles/fins are removed:

(1) Wrinkles should be fully cured, tight and the resin should be homogeneous across the full width of the wrinkle.

(2) In most cases, when wrinkles/fins are removed from the installed CIPP, the resin in the liner pipe is fully cured and homogeneous and no further repair is required. If a repair is required the manufacturer should be contacted for the correct repair procedure.

3. Blisters should be probed and punctured to determine the existence of water behind the blister.
   a. No action required unless the pipe is leaking at the blisters.
4. Lifts in Liner
   a. Soft lifts should be re-processed by the Contractor to fully cure the CIPP.
   b. Hard lift shall be removed and a new short liner as required being equivalent to the original installed CIPP.
5. A bulge in the invert caused by residual debris left in the pipe that impedes the flow characteristics of the pipeline should be cut out.
   a. Cut out the section of the bulge and replace with a new short liner equivalent to the original product or as recommended by the manufacturer.
6. Pinholes: the area where the liner has pinholes should be patched with a shortliner repair or the liner removed and replaced as recommended by the manufacturer.
7. Soft spot in liner needs to be reheated and hardened or cut out and replaced or as recommended by the manufacturer.
8. Dry tube or white spots are not acceptable and shall be removed and a patch repair shall be performed or as recommended by the manufacturer.
9. Liner surface peeled off.
   a. Cut out a representative sample of the CIPP.
   b. Test physical properties and remaining CIPP thickness to verify that the contract design requirements are met.

c. Replace liner or as recommended by the manufacturer.

10. Hole in the liner is not acceptable.
    a. Small holes can be repaired with epoxy.
    b. Short liner installed over larger holes or as recommended by the manufacturer.
11. Cracks in liner are unacceptable and shall be repaired.
12. Loose liner seam tape shall be removed to prevent potential hang-up of debris.
13. Annular space between host pipe and liner at manhole.
    a. If leaking between the host pipe and the CIPP, inject a hydrophilic type grout to stop the leakage.
    b. If the pipe is located in groundwater, inject a hydrophilic type grout to stop possible future leakage.
    c. If the pipe is not in groundwater, a cementitious grout can be used to fill the space.
14. Liner Delamination
    a. Cut out the section of delaminated liner and replace with a new short liner equivalent to the original product or as recommended by the manufacturer.
15. Improper repair of CIPP: duct tape is not an acceptable repair for any situation.
16. The CIPP should fit tight inside the host pipe.
    a. If the CIPP does not fit tightly against the original pipe at its termination point(s), the full circumference of the CIPP exiting the existing host pipe should be sealed by filling with a resin mixture compatible with the CIPP.

3.6 CLEAN-UP AND RESTORATION

A. The Contractor shall not allow the site of the Work to become littered with trash and waste material, but shall maintain the site in a neat and orderly condition throughout the construction period.

B. On or before completion, the Contractor shall clean and remove from the site of the Work all surplus and discarded materials, temporary structures, stumps and portions of trees, and debris of any kind. He shall leave the site of work in a neat and orderly condition, similar or equal to that prior to construction.

C. All private and public property along or adjacent to the Work disturbed by construction operations shall be restored to a condition similar or equal to that existing prior to construction.

D. Before final acceptance by the Owner, the Contractor shall replace and/or restore any water, sewer, drain, and gas lines and appurtenances; electrical, telephone, telegraph conduits and wires, both underground and aboveground, and appurtenances; traffic signals, fire and police alarm systems and appurtenances; sidewalks, curbs, gutter, drainage ditches and

pavements and all other public utility facilities and appurtenances along or adjacent to the Work that may have been disturbed by construction operations.

E. Conditions permitting, property cleanup and restoration shall begin and be prosecuted to completion on a timely basis as set forth herein.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Payment for this work will be as noted.

ITEM NS-22 “CIPP LINER FOR 72” CMP AT CPKC RAILROAD” paid per LINEAR FOOT.

Railroad permit shall be obtained by the contractor and inspection fees and any other expenses shall be paid by the contractor. The permit will be initiated by the Engineer. The contractor will be responsible for performing the following tasks and any other associated work per railroad requirements:

- Sheetpile design parameters for excavation pit for CIPP liner installation.
- Cure-in-place lining procedure.
- Settlement monitoring plan.
- General construction procedures and recommendations per manufacturer.
- Insurance payment.

See attached Appendix “B” for CPKC Railroad Crossing Requirements.

END OF SECTION

SECTION 16010

ELECTRICAL GENERAL PROVISIONS

PART 1: GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall provide electrical work, complete and operable, in accordance with the Contract Documents.

B. The provisions of this Section apply to all sections in Division 16, except as indicated otherwise.

C. The WORK in this Section is to provide new plant electrical systems, upgrade existing electrical systems, and to provide for electrically powered equipment where provided under specifications in other Divisions. The CONTRACTOR's attention is directed to the requirement for proper coordination of the WORK of this Section with the WORK of equipment specifications and with the Owner's requirement to keep the existing plant running at all times. See Civil and Mechanical Specifications for Suggested Construction Sequence. The electrical work shall be coordinated and performed hand in hand with all other trades such that the plant construction sequence can be accomplished.

D. All concrete, excavation, backfill, and steel reinforcement work required for encasement, installation, or construction of the work of the various sections of Division 16 is included as a part of the work under the respective sections, including duct banks, manholes, handholes, equipment housekeeping pads, and light pole bases.

1.02 REFERENCE STANDARDS

A. The WORK of this Section and all sections in Division 16 shall comply with the following as applicable:

NEC (NFPA 70)	National Electrical Code – latest edition
NESC	National Electrical Safety Code – latest edition
NETA	International Electrical Testing Association, NETA ATS-2021 edition
NEMA 250	Enclosure for Electrical Equipment
NFPA 820	Standard for Fire Protection in Wastewater Treatment and Collection Facilities, 2020 edition

B. All electrical equipment shall be listed by and shall bear the label of Underwriters' Laboratories, Inc. (UL) or an independent testing laboratory acceptable to the local code enforcement agency having jurisdiction.

C. Installation of electrical equipment and materials shall comply with OSHA Safety and Health Standards (29 CFR 1910 and 29 CFR 1926, as applicable), state building standards, and applicable local codes and regulations.

D. Where the requirements of the specifications conflict with UL, NEMA, NFPA, or other applicable standards, the more stringent requirements shall govern.

1.03 SUMMARY OF ELECTRICAL WORK

A. Drawings: Refer to the Electrical Drawings for graphic representations, schedules and notations showing electrical work.

1. The Drawings show approximate locations only of feeders, branch circuits, outlets, etc., except where specific routing or dimensions are indicated. The Engineer reserves the right to make reasonable changes in locations indicated before roughing in without additional cost to the Owner.

2. Because of the small scale of the Drawings, it is not possible to indicate all of the offsets, fittings, and accessories required. The Contractor shall investigate the structural and finish conditions affecting his work and shall arrange such work accordingly, furnishing fittings, bends, junction boxes, pull boxes, access panels, and accessories required to meet such conditions.

3. The Contractor shall allow in its Bid, procurement, installation and testing work for variations in the site dimensions, layout, ease of access, and construction utilities available at the cost of the Contractor because of site variations.

B. Specifications

1. Refer to the DIVISION 16 sections for the primary technical specifications of electrical work.

2. General Outline: This section of the specifications covers furnishing materials, equipment, constant competent supervision, special tools, test equipment, technicians, and labor necessary for installation of a complete working electrical system, all as indicated on the plans and in these Specifications.

C. Scope

1. Under this part of the contract, install all electrical associated with the Reserve Relief Homewood Pump Station, St. John the Baptist Parish, Louisiana.

2. The work shall include but not necessarily be limited to the following:

a. See drawings and specifications.

All proposed construction shall be elevated above Base Flood elevation, such that it shall not be affected by future flooding.

b. Supply and Install Major New Equipment:

i. The Contractor shall be responsible to coordinate all work at the pump station with the Utility Company, including the Utility service drop, Utility metering, and Utility installation requirements. The Contractor shall be responsible for continuation of the Utility service to the Automatic Transfer Switch ATS-1; Emergency stand-by power generator; 480V feeders and control wiring from the generator to ATS; 480V Panel "HV"; 480V distribution from the panel "HV", to station loads, pumps; all station control and monitoring including the Pump Control Panel, and Scada radio monitoring system reporting to SJBP EOC.

ii. Electrical Structure for the following electrical equipment:

a) Utility Junction Box, Utility CT enclosure, and meter.

b) 480V Automatic Transfer ATS-1, pump starters, and distribution circuits from panel "HV" to all station loads.

c) Station distribution conduits and cables.

iii. Service Entrance: The Contractor shall include in his bid all related Utility costs to Owner to provide electrical service to plant. Contractor to pay all Utility (Entergy) charges, supply and

install all items required by Entergy, including but not limited to metering, metering pads, junction boxes, CT enclosure, and any necessary conduits, cables, and grounding.

iv. Install a SCADA based PLC pump control panel furnished under Division 16. The system shall also communicate with the existing JP telemetry system to provide monitoring and control functions for the pump station.

c. Electrical duct banks, cables, feeder and etc.

d. Power distribution systems at 480V- branch circuits / panels / wiring / transformers / devices / etc.

e. Grounding systems.

f. Raceway systems.

g. All required sleeves, thimbles, anchors, hangers, bolts, miscellaneous structural steel, cutting, housekeeping pads, etc., for the complete installation of the electrical systems serving the Electrical Modifications.

D. Related Work

1. All electrical distribution equipment listed under Division 16 shall be supplied and installed as specified in Division 16.

1.04 COORDINATION OF ELECTRICAL WORK

A. General: Refer to the DIVISION 1 sections for general coordination requirements applicable to the entire work. It is recognized that the contract documents are diagrammatic in showing certain physical relationships which must be established within the electrical work, and in its interface with other work including utilities and mechanical work, and that such establishment is the exclusive responsibility of the Contractor.

B. Arrange electrical work in a neat, well organized manner with exposed conduit and similar services running parallel with primary lines of the building construction, and with a minimum of 8'-0" overhead clearance or as directed by the Engineer.

C. Advise other trades of openings required in their work for the subsequent move-in of large units of electrical work (equipment).

D. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.

E. Refer to equipment specifications in Divisions 2 through 15 for rough-in requirements.

F. Verify all dimensions by field measurements.

G. Arrange for sleeves, slots, and openings in other building components to allow for electrical installations.

H. Coordinate the installation of required supporting devices and sleeves to be set in poured in place concrete and other structural components, as they are constructed.

I. Coordinate the cutting and patching of building components to accommodate the installation of electrical equipment and materials.

J. Where mounting heights are not detailed or dimensioned, install electrical services and overhead equipment services and overhead equipment to provide the maximum headroom possible.

K. Install electrical equipment to facilitate maintenance and repair or replacement of equipment for ease of disconnecting, with minimum of interference with other installations.

L. Where the Drawings do not indicate equipment locations, such locations shall be obtained from the Engineer. Where equipment is installed without instruction and must be moved, it shall be moved without additional cost to the OWNER.

M. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the work. Give particular attention to large equipment requiring positioning prior to closing-in the building.

N. Coordinate connection of electrical systems with exterior underground utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

O. Location and arrangement of outlets, conduit runs, equipment, and other items shall be determined by the Contractor in the field, based on the physical size and arrangement of equipment, equipment clearance requirements, finished elevations, and obstructions.

1.05 TEMPORARY ELECTRICITY

A. Furnish and install all necessary temporary power, metering, lighting or wiring that is required to ensure quality workmanship everywhere.

B. Furnish and install area distribution boxes so located that the individual trades may use their own construction-type extension cords to obtain proper power and artificial lighting at all points where required by inspectors and for safety.

1.06 PUBLIC UTILITIES REQUIREMENTS

A. The CONTRACTOR shall contact the serving utility and verify compliance with requirements before construction. The CONTRACTOR shall coordinate schedules and payments for work by all utilities.

B. Electrical service shall be as indicated and be as required by the serving utility.

C. The CONTRACTOR shall verify and provide all service conduits, fittings, grounding devices, and all service wires not provided by the serving utility.

D. The CONTRACTOR shall verify with the utility the exact location of each service point, the type of service, and shall pay all charges levied by the serving utilities without additional cost to the OWNER.

1.07 PERMITS AND INSPECTION

A. Permits shall be obtained and inspection fees shall be paid according to General Conditions.

B. The CONTRACTOR shall pay all connection and turn on service charges required by the utility company.

1.08 CONTRACTOR SUBMITTALS

A. General: Submittals shall be furnished in accordance with Section 01340 – Contractor Submittals. In addition, the submittals shall comply with the following:

B. Shop Drawings: Shop drawings shall include the following:

1. Complete material lists stating manufacturer and brand name of each item or class of material.
2. Shop drawings for all grounding work not specifically indicated.
3. Front, side, rear elevations and top views with dimensional data.
4. Location of conduit entrances and access plates.
5. Component data.
6. Connection diagrams, terminal numbers, internal wiring diagrams, conductor size, and cable numbers.
7. Method of anchoring, seismic requirements; weight.
8. Types of materials and finish.
9. Nameplates.
10. Temperature limitations, as applicable.
11. Voltage requirement, phase, and current, as applicable.
12. Front and rear access requirements.
13. Test reports
14. Grounding requirements
15. Catalog cuts or photocopies of applicable pages of bulletins or brochures for mass produced, non custom manufactured material. Catalog data sheets shall be stamped to indicate the project name, applicable Section and paragraph, model number, and options. This information shall be marked in spaces designated for such data in the ENGINEER's stamp.

C. Shop drawings shall be custom prepared. Drawings or data indicating "optional" or "as required" equipment are not acceptable. Options not proposed shall be crossed out or deleted from shop drawings.

D. Materials and Equipment Schedules: The CONTRACTOR shall deliver to the ENGINEER within 30 days, a complete list of all materials, equipment, apparatus, and fixtures proposed for use. The list shall include type, sizes, names of manufacturers, catalog numbers, and such other information required to identify the items.

E. Owner's Manuals: Complete information in accordance with Section 01300.

F. Record Drawings: The CONTRACTOR shall show invert and top elevations and routing of all duct banks and concealed below grade electrical installations. Record drawings shall be prepared, be available to the ENGINEER, and be submitted according to Section 01300.

1.09 AREA DESIGNATIONS

A. General

1. The area classification for the Reserve Relief Homewood Pump Station is shown on the drawings. Where chemicals are handled, adequate ventilation shall be provided. Raceways shall be sealed with appropriate fittings where they enter chemical areas, for example, in sodium hypochlorite areas, chlorine, ammonia, sulfur dioxide, and HFS areas to prevent passage of gases to other areas. Work in classified hazardous areas shall comply with NEC article 500.

2. Raceway system enclosures shall comply with Section 16110 Electrical Raceway Systems. Raceway sealing fittings shall comply with Section 16110.

3. Electric WORK specifically indicated in sections within any Division of the Specifications shall comply with those requirements.

4. Electrical Enclosures/Boxes etc. shall be NEMA 4X 316 stainless steel.

5. Installations in hazardous locations shall conform strictly to the requirements of the Class, Group, and Division.

B. Material Requirements

1. NEMA 1, 3R and 12 enclosures shall be steel coated with ANSI 61 gray paint. NEMA 4X, 7 and 9 shall not be coated.

2. NEMA 4X enclosures shall be 316 stainless steel except in chlorine and HFS areas where non metallic enclosures compression molded fiberglass shall be provided.

3. NEMA 7 enclosures shall be cast aluminum where used with aluminum conduit; cast iron when used with galvanized steel conduit.

4. Sealing fittings shall be provided in chlorine and hydrofluosilicic (HFS) acid areas and in areas indicated on the drawings as hazardous.

1.10 TESTS

A. The CONTRACTOR shall be responsible for all factory and field tests required by specifications in Division 16 and by the ENGINEER or other authorities having jurisdiction. The CONTRACTOR shall furnish all necessary testing equipment and pay all costs of tests, including all replacement parts and labor, due to damage resulting from damaged equipment or from testing and correction of faulty installation.

B. Where test reports are indicated, proof of design test reports for mass produced equipment shall be submitted with the shop drawings, and factory performance test reports for custom manufactured equipment shall be submitted and be approved prior to shipment. Field test reports shall be submitted for review prior to Substantial Completion.

C. Any equipment or material which fails a test shall be removed and replaced at no additional cost to the OWNER.

D. The Contractor shall conduct operating tests to demonstrate that the electrical systems are installed and will operate properly and in accordance with the requirements of this Project Manual. Tests shall be performed in the presence of the Engineer. The Contractor shall furnish instruments and personnel required for such tests. Instruments used for testing shall have been calibrated within 6 months of the test date. Contractor shall furnish calibration certificate to the Engineer upon request. The Contractor shall pay all associated costs, including all replacement parts and labor required as a result of damages caused by tests, and to correct faulty installation.

E. Any work and materials tested and found varying from the requirements of the Drawings and Project Manual shall be replaced by the Contractor without additional cost the Owner. Corrections, repairs, and/or replacements shall be made in a manner satisfactory to the Engineer.

F. The Contractor shall be responsible for developing and implementing a test plan for all major electrical equipment installed. Test plans shall be submitted to the Engineer for review at least 2 weeks in advance of performing the tests. At a minimum, the plan shall identify the equipment to be tested, the test to be performed, the intended result of the

test, and any impact to operations (required shut downs, etc.). Major electrical equipment to be tested shall include, but not be limited to, the following:

1. Generators
2. Transfer Switches
3. Controls Panels

G. Manufacturer-authorized service technicians shall be utilized to perform the testing, programming, start-up, calibration, and commissioning of major equipment and systems.

H. Whether or not specifically identified in this project manual, the Contractor shall provide all examinations, inspections, tests, calibrations, programming, start-up, and commissioning required by the manufacturer's published instructions and by applicable published NFPA standards. Contractor shall document the results of tests, inspections, etc. and shall make results available to the Engineer for review upon request.

I. Contractor shall be responsible for demonstrating that the installed systems, equipment, fixtures, devices, etc. are fully functional and without deficiencies.

J. The requirements of this paragraph are in addition to specific tests which may be called for in other sections.

1.11 DRAWINGS

A. The electrical drawings indicate the general layout of the complete electrical system and show arrangements of switchgear, feeders, circuits, outlets, switches, controls, panel boards, and other work based upon information available during the design period. The Contractor shall be responsible to verify all dimensions, control schemes, and power requirements of the actual site and purchased equipment in order to deliver a complete electrical system. All items not specifically shown on the drawings, but obviously required to obtain a workable installation shall be included.

B. Drawings indicate the wiring required for the installation and proper operation of the systems specified. If the Contractor chooses to install an approved system requiring different wiring, any additional material or labor required to furnish and install the wiring for the new system shall be furnished by the Contractor as part of this Contract without extra cost to the Owner.

C. When an item of equipment is indicated on a floor plan and not shown on associated riser diagram or vice versa, the Contractor shall provide said item and all required conduit and wiring connections for a complete system as part of the Contract.

D. The Contractor shall show depths and routing of all concealed below-grade electrical installations. This set of record drawings shall be available to the Engineer during construction. After final inspection, the Contractor shall transfer all record drawing information to a set of reproducible tracings which shall then be delivered to the Engineer.

E. Raceways and conductors for lighting, switches, receptacles and other miscellaneous low voltage power and signal systems as specified are typically not shown on the Drawings. Raceways and conductors shall be provided as required for a complete and operating system. Refer to riser diagrams for signal system wiring. Homeruns, as shown on the Drawings, are to assist the Contractor in identifying raceways to be run exposed and raceways to be run concealed. Raceways installed exposed shall be near the ceiling or along walls of the areas through which they pass and shall be routed to avoid conflicts with HVAC ducts, cranes hoists, monorails, equipment hatches, doors, windows, etc.

Raceways installed concealed shall be run in the center of concrete floor slabs, above suspended ceilings, or in partitions as required

1.12 SITE INVESTIGATION

A. It is the Contractor's responsibility to satisfy himself as to the nature and location of the work, the general conditions, the existing equipment to remain, existing equipment to be modified or to be removed, and all other matters which can in any way affect the work or the cost thereof under this contract. Any failure by the Contractor to acquaint himself with all available information will not relieve him of responsibility of successfully performing the work. Contractor is to examine all the plans and specifications and include in his price all work required for power, communications, instrumentation, and any other work as required by this Division and as specified in other Divisions/Sections.

1.13 WIRING FOR EQUIPMENT BY OTHERS

A. Electrical service for all equipment furnished under this Project manual shall be roughed-in and connected under this Section. It is the responsibility of the Contractor to obtain correct roughing-in dimensions and requirements for this equipment.

B. Some equipment will be furnished under other Divisions of work. Connection / interconnection of that equipment shall be part of Division 16 and shall comply with Division 16 Sections.

1.14 SUBSTITUTIONS

A. Substitutions shall be submitted in accordance with Division 1 and provisions thereof.

B. Any item submitted for approval as a substitute for the specified item shall be accompanied by manufacturer's documentation stating/illustrating the following applicable information in addition to the specific information requested in other sections:

1. Dimensions/weight.
2. Electrical ratings – voltage, amperage, short circuit capability, etc.
3. Construction – gauge of steel/aluminum, paint finish/application method, color, NEMA type, etc.
4. Warranty.
5. Local manufacturer's representative or nearest stocking distributor.
6. Length of time the product has been available to the public.

1.15 DELIVERY AND STORAGE

A. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications, adequately packaged and protected to prevent damage during shipment, storage, and handling.

B. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage.

C. Coordinate deliveries of electrical materials and equipment to minimize construction site congestion.

1.16 WARRANTIES

A. Refer to other Division 16 sections, and Division 1 for procedures and submittal requirements for warranties.

B. All electrical equipment, devices, installation, labor, and workmanship provided by the Contractor as part of this division shall be warranted free from defects in work and materials for 12 months from the date of final acceptance by the Parish. Equipment, materials, and/or devices that fail within the warranty period shall be repaired or replaced by the Contractor at no additional cost.

1.17 MOUNTING HEIGHTS

A. Unless otherwise noted on the Drawings, the following mounting heights shall apply. Upon approval, mounting heights may be adjusted.

B. Height of Outlets – all heights measured from finish floor to bottom of device.

1. Wall Switches 46”
2. Receptacle Outlet 16”

C. Heights of Disconnect Switches, Protective Devices, Controllers, etc.

1. The mounting height of disconnect switches, circuit breakers, motor controllers, push button stations, and other similar devices and equipment will vary depending upon location and whether individually or group mounted. For convenience and safety operating levers, handles or buttons shall be mounted no more than 72 inches above the finish floor line.

D. Panelboards shall be located so that the highest overcurrent protective device is a maximum of 72” above the floor.

1.18 SAFETY

A. It shall be the Contractor's responsibility to do all things necessary in the pursuit of the installation or testing to provide safe conditions in which to work.

1.19 FIRESTOPPING

A. Firestopping of all openings in fire-rated floors, walls, and ceilings accommodating penetrating items such as conduits shall be required as part of Division 16 work. Provide Firestop installation as required to meet ratings equal to the floor or wall being penetrated.

B. Fire stop materials shall be manufactured for that purpose and shall be installed in accordance with the manufacturer's recommendation in order to provide a U.L. listed fire stop at all openings equal to or exceeding the rated floor, wall, or ceiling.

C. Plastic sleeve/pipe shall not be used within the building when penetrating a fire-resistant-rated wall, ceiling, partition, or floor.

1.20 DEMONSTRATION AND TRAINING

A. Demonstration and training for operation and maintenance of equipment and systems specified as part of Division 16 shall be provided under this Division of Work and as specified in other Division 16 sections.

B. Where specific training is required by other Sections of this Division, such training shall be video recorded for future reference. A separate USB drive shall be provided to the Parish for each training session (multiple sessions shall not be placed on a single USB). Each USB drive shall be clearly labeled to identify the training session contained on it.

PART 2: PRODUCTS

2.01 GENERAL

A. All equipment and materials shall be new, shall be listed by UL, and shall bear the UL label where UL requirements apply. All equipment and materials shall be the products of experienced and reputable manufacturers in the industry. Similar items in the WORK shall be products of the same manufacturer. All equipment and materials shall be of industrial grade standard of construction.

B. On all devices indicated to display dates, the year shall be displayed as 4 digits.

2.02 CONTRACTOR FURNISHED DRAWINGS

A. The Contractor shall give the Engineer drawings showing all interconnections of power, communications, signal, control and instrumentation devices related to the entire job. The drawings shall utilize the nomenclature established in the following drawings:

Electrical Drawings

Equipment Shop Drawings

Pump Control Panel Drawings

The drawings shall also indicate actual connections to equipment not covered by the above drawings but covered by other shop drawings. The connections shall be indicated by reference to the relevant shop drawings and by identification of conductors by nomenclature used in referenced shop drawings. The drawings will thus provide all information necessary to trace conductors to any relevant shop drawings.

Drawings by the Contractor described above shall consist of the following for power, controls and communications related to the entire job.

1. Conduit Lists: Numbered lists of all conduits indicating origin and termination of conduit and cables contained in conduit. Use same template as shown on Engineer's drawings.
2. Cable Lists: Numbered lists of all cables indicating types of conductors, conduit number used and identification of cable conductors by nomenclature of shop drawings as described above.
3. Conduit Layout Drawings: Drawings showing the physical layout and routing of conduit including identification of each conduit by numbers used on the Conduit Lists.
4. Point to Point Connection Diagrams: Drawings showing the physical layout of terminal strips at all equipment and associated interconnecting wiring type, wire numbering system, equipment shop drawing references etc., to form complete wiring reference drawing.
5. Logic Drawings: For items not documented in equipment submittals, provide ladder type schematic diagrams showing relays, switches, programmable controllers, indicating lights, annunciators, etc., furnished for the job. Show all

system logic, wire numbers, terminal blocks external wiring to equipment etc., to form a complete operational logic system. Provide written description accompanying logic sheets explaining the logic operation.

6. Loop Diagrams: Where process control is required as part of the project. Provide loop drawings per ISA and SAMA loop layout specifications.

B. The Contractor shall prepare coordination drawings showing major elements, components, and systems of electrical equipment and materials in relation with other building components. Prepare drawings to an accurate scale of 1/4" = 1'-0" or larger. Indicate the locations of all equipment and materials, including clearances for servicing and maintaining equipment. Indicate movement and positioning of large equipment into the building during construction.

C. Prepare floor plans, elevations, sections, and details to conclusively coordinate and integrate installations.

D. Lack of field coordination shall not be a cause for additional compensation to the Contractor. At the request of the Engineer, Contractor shall be required to submit coordination drawings for review. The drawings detailed in Paragraph 2.02A are required to be submitted by the Contractor even if coordination drawings are not requested.

E. Format.

1 Furnish drawings in hard copy and soft copy. Soft copy shall be electronic in AutoCAD ".dwg" format and in Adobe "pdf" format. Hard copy shall be on 11" x 17".

2. Furnish programs in soft copy and hard copy. Hard copy shall be on 11 x 17. Soft copy shall be electronic format.

2.03 ELECTRICAL SURGE PROTECTIVE DEVICES (SPD)

A. General

1. See section 16671 for equipment specifications.

2. Function: Protect electronic elements of electrical system against damage due to electrical transients induced in interconnecting lines by lightning and nearby electrical systems.

3. Implementation: Provide, install, coordinate, and inspect grounding of surge suppressors at

a. Connection of ac power to electronic equipment including panels, consoles, assemblies, UPS, control systems, telemetry, etc.

b. At the field and panel, console, or assembly connection of analog or digital signal circuits that have portions of the circuit extending outside of a protective building.

2.04 REQUIREMENTS – ELECTRICAL, PUMP CONTROL PANEL, & INSTRUMENT SUBMITTALS

A. Administrative procedures for submittals are listed in Section 01340 – Submittals. The subsequent items (2.05 through 2.07) detail additional requirement for electrical and instrument submittals.

2.05 SHOP DRAWING SUBMITTALS

A. General:

1. Description: Drawings, diagrams, illustrations, schedules, design related submittals and other data or information which illustrates some portion of the Work.

2. Preparation

a. Format: Whenever possible, schedule for and combine Shop Drawings required for submission in each Specification section or division into a single Submittal package. Also combine product data for like items into a single Submittal package.

b. Legends and Abbreviation Lists: As part of first Submittal, submit complete definition of symbols and abbreviations used on this Project. For example, but not limited to engineering units, flowstreams, instruments, structures, and other process items used in nameplates, legends, data sheets, point descriptions, CRT displays, alarm/status logs, and reports. Use identical abbreviations for all Submittals. Submit updated versions with subsequent Submittals.

c. Present in a clear and thorough manner and of sufficient details to show kind, size, arrangement, and function of components, materials, and devices and compliance with Contract Documents. Identify details by reference to sheet and detail, and schedule or room numbers shown on Drawings.

d. Identify and Indicate

i. Pertinent Drawing sheet(s) and detail number(s), goods, units and assemblies, and system and equipment identification and tag numbers.

ii. Critical field dimensions and relationships to other critical features of Work.

a). Identify proposed items and options. Identify installed spares and other provisions for future work (e.g., reserved panel space; unused components, wiring, and terminals).

e. Product Data: Clearly mark each copy to identify pertinent goods or models and show performance characteristics and capacities, dimensions and clearances required, wiring or piping diagrams and controls, and external connections, anchorages, and supports required.

f. Equipment and Component Titles: Identical to title shown on Drawings.

g. Manufacturer's standard schematic drawings and diagrams as follows:

i. Modify to delete information that is not applicable to Work.

ii. Supplement standard information to provide information specifically applicable to Work.

3. Foreign Manufacturers: When proposed, include following additional information:

1. Names and addresses of at least two companies closest to Project that maintain technical service representatives.

2. Complete inventory of spare parts and accessories for each piece of equipment.

4. CONTRACTOR Responsibilities: Provide Project-specific information as required and as necessary to clearly show calculations, dimensions, logic and assumptions, and referenced standards and codes upon which design is based.

5. Resubmission: Clearly identify each change.

B. Shop Drawings – Specific:

1. Bill-of-Materials

a. Group equipment items by enclosure and field, and by equipment type.

b. Data Included

i. Equipment tag number.

ii. Description.

iii. Manufacturer, complete model number and all options not defined by model number.

iv. Quantity supplied.

2. Catalog Cuts: Components, electrical devices, and mechanical devices

a. Catalog information.

b. Descriptive literature.

c. External power and signal connections.

d. Scaled drawings showing exterior dimensions and locations of all electrical and mechanical interfaces.

e. Name, address, and telephone number of manufacturer's local office, representative, distributor, or service facility.

3. Component Data Sheets: Data sheets for I&C components.

a. Format and level of Detail: In accordance with ISA-S20.

b. Include component type identification code and name on data sheet.

c. Specific features and configuration data for each component:

i. Location or service.

ii. Manufacturer and complete model number.

iii. Size and scale range.

iv. Set points.

v. Materials of construction.

vi. Options included.

d. Name, address, and telephone number of manufacturer's local office, representative, distributor, or service facility.

4. Panel Construction Drawings:

a. Scale Drawings: Show dimensions and location of panel mounted devices, doors, louvers, and subpanels, internal and external.

b. Panel Legend: List front of panel devices by tag numbers nameplate inscriptions, service legends, and annuciator inscriptions.

c. Bill of Materials: Include tag number, description, manufacturer, and model number.

d. Construction Details: NEMA rating, materials, material thickness, structural stiffeners and brackets, lifting lugs, mounting brackets and tabs, door hinges and latches, and welding and other connection callouts and details.

e. Construction Notes: Finishes, wire color schemes, wire ratings, wire and terminal block, numbering and labeling scheme.

5. Panel Control Diagrams: For analog and discrete control and power circuits.

a. Diagram Type: Ladder diagrams. Include all devices that require electrical connections. Show unique rung numbers on left side of each rung.

b. Item Identification: Identify each item with attributes listed.

i. Wires: Wire number and color. Cable number if part of multiconductor cable.

ii. Terminals: Location (enclosure number, terminal junction box number, or MCC number), terminal strip number, and terminal block number.

iii. Discrete Components:

1) Name, terminal numbers, and location if not in panel.

2) Switching action (open or close on rising or falling process variable), set point value an units, and process variable description (e.g. Breaker Bell Alarm Lockout).

iv. Analog Components:

1) Name, terminal number, and location if not in panel.

2) Range, set point values, units, and process variable description (e.g. KW demand).

v. Relay Coils:

1) Name and its function.

2) On right side of rung where coil is located, list contact location by ladder number and sheet number. Underline normally closed contacts.

vi. Relay Contacts: Coil name, function, and coil location (ladder rung number and sheet number).

1) Show each circuit individually. No "typical" diagrams or "typical" wire lists will be permitted.

2) Ground wires, surge protectors, and connections.

6. Interconnection Wiring Diagram: Show point to point wiring between panels and field devices. Show routing including pull boxes and terminal function boxes. Show terminal and wire numbers.

7. Installation Details: Include modifications or further details required to adequately define installation of I&C components, including manufacturer's instructions.

8. Applications Software Documentation

   a. PLC, HMI, Configuration: Configuration data for

      i. Complete process or system data base.

      ii. I/O list.

      iii. Computed Points: Format similar to list in these documents. Include description of algorithms used to compute each variable.

      iv. Any other process related data bases.

   b. Control Strategy Configuration:

      i. A detailed written description for each loop. Describe loop functions. Include references to the associated drawing and sheet numbers, software module numbers, and point tag numbers.

      ii. Function diagrams for analog type loops. Per IEC-1131-3. Depict functions such as controls, calculations, scaling, and signal switching. Organize by facility and function.

      iii. Detailed ladder diagrams for discrete type (ON/OFF, START/STOP, SEQUENCE, etc.) control loops and discrete interlock functions. Include alarms, discrete status displays, and manual switching functions. Organize by facility and loop number.

      iv. Ladder and Symbols and Usage; Conform to IEC-1131-3.

      v. Function diagrams to supplement or be used in lieu of ladder diagrams where the system functions can be more clearly depicted in this manner.

      vi. Symbols and Usage; Conform to IEC-1131-3.

      vii. Listing of software configuration blocks, their parameters and values.

   c. PLC Calculated Values List for Calculated Analog Points and Calculated Discrete Points, Including:

      i. PLC numbers.

      ii. Variable tag numbers.

      iii. Variable description.

      iv. Calculation formula.

      v. Engineering units, if applicable.

   d. Table with Following Information for Each PLC:

      i. Types and quantities of modules provided.

ii. Number and type of I/O points provided for each module.

iii. Number and type of I/O point used for each module.

iv. Number and type of spare I/O points for each module.

v. Types and quantities of controller, logic and other modules provided.

vi. Capacity of each type of module provided.

vii. Capacity used of each type of module.

viii. Spare capacity of each type of module.

e. Data interfaces to the Other Equipment: Communications Programming required to implement data transfer between PLC or other controller and other system components.

i. Detailed written descriptions, block diagrams, and macro level flow charts or pseudo code.

ii. Symbols and usage conforming to IEC-1131-3. Pseudo code conforming to software implementation standards in presoftware development submittal.

f. Description of other data structures used by system.

9. PLC Software Control Requirements:

a. Submit details of PLC software configuration.

b. Schedule:

i. Submit first list of all hardware details as part of PLC software Shop Drawings.

ii. Submit updated software configuration lists at approximately 30-day intervals.

10. List of spares, expendables, test equipment and tools.

11. Additional Equipment Recommended: List of, and descriptive literature for, additional spares, expendables, test equipment and tools recommended. (Include unit prices).

2.06 QUALITY CONTROL SUBMITTALS

A. Certificates

1. Manufacturer's Certificate of Compliance

a. When specified in individual Specification sections or where goods are specified to a recognized standard or code, submit prior to shipment of product or material to the site.

b. ENGINEER may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.

c. Signed by product manufacturer certifying that materials, manufacture, and product specified conforms to or exceeds specified requirements and intent for which product will be used. Submit supporting reference data, affidavits, and certifications as appropriate.

d. May reflect recent or previous test results on material or product, but must be acceptable to ENGINEER.

2. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in the individual Specification sections.

3. Manufacturer's Certificate of Proper Installation: See Section 16010SFS, Electrical Work General, Supplemental Functional Specification.

B. Operations & Maintenance Manuals: As required in Section 1730 Operations and Maintenance Data

1. Operation and Maintenance (O&M) Manuals: Operations and maintenance data, unless otherwise specified in this section.

a. Content and Format

i. Complete sets O&M manuals.

ii. Sufficient detail to allow operation, removal, installation, adjustment, calibration, maintenance and purchasing replacements for each Electrical System component.

iii. Final version of Legend and Abbreviation Lists.

b. Include

i. Process and Instrumentation Diagrams: One reproducible copy of P&ID to reflect as-built system design.

ii. Refer to paragraph Shop Drawings for the following items:

1) Bill of Materials.

2) Catalog Cuts.

3) Component Data Sheets.

4) Panel Control Diagrams.

5) Application Software Documentation.

iii. Device O&M manuals for components, electrical devices, and mechanical devices include:

1) Operations procedures.

2) Installation requirements and procedures.

3) Maintenance requirements and procedures.

4) Troubleshooting procedures.

5) Calibration procedures.

6) Internal schematic and wiring diagrams.

7) Component Calibration Sheets from field quality control calibrations.

iv. List of spares, expendables, test equipment and tools provided.

v. List of additional spares, expendables, test equipment and tools recommended.

2. Performance Acceptance Test (PAT) Submittals:

a. Preliminary Test Procedures: Outlines of proposed tests, forms, and checklist.

b. Final Test Procedures: Proposed test procedures, forms, and checklist.

c. Test Documentations: Copy of signed off test procedures when tests are completed.

C. Statement of Qualification: Evidence of qualification, certification, or registration to verify qualification of site representatives, professional land surveyors, engineers, materials testing laboratories, specialty Subcontractors, trades, specialist, consultants, installers and other professionals.

D. Field Samples: Provide as required by individual Specifications and as may be required by ENGINEER during progress of Work.

E. Written Test Reports of Each Test and Inspection: As a minimum, included the following:

1. Date of test and date issued, Project title and number, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.

2. Date and time of sampling or inspection and record of temperature and weather conditions.

3. Identification of product and Specification section, location of Sample, test standard in the Project, type of inspection or test with referenced standard or code, certified results of test.

4. Compliance with Contract Documents, and identifying corrective action necessary to bring materials and equipment into compliance.

5. Provide an interpretation of test results, when requested by ENGINEER.

6. Performance Acceptance Tests (PAT):

a. Preliminary Test Procedures: Outlines of proposed tests, forms, and checklists.

b. Final Test Procedures: Proposed test procedures, forms, and checklists.

c. Test Documentation: Copy of signed off test procedures when tests are completed.

2.07 MISCELLANEOUS SUBMITTALS

A. Miscellaneous

1. Construction Photographs

a. CONTRACTOR shall provide construction photographs in digital format showing the regular progress of the WORK. All photographs shall indicate the date and the job title, photograph identification, and direction the camera was facing.

b. On each project, starting when the WORK BEGINS and continuing for as long as the WORK is in progress, not less than four (4) exposures consisting of different subjects or angles of view each time, shall be taken from different locations in the project area at intervals not exceeding one month apart. All photographs shall be furnished to the ENGINEER with the monthly payment request.

2. Records of Examination.

3. Progress Schedules and Narrative Progress Reports: As required in Sections 001310, 01200, Construction Scheduling, Project Meetings.

4. Training Materials: Provide all training materials to meet the specification training requirements.

5. Submittals Required by Laws and Regulations and Governing Agencies

   a. Submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.

   b. Transmit to ENGINEER or OWNER's records one copy of correspondence and transmittals (to include enclosures and attachments) between CONTRACTOR and governing agency.

2.08 REQUIREMENTS – ELECTRICAL & INSTRUMENT - MANUFACTURER'S CERTIFICATE

A. Manufacturer's Certificate of Proper Installation: Contractor shall provide a Manufacturer's Certificate of Proper Installation for each separate piece of equipment, or each system, installed under this project. Provide certificate on form appended to Section 16010SFS, Electrical Work General, Supplemental Functional Specification, at the end of this section.

2.09 QUALIFICATION OF MANUFACTURER'S REPRESENTATIVE

A. Authorized representative of the manufacturer, factory trained and experienced in the technical applications, installation, operation and maintenance of respective equipment, subsystem or system. Representative subject to acceptance by OWNER and ENGINEER. No substitute representatives will be allowed unless prior written approval by ENGINEER has been given.

2.10 ONSITE STAFF

Contractor shall provide the following:

A. Onsite Supervision

1. Site representative to supervise and coordinate onsite activities.
2. Site representative shall be onsite during total period required to complete onsite activities.

B. Startup and Testing Team

1. Thoroughly check installation, termination and adjustment.
2. Complete onsite tests.
3. Complete onsite training.
4. Provide startup assistance to OWNER.

2.11 FULFILLMENT OF SPECIFIED MINIMUM SERVICES

A. Startup and training are mutually exclusive activities.

B. Where manufacturer's services are required, furnish manufacturer's qualified representative.

C. Schedule manufacturer's onsite services to avoid conflicting with other onsite testing or other manufacturer's onsite services.

1. Determine that all conditions necessary to allow successful testing have been met before scheduling services.

D. Onsite services shall include as a minimum

1. Inspection, checking and adjustment as required for equipment to function as warranted by manufacturer and necessary to furnish written approval of installation.
2. Revisiting the site as required to correct problems and until installation and operation are acceptable to ENGINEER.
3. Resolution of assembly or installation problems attributable to, or associated with, respective manufacturer's goods and systems.
4. Assistance during functional and performance testing and startup demonstration and until product acceptance by the OWNER.
5. Completion of Manufacturer's Certificate of Proper Installation (form enclosed at end of this section) with applicable certificates for proper installation and initial, interim and final test or service.

E. On Site Training

1. Provide the services of manufacturers engineer to train owners operations staff on all operating aspects of the systems furnished such as troubleshooting, common problems encountered, operational safety procedures, etc. This training shall take place after testing is complete.
2. Provide services of manufacturers engineer to train owner's maintenance and IT staff in all aspects of the system such as trouble shooting, normal problems encountered, programming, set up, etc. The training shall take place after testing is complete.

2.12 SUPPLEMENT

A. See Section 16010, Electrical Work General, Supplemental Functional Specification, with attached forms:
   1. Performance Acceptance Tests
   2. Instrument Calibration sheet
   3. Manufacturer's Certificate of Proper Installation

2.13 FINAL SYSTEM DOCUMENTATION

A. Prior to final acceptance of the system, operating and maintenance manuals covering instructions and maintenance of each type of equipment, shall be furnished, in accordance with the specification requirements, and as noted herein. The instructions shall be bound in three ring binders and also identically delivered in electronic format on flash drive or CDs, with drawings reduced or folded for inclusion and shall provide at least the following as a minimum:

1. A comprehensive index.
2. A complete "as constructed" set of approved shop drawings.
3. A complete list of the equipment supplied including serial numbers, ranges, and pertinent data.
4. Full specifications on each item.
5. "As constructed" system schematic drawings illustrating all components, piping and electrical connections of the system supplied under this section.

6. Detailed service maintenance and operation instructions for each item supplied.
7. Special maintenance requirements particular to this system shall be clearly defined, along with special calibration and test procedures.
8. The operating instructions shall also incorporate a functional description of the entire system, with references to the systems schematic drawings and instructions.
9. Complete parts lists with stock numbers and name, address and telephone number of the local supplier.
10. Service manuals and schematic diagrams to discrete component level.

PART 3: EXECUTION

3.01 GENERAL

A. Incidentals: The CONTRACTOR shall provide all materials and incidentals required for a complete and operable system, even if not required explicitly by the Specifications or the Drawings. Typical incidentals are terminal lugs not furnished with vendor supplied equipment, compression connectors for cables, splices, junction and terminal boxes, and control wiring required by vendor furnished equipment to connect with other equipment indicated in the Contract Documents.

B. Field Control of Location and Arrangement: The Drawings diagrammatically indicate the desired location and arrangement of outlets, conduit runs, equipment, and other items. Exact locations shall be determined by the CONTRACTOR in the field based on the physical size and arrangement of equipment, finished elevations, and other obstructions. Locations shown on the Drawings, however, shall be followed as closely as possible.

1. Where conduit development drawings or "home runs" are shown, the CONTRACTOR shall route the conduits in accordance with the indicated installation requirements. Routings shall be exposed or encased as indicated. Conduits encased in a slab shall be sized for conduit OD to not exceed one third of the slab thickness and be laid out and spaced to not impede concrete flow.
2. All conduit and equipment shall be installed in such a manner as to avoid all obstructions and to preserve head room and keep openings and passageways clear. Lighting fixtures, switches, convenience outlets, and similar items shall be located within finished rooms as indicated. Where the Drawings do not indicate exact locations, such locations shall be determined by the ENGINEER. If equipment is installed without instruction and must be moved, it shall be moved without additional cost to the OWNER. Lighting fixture locations shall be adjusted slightly to avoid obstructions and to minimize shadows.

C. Workmanship: All materials and equipment shall be installed in strict accordance with printed recommendations of the manufacturer. Installation shall be accomplished by workers skilled in the work. Installation shall be coordinated in the field with other trades to avoid interferences.

D. Protection of Equipment and Materials: The CONTRACTOR shall fully protect all materials and equipment against damage from any cause. All materials and equipment, both in storage and during construction, shall be covered in such a manner that no finished surfaces will be damaged, marred, or splattered with water, foam, plaster, or paint. All moving parts shall be kept clean and dry. The CONTRACTOR shall replace or

refinish all damaged materials or equipment, including face plates of panels and switchboard sections, at no additional expense to the OWNER.

E. Incoming utility power equipment shall be provided in conformance with the utility's requirements.

F. The CONTRACTOR shall provide power wiring in conduit for all HVAC equipment. Starters shall be in full voltage, 120VAC transformer control power.

3.02 CORE DRILLING

A. The CONTRACTOR shall perform core drilling required for installation of raceways through concrete walls and floors. Locations of floor penetrations are approximate. Verify all exact core drilling locations based on equipment actually furnished as well as exact field placement. To the extent possible, identify the existence and locations of encased raceways and other piping in existing walls and floors with the OWNER prior to any core drilling activities. Damage to any encased conduits, wiring, and piping shall be repaired at no extra cost to the OWNER.

3.03 CONCRETE HOUSEKEEPING PADS

A. Concrete housekeeping pads shall be provided for all indoor floor standing electrical equipment. Housekeeping pads for all equipment, including future units, shall be 4 inches above surrounding finished floor or grade and 2 inches larger in both dimensions than the equipment, unless otherwise indicated.

B. Concrete housekeeping curb shall be provided for all conduit stub up in indoor locations that are not concealed by equipment enclosures. Such curb shall be 3 inches above finished floor or grade.

3.04 EQUIPMENT ANCHORING

A. Floor supported, wall, or ceiling hung equipment and conductors shall be anchored in place by methods that will meet seismic requirements in the area where project is located. Wall mounted panels that weigh more than 500 pounds or which are within 18 inches of the floor shall be provided with fabricated steel support pedestals. If the supported equipment is a panel or cabinet enclosed within removable side plates, it shall match supported equipment in physical appearance and dimensions. Transformers hung from 4inch stud walls and weighing more than 300 pounds shall have auxiliary floor supports.

B. Leveling channels anchored to the concrete pad shall be provided for all switchgear equipment and pad mounted transformer installations.

C. Anchoring methods and leveling criteria specified in the printed recommendations of the equipment manufacturers are a part of the WORK of this Contract. Such recommendations shall be submitted as shop drawings.

3.05 EQUIPMENT IDENTIFICATION

A. See Section 16055.

3.06 CLEANING

A. Before final acceptance, all parts of the WORK shall be thoroughly cleaned. Exposed parts shall be thoroughly clean of cement, plaster, and other materials. All oil and grease spots shall be removed with a non flammable cleaning solvent. Such surfaces shall be carefully wiped and all cracks and corners scraped out. Paint touch up shall be applied to all scratches on panels and cabinets. Electrical cabinets or enclosures shall be vacuum cleaned.

B. Clean and restore to original finish all equipment prior to final acceptance.

C. During progress of the work the Contractor shall clean the premises and shall leave the premises and all portions of the site free of debris.

3.07 CUTTING AND PATCHING

A. Contractor shall be responsible for all cutting, fitting and patching, including attendant excavation and backfill, required to complete the Work or to:

1. Make its several parts fit together properly.
2. Uncover portions of the Work to provide for installation of ill timed work.
3. Remove and replace defective work.
4. Remove and replace work not conforming to requirements of Contract Documents.
5. Remove samples of installed work as specified for testing.
6. Provide routine penetrations of non structural surfaces for installation of piping and electrical conduit.

B. Submit a written request to the Owner's Representative well in advance of executing any cutting or alteration which affects:

1. Work of the Owner or any separate contractor.
2. Structural value or integrity of any element of the Project or work.
3. Integrity or effectiveness of weather exposed or moisture resistant elements or systems.
4. Efficiency, operation life, maintenance or safety of operation elements.
5. Visual qualities of sight exposed elements.

C. Request shall include:

1. Identification of the work.
2. Description of affected work.
3. The necessity for cutting, alteration or excavation.
4. Effect on work of Owner or any separate contractor, or an structural or weatherproof integrity of work.
5. Description of proposed work:
    a. Scope of cutting, patching, alteration, or excavation.
    b. Trades who will execute the work.
    c. Products proposed to be used.
    d. Extent of refinishing to be done.

6. Alternatives to cutting and patching.
7. Cost proposal, when applicable.
8. Written permission of any separate contractor whose work will be affected.

D. Submit written notice to the Owner's Representative designating the date and the time the work will be uncovered.

3.08 SLEEVES AND FORMS FOR OPENINGS

A. Provide and place all sleeves for conduits penetrating floors, walls, partitions, etc. Locate all necessary slots for electrical work and form before concrete is poured.

B. Exact locations are required for stubbing up and terminating concealed conduit. Obtain shop drawings and templates from equipment vendors or other subcontractors and locate the concealed conduit before the floor slab is poured.

C. Where setting drawings are not available in time to avoid delay in scheduled floor slab pours, the Engineer may allow the installations of such conduit to be exposed. Requests for this deviation must be submitted in writing. No additional compensation for such change will be allowed.

D. Seal all openings, sleeves, penetration and slots.

3.09 MATERIALS

A. Comply with specifications and standards for each specific product involved.

3.10 EXECUTION

A. Inspection

1. Inspect existing conditions of Project, including elements subject to damage or to movement during cutting and patching.
2. After uncovering work, inspect conditions affecting installation of products, or performance of work.
3. Report unsatisfactory or questionable conditions to the Owner's Representative in writing; do not proceed with work until the Owner's Representative has provided further instructions.

B. Preparation

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

C. Performance

1. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.
2. Execute excavating and backfilling by methods which will prevent settlement or damage to other work.

3. Employ original Installer or Fabricator to perform cutting and patching for:
   a. Weather exposed or moisture resistant elements.
   b. Sight exposed finished surfaces.
4. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.
5. Restore work which has been cut or removed; install new products to provide completed work in accord with requirements of Contract Documents.
6. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
7. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
   a. For continuous surfaces; refinish to nearest intersection.
   b. For an assembly, refinish entire unit.

3.11 MEASUREMENT

Measurement for payment for electrical work, general will be on a Lump Sum basis as specified herein.

3.12 PAYMENT

Payment for the work under this section will be made under:

Item	Description	Unit Price
NS-14	Electrical Work	Lump Sum
NS-18	Entergy Allowance	Lump Sum
NS-20	Entergy Overhead Power Line Relocation	Lump Sum

END OF SECTION 16010

SECTION 16010

ELECTRICAL WORK, GENERAL

SUPPLEMENTAL FUNCTIONAL SPECIFICATION

Suggested Construction Sequence

REFERENCE: One Line Diagram
SCADA – Pump Control Panel - Construction Sequence

PART 1: GENERAL

1.01 Construction System Sequence:

A. Coordinate the electrical construction sequence with the General Contractor.

B. The power, pump control, SCADA, systems installation shall proceed together such that power, control, and SCADA reporting functions all are put on line at approximately the same time.

1.02 Forms: The Electrical Contractor and his Suppliers shall complete the attached forms at the appropriate stage of work and as called for in the various specification sections:

A. Performance Acceptance Test Sheet

B. Instrument Calibration Sheet

C. Manufacturer's Certificate of Proper Installation

PART 2: MEASUREMENT AND PAYMENT

2.01 Measurement and payment for the work under this section shall be at NO DIRECT PAY and shall be included with the related bid items.

PERFORMANCE ACCEPTANCE TEST SHEET

Project Name:	Project No.:
Demonstration Test(s): For each functional requirement of the loop: (a) List and number the requirement. (b) Briefly describe the demonstration test. (c) Cite the results that will verify the required performance. (d) Provide space for signoff.	

Forms/Sheets Verified	By	Date	**Loop Accepted By OWNER**
Loop Status Report			By:
Instrument Calibration Sheet			Date:
I&C Valve Calibration Sheet			
Performance Acceptance Test	By	Date	
Performed			
Witnessed			Loop No.:

INSTRUMENT CALIBRATION SHEET														
COMPONENT					**MANUFACTURER**					**PROJECT**				
Code:					Name:					Number				
Name:					Model:					Name:				
					Serial #:									
FUNCTIONS														
	RANGE	VALUE	UNITS	COMPUTING FUNCTIONS? Y/N						CONTROL? Y/N Action? direct/reverse Modes? P / I / D				
Indicate? Y/N	Chart:			Describe										
Record? Y/N	Scale:									SWITCH? Y/N Unit Range: Differential: fixed/adjustable Reset? automatic/manual				
Transmit/ Convert? Y/N	Input:													
	Output:													
ANALOG CALIBRATIONS								**DISCRETE CALIBRATIONS**						Note No.
REQUIRED			AS CALIBRATED					REQUIRED			AS CALIBRATED			
Input	Indicated	Output	Increasing Input		Decreasing Input			Number	Trip Point	Reset Point	Trip Point	Reset Point		
			Indicated	Output	Indicated	Output			(note rising or falling)		(note rising or falling)			
								1						
								2						
								3						
								4						
CONTROL MODE SETTINGS:			P:	I:	D:			5						
#	NOTES:									Component Calibrated and Ready for Startup				
										By:				
										Date:				
										Tag No.:				

MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT. SERIAL NO: _____

EQPT. TAG NO: _____ EQPT./SYSTEM: _____

PROJECT NO: _____ SPEC. SECTION _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

_____ Installed in accordance with Manufacturer's recommendations.
_____ Inspected, checked and adjusted.
_____ Serviced with proper initial lubricants.
_____ Electrical and mechanical connections meet quality and safety standards.
_____ All applicable safety equipment has been properly installed.
_____ System has been performance tested and meets or exceed specified performance requirements (when complete system of one manufacturer).

Comments: _____
_____
_____
_____

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve and operate his equipment and (iii) authorized to make recommendations required to assure that the equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20_____

Manufacturer: _____

By Manufacturer's Authorized Representative: _____
(Authorized Signature)

END OF SUPPLEMENT

SECTION 16055

ELECTRICAL IDENTIFICATION

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications sections, apply to work of this section.

B. This section is a Division 16 Basic Materials and Methods section, and is part of each Division 16 section making reference to electrical identification specified herein.

1.02 DESCRIPTION OF WORK

A. Extent of electrical related identification is indicated by drawings, schedules and within this Section.

B. Types of electrical identification specified in this section include the following:

1. Cable/Conductor identification.
2. Operational instructions and warnings.
3. Danger signs.
4. Equipment/system identification signs.

C. Remove existing identification and provide new identification on all existing equipment where identification nomenclature has changed as a result of this project.

PART 2: PRODUCTS

2.01 ELECTRICAL IDENTIFICATION MATERIALS

A. General

1. Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than single types required for each application. Where more than single type is specified for an application, selection is Installer's option, but provide single selection for each application.

B. Color-Coded Plastic Tape

1. Provide manufacturer's standard self-adhesive vinyl tape not less than 3 mils thick by 1½ " wide. Provide color as required to identify conductor/conduit.

C. Cable/Conductor Identification Bands

1. Wire Markers: Provide computer-generated vinyl or plastic sleeve, slipover type, white background with black imprinting as required for specific application.
2. Color-Coded Plastic Tape: Provide manufacturer's standard self-adhesive vinyl tape. Unless otherwise indicated, provide colors according to applicable codes or standards.

D. Operational Instructions and Warnings

1. Provide manufacturer's standard pre-printed, accident-prevention and operational tags, of plasticizes card stock with matte finish suitable for writing, approximately 3¼" x 5-5/8", with brass grommets and wire fasteners, and with appropriate pre-printed wording including large-size primary wording (as examples: "DANGER", "CAUTION, DO NOT OPERATE").

2. Provide manufacturer's standard, self-adhesive or pressure-sensitive, pre-printed, flexible vinyl signs for operational instructions or warnings, of sizes suitable for application areas and adequate for visibility, with proper wording for each application (as examples: "208V", EXHAUST FAN", "RECTIFIER"). Unless otherwise indicated or required by governing regulations, provide orange signs with black lettering.

E. Danger and Caution Signs

1. Provide manufacturer's standard "DANGER" signs of baked enamel finish on 20-gage steel, of standard red, black and white graphics, 14" x 10" size except where 10" x 7" is the largest size which can be applied where needed and except where larger size is needed for adequate vision, and with/wording: "DANGER HIGH VOLTAGE UNAUTHORIZED PERSONNEL KEEP OUT."

2. Provide manufacturer's standard "CAUTION" signs of pressure sensitive polyester, with adhesive back coating, 2-1/4" x 9". Wording shall be as scheduled. (Example: Caution-480 Volts; Caution-Buried Cable).

F. Equipment/System Identification Signs

1. Provide engraved stock melamine plastic-laminate, complying with FS L-P-387, in sizes and thickness indicated, engraved with engraver's standard letter style of sizes and wording indicated black and white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

2. Thickness: 1/16", for units up to 20-sq. in. or 8" length, 1/8" for larger units.

G. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate substrate.

H. Conduit Markers:

1. Indoor Conduit markers shall be

a. High-adhesive type with easy removability

b. Vinyl-impregnated cloth construction for long-term durability

c. Resist abrasion, moisture, dirt and oil

d. Non-smear, black legend on bright yellow background

e. Size: Medium -- with 1 in. type on large conduits; Small: with 5/8 in. type on smaller conduits

f. Markers shall be Ideal 44-590, Brady, or equal.

2. Outdoor Conduit markers shall be

a. 1" wide embossed 316 stainless steel straps attached to conduit with a stainless wire.

2.02 LETTERING AND GRAPHICS

A. Coordinate names, abbreviations and other designations used in electrical identification work, with corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of electrical systems and equipment.

PART 3: EXECUTION

3.01 APPLICATION AND INSTALLATION

A. General Installation Requirements

1. Coordination: Where identification is to be applied to surfaces which require finish, install identification after completion of painting.

2. Regulations: Comply with governing regulations and requests of governing authorities for identification of electrical work.

B. Cable/Conductor Identification

1. Apply cable/conductor identification on each cable and conductor in each box/enclosure/cabinet where wires are present, except where another form of identification (such as color-coded conductors) is provided. Match identification with marking system used in panel boards, shop drawings, contract documents, and similar previously established identification for project electrical work.

2. Conductors shall be clearly and permanently identified.

3. All control circuit and instrument circuit terminations shall be identified, both on the conductor and on the terminal block.

4. For conductors #6 and smaller, conductor color-coding shall be color insulation. For conductor color coding of wire larger than #6, use self-adhesive wraparound tape markers. Use markers at all panel boards, boxes, outlets, switches, circuit breakers and control centers.

5. All ground conductors and these only: Green.

C. Equipment/System Identification Signs:

1. Provide engraved plastic-laminate, in sizes and thicknesses indicated, engraved with engraver's standard letter style of sizes and wording indicated black and white core (letter color; except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

2. Thickness: 1/16" for units up to 20 sq. in. or 8" in length, 1/8" for larger units.

D. Fasteners: Self-tapping stainless steel screws, except use contact-type permanent adhesive where screws cannot or should not penetrate substrate.

3.02 LETTERING AND GRAPHICS

A. Coordinate names, abbreviation and other designations used in electrical identification work, with corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of electrical systems and equipment.

208Y/120V:	Ground Conductor:	Green
	Phase Conductors:	Black, red, blue
	Neutral Conductor:	White
480Y/277V:	Ground Conductor:	Green
	Phase Conductors:	Brown, orange, yellow
	Neutral Conductor:	White or gray

13.8kV:Phase conductors: Color code each phase

B. Junction Box Identification:

1. Apply panel and circuit identification numbers on the cover of all boxes located above ceilings or exposed. Utilize black lettering for normal power circuits and red lettering for emergency power circuits (use indelible ink marker pens).

C. Danger and Caution Signs:

1. In addition to installation of danger signs required by governing regulations and authorities install appropriate danger signs at locations indicated below and at locations subsequently identified by Installer of electrical work as constituting similar dangers for persons in or about project.

Type sign (Danger/Caution)	Location
Danger: "NO SMOKING"	ELECTRICAL BUILDING
Danger: "480 VOLTS"	ELECTRICAL-GEAR (Outdoors)

D. Equipment/System Identification:

1. Install engraved plastic-laminate sign on each major unit of electrical equipment in building unless unit is specified with its own self-explanatory identification. Except as otherwise indicated, provide single line of text, ½" high lettering on 1½" high sign (2" high where 2 lines are required), white lettering in black field. Provide text matching terminology and numbering of the contract documents and shop drawings. Provide signs for the following pieces of electrical equipment:

a. Panel boards, electrical cabinets and enclosures.

b. Recess panel/doors to electrical facilities.

c. Major electrical switchgear.

d. Disconnect switches.

e. All junction boxes and pull boxes: Signs to include identification number (i.e. pull box number) and Danger sign (e.g. "PPB-1" "DANGER HIGH VOLTAGE – 480Volts KEEP OUT").

E. Conduits: Number all conduits at both ends of run and all intermediate junction and pull boxes per drawing Conduit and Cable Schedules. Conduit number must be visible to person standing on grade level in front of conduit. For conduits that are not shown on schedule but that are necessary to install the project, Contractor to assign a conduit number and update conduit and cable schedule or record drawings.

F. Install signs at locations indicated, or, where not otherwise indicated, at location for best convenience of viewing without interference with operation and maintenance of equipment. Secure to substrate with fasteners, except use adhesive where fasteners should not or cannot penetrate the substrate.

G. Remove existing identification and provide appropriate new identification on all existing equipment where identification nomenclature has changed as a result of this project.

H. The Electrical Contractor shall be responsible for terminating and properly labeling all field wiring

3.03 PAYMENT

A. Measurement and payment for the work under this section shall be at NO DIRECT PAY and shall be included with the related work bid items.

END OF SECTION 16055

SECTION 16110

ELECTRICAL RACEWAY SYSTEMS

PART 1: GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall provide electrical raceway systems, complete and in place, in accordance with the Contract Documents.

1.02 CONTRACTOR SUBMITTALS

A. General: Submittals shall be furnished in accordance with Sections 01340 – Contractor Submittals, and 16010 – Electrical Work, General.

B. Shop Drawings

1. Complete catalog cuts of all raceways, fittings, boxes, supports, and mounting hardware, marked where applicable to show proposed materials and finishes. Submit all internal hardware such as power terminal blocks etc.

2. Dimensioned layout drawings of all cable tray routings, including elevations.

PART 2: PRODUCTS

2.01 GENERAL

A. Pull and junction boxes, fittings, and other indicated enclosures which are dedicated to the raceway system, shall comply with the requirements of this Section.

2.02 CONDUIT

A. Rigid Aluminum (RAL) Conduits

1. Rigid aluminum conduit shall be manufactured of 6063 alloy, temper T 1.

2. Rigid aluminum conduit shall be manufactured in accordance with ANSI C80.5 Rigid Aluminum Conduit, and UL 6 Rigid Metal Electrical Conduit.

3. Manufacturers, or equal

a. Allied

b. Alcoa

B. Rigid Galvanized Steel (RGS) Conduit

1. Rigid steel conduit shall be mild steel, hot dip galvanized inside and out.

2. Rigid steel conduit shall be manufactured in accordance with ANSI C80.1 Rigid Steel Conduit, Zinc Coated, and UL 6.

3. Manufacturers, or equal.

a. LTV Steel

b. Triangle

c. Wheatland Tube

C. Rigid Non Metallic Conduit

1. Rigid non metallic conduit shall be Schedule 40 PVC, Schedule 80 PVC, sunlight resistant.

2. Rigid PVC conduit and elbows shall be manufactured in accordance with NEMA TC-2 Electrical Plastic Tubing and Conduit, Federal specification WC1O94A and UL 651 specifications. Fittings are manufactured to NEMA TC-3, Federal specification WC1094A and UL514B. Both conduit and fittings shall carry respective UL or ETL Listings and UL or ETL labels. Rigid PVC shall be UL listed for exposed outdoor usage and sunlight resistance.

3. Manufacturers, or equal

a. Carlon

b. Condux

D. Rigid PVC Coated Galvanized Steel (RPGS) Conduit

1. The conduit, prior to PVC coating, shall meet the requirements for RGS conduit above.

2. A PVC coating shall be bonded to the outer surface of the galvanized conduit. The bond between the coating and the conduit surface shall be greater than the tensile strength of the coating.

3. PVC coating thickness shall be not less than 40 mils.

4. PVC coated RGS shall be manufactured in accordance with the following standards:

a. UL 6

b. ANSI C80.1

c. NEMA RN1 PVC Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit

5. Manufacturers, or equal

a. Robroy

b. Ocal

E. Liquidtight Flexible Conduit

1. Liquidtight flexible conduit shall be constructed of a flexible hot dipped galvanized metal core with a sunlight resistant thermoplastic outer jacket. Liquidtight connectors shall be malleable iron. Provide external grounding jumper per NEC.

2. Liquidtight flexible conduit shall be manufactured in accordance with UL 360 Liquid Tight Flexible.

3. Manufacturers, or equal

a. Anaconda, "Sealtite"

b. Electriflex, "Liquatite"

c. T&B

F. Electrical Metallic Tubing (EMT) or Intermediate (IMC) conduit will not be accepted.

2.03 FITTINGS AND BOXES

A. General

1. All cast and malleable iron fittings for use with metallic conduit shall be the threaded type with five full threads.

2. All fittings and boxes shall have neoprene gaskets and non magnetic stainless steel screws. All covers shall be attached by means of holes tapped into the body of the fitting. Covers for fittings attached by means of clips or clamps will not be acceptable. Standard boxes for non hazardous areas shall be FS/FD type.

3. Boxes larger than standard cast or malleable types shall be 316 stainless steel, NEMA 4X.

4. Hubs shall be grounding type as manufactured by Myers, O.Z. Gedney, or equal.

5. Conduit, fittings, and boxes in hazardous locations shall be suitable for the Class and Division indicated.

6. The Kellems grip to support the cables shall be 316 stainless steel.

B. Cast Aluminum Fittings and Boxes

1. All cast aluminum boxes and fittings shall have less than 0.40 percent copper content and shall be utilized with aluminum conduit.

2. Manufacturers, or equal

a. O.Z. Gedney

b. Appleton

c. Crouse Hinds

C. Malleable Iron Fittings and Boxes

1. All fittings and boxes for use with galvanized steel conduit shall be of malleable iron or gray iron alloy with zinc plating.

2. Manufacturers, or equal

   a. O.Z. Gedney

   b. Crouse Hinds

   c. Appleton

D. PVC Fittings and Boxes

1. All fittings for use with rigid non metallic conduit shall be PVC, solvent welded type.

2. Boxes shall be PVC or fiberglass reinforced polyester (FRP) with stainless steel hardware.

3. Manufacturers, or equal

   a. Carlon

   b. Crouse Hinds

   c. Hoffman

4. Provide all welding solvent as required for installation of non metallic conduit and fittings.

E. PVC Coated Fittings

1. All fittings for use with PVC coated RGS shall be PVC coated and shall be products of the same manufacturer as the conduit.

F. Stainless Steel Boxes

1. Stainless steel boxes shall be used with PVC coated RGS conduit and where indicated.

2. Stainless steel boxes shall be NEMA 4X, Type 316.

3. Stainless steel shall be minimum 14 gauge thickness, with a brushed finish.

4. Doors shall have full length stainless steel piano hinges. Non hinged boxes are not acceptable.

5. Manufacturers, or equal

   a. Hoffman

   b. Rohn

c. Hammond

G. Sheet Steel Boxes

1. Sheet steel boxes shall be galvanized steel outlet and switch boxes.

2. Manufacturers, or equal

a. Raco

b. Steel City

H. Conduit Seals, Breathers, Drains

1. Seals shall be UL: approved for the area hazard classification

2. Seal material shall match the conduit system

3. Seal shall be designed for 40% wiring fill to match conduit sizing design

4. Drains shall be stainless steel, UL rated for the hazard area classification, and installed in all sealing fittings. Sealing fitting shall typically be installed in a vertical direction to allow condensate drainage from above seal.

5. Provide a combination Ex Pf Breather/Drain in all explosion proof enclosures.

6. Provide a combination breather/drain in all enclosures located outdoors.

2.04 CONDUIT, CABLE WALL/FLOOR PENETRATIONS

A. Provide multi transit cable penetration system where called for on the drawings

1. Flanged 316ss frame installed in wall or installed on curb on roof top

2. Keep cable spacing shown on drawings.

3. Provide waterproof sealing on CLX cable construction for horizontal or vertical installation.

4. Provide min 2 spare unused modules at each penetration.

5. Design shall be free from electromagnetic radiation pick up from transit cables. Installation detail shall be such to eliminate this problem. Coordinate with transit system manufacturer, particularly on VSD cables.

B. System shall be Roxtec G frame with multidiameter EPDM modules, and sealing compression wedge. All metal components shall be 316ss.

2.05 BUSHINGS

A. Insulated throat grounding bushings where conduits stub up into electrical equipment such as switchgear, MCC, VFD etc. Bushings shall be as manufactured by T&B or equal.

PART 3: EXECUTION

3.01 INSPECTION

A. Examine areas and conditions under which raceways are to be installed, and substrate which will support raceways. Notify Contractor in writing of conditions detrimental to proper completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 INSTALLATION OF RACEWAYS

A. General: Install raceways as indicated; in accordance with manufacturer's written installation instructions, and in compliance with NEC, and NECA's "Standards of Installation." Install units plumb and level, and maintain manufacturer's recommended clearances.

B. Coordinate with all other trades prior to installation of raceways. Coordinate with other work including wires/cables, boxes, and panel work, as necessary to interface installation of electrical raceways and components with other work. Routings shall be adjusted to avoid obstructions. Lack of such coordination shall not be justification for extra compensation, and removal and reinstallation to resolve conflicts shall be at no extra cost to the OWNER.

C. All exposed raceways shall be installed at least ½-inch from walls or ceilings except that at locations above finished grade where damp conditions do not prevail, exposed raceways may be installed ¼-inch minimum from the face of walls or ceilings by the use of clamp backs or struts.

D. Wherever contact with concrete or dissimilar metals can produce galvanic corrosion of equipment, suitable insulating means shall be provided to prevent such corrosion.

3.03 INSTALLATION OF CONDUITS

A. General: Outdoor construction requires the CONTRACTOR to install conduits in a manner to prevent water ingressing into enclosures.

1. Conduits to enter enclosures from underneath or if this is not possible entry point to be close to enclosure bottom. Conduit top entry is not permitted. Use Myers Hubs with grounding lug attachment for conduit entry. All conduit supports to be stainless steel or hot dipped galvanized after fabrication and all fastening hardware to be stainless steel.

B. Mechanically fasten together metal conduits, enclosures, and raceways for conductors to form continuous electrical conductor. Connect to electrical boxes, fittings and cabinets to provide electrical continuity and firm mechanical assembly. All threads shall be coated with a conductive lubricant before assembly.

C. Avoid use of dissimilar metals throughout system to eliminate possibility of electrolysis. Where dissimilar metals are in contact, coat surfaces with corrosion inhibiting compound before assembling.

D. Install miscellaneous fitting such as reducers, chase nipples, 3-piece unions, split couplings, and plugs that have been specifically designed and manufactured for their particular application. Factory elbows shall be utilized where possible. Install expansion fittings in raceways every 200' linear RGS run (100' RAC run). Use expansion-deflection fittings where conduits cross structure expansion joints. Refer to structure drawings for expansion joint locations. Provide bonding jumpers around fittings. When installing conduits in existing plant, field verify location of structural expansion joints.

E. Use roughing-in dimensions of electrically operated unit furnished by supplier. Set conduit and boxes for connection to units only after review of dimensions and after checking location with other trades.

F. Provide nylon pull cord in empty conduits. Test conduits required to be installed, but left empty, with ball mandrel. Clear any conduit which rejects ball mandrel. Pay costs involved for restoration of conduit and surrounding surfaces to original condition.

G. Conduit Application:

1. Concealed Interior, Dry: Type Aluminum. {MCC-1}

2. Exposed Interior, Dry (heights Above Finished Floor):

   a. Aluminum.

   b. Where conduit run originates as RGS, RPGS continue with RGS, RPGS to first connection device.

3. Exposed Interior, Wet: Type Aluminum.

4. Hazardous Area: Type Aluminum.

5. Exposed Exterior: Type Aluminum

6. Concrete Embedded: Type PVC Schedule 40 or 80 on horizontal runs with Type pvc80 long sweep elbows where conduit terminates at slab elevation.

H. Use flexible conduit from outlet boxes to recessed lighting fixtures, and final 24" of connection to motors, or control items subject to movement or vibration, and in cells in precast concrete panels.

I. Use liquid-tight flexible conduit where subjected to one or more of the following conditions:

1. Exterior location.

2. Moist or humid atmosphere where condensate can be expected to accumulate.

3. Corrosive atmosphere.

4. Subjected to water spray or dripping oil, water or grease.

J. Cut conduits straight, properly ream, and cut threads for heavy wall conduit deep and clean. Field-bend conduit with benders designed for purpose so as not to distort nor vary internal diameter.

K. Wherever possible, conduit runs shall slope to drain at one or both ends of run. Wherever conduit enters substructures below grade, the conduit shall be sloped to drain water away from the structure. Extreme care shall be taken to avoid pockets or depressions in conduit.

L. Size conduits to meet NEC, except no conduit smaller than ¾" shall be embedded in concrete or masonry. Exposed conduit shall be ¾" minimum.

M. In all outdoor areas, and inside all plant building process areas (areas where pumps, or piping, or tanks etc. exist), fasten conduit terminations in enclosures with Myers hubs, and grounding attachment. Fasten indoor conduit terminations in enclosures by 2 lock nuts (inside and outside enclosure), and grounding bushing.

N. Conduits are not to cross pipe shafts, or ventilating duct openings.

O. Keep conduits a minimum distance of 6" from parallel runs of flues, hot water pipes or other sources of heat. Wherever possible, install horizontal raceway runs above water and steam piping.

P. Use of running threads at conduit joints and terminations is prohibited. Where required, use 3-piece union or split coupling.

Q. Complete installation of electrical raceways before starting installation of cables/wires within raceways.

R. Support vertical conduit of any size at each floor level or a maximum of every 10 feet, whichever is smaller, with clamp hangers.

S. Concealed conduits of any size installed above ceilings and in walls shall have supports spaced every eight (8) feet maximum with not less than two (2) supports for each ten (10) foot length and one support at each elbow.

T. In addition to other conduit support requirements, conduits shall be securely fastened within eighteen (18) inches of each box, cabinet, or other conduit termination.

U. Conduits Underground and below slabs:

1. Raceways installed underground shall have conduit threads painted with corrosion inhibiting compound before couplings are assembled. Draw up coupling and conduit sufficiently tight to ensure water tightness.

2. For slabs, install conduits larger than 2.5" under concrete slabs. All conduit in ground and under slabs shall be PVC schedule 80 and hung from slab utilizing 316 stainless steel 5/8" rod and stainless hardware every four (4) feet. There shall be a minimum of 2 hangars per conduit. In addition, see specifications Section 16111, item 3.02.E.

V. Conduits in Concrete Slabs:

1. Place conduits between bottom reinforcing steel and top reinforcing steel.

2. Place conduits either parallel, or at 90 degrees, to main reinforcing steel.

3. Separate conduits by not less than diameter of larger conduit to ensure proper concrete bond.

4. Conduits crossing in slab must be reviewed for proper cover by Engineer.

5. Embedded conduit diameter is not to exceed 1/3 of slab thickness.

6. Install conduits as not to damage or run through structural members. Avoid horizontal or cross runs in building partitions or sidewalls.

W. Exposed Conduits:

1. Install exposed conduits and extensions from concealed conduit systems neatly, parallel with, or at right angles to walls of building.

2. Install exposed conduit work as not to interfere with ceiling inserts, lights or ventilation ducts or outlets.

3. Support exposed conduits by use of hangers, clamps, or clips. Support conduits on each side of bends and on spacing not to exceed following: up to 1": 6'-0"; 1-1/4" and over: 8'-0".

4. Run conduits for outlets on waterproof walls exposed. Set anchors for supporting conduit on waterproof wall in waterproof cement.

5. Above requirements for exposed conduits also apply to conduits installed in space above hung ceilings, and in crawl spaces.

X. Non-Metallic Conduits:

1. Non--metallic conduit as hereinafter specified shall be used, where indicated.

2. Non-metallic conduit installed underground shall be installed in concrete envelope. Where conduit rises out of ground or enters the building, PVC Schedule 80 shall be used and connected with adapters designed for the purpose. Ninety degree elbows shall be PVC Schedule 80. Concrete envelope shall extend to 1'-0" above grade with edges chamfered 1" at 45 degree where conduit rises out of ground.

3. Make solvent cemented joints in accordance with recommendations of manufacturer.

4. Install PVC conduits in accordance with NEC and in compliance with local utility practices.

5. Non-metallic conduit installed above ground areas shall be PVC Schedule 80.

   a. Conduit shall be supported per NEC Table 352-30(B)

b. Install away from steam lines and other heat sources.

c. Provide expansion fittings per NEC 352.44

Y. Penetrations

1. Flash and counterflash conduits penetrating roofing membrane.

2. Seal penetrations with oakum or expandable plastic compound.

3. Provide PVC sleeves and chases where conduits pass through slabs, floors, or walls. Finish to match adjacent surfaces.

4. Provide escutcheon plates where exposed conduits pass through walls, floors or ceilings.

Z. Bushings

1. Bushings for terminating conduits smaller than 1¼" shall have flared bottom and ribbed sides, with smooth upper edges to prevent injury to cable installation.

2. Install insulated type bushing for terminating conduits 1¼" and larger. Bushings shall have flared bottom and ribbed sides. Upper edge to have phenolic insulating ring molded into bushing.

3. Bushing of standard or insulated type shall have screw type grounding terminal.

AA. Miscellaneous fittings such as reducers, chase nipples, 3-piece unions, split couplings, and plugs shall be specifically designed for their particular application.

AB. Provide conduit seal fittings at the following locations:

1. In hazardous classified locations, in strict accordance with the NEC.

2. In chlorine, ammonia, sulfur dioxide, and HFS areas to prevent passage of gases to other areas.

AC. Conduit sealing bushings shall be used to seal conduit ends exposed to the weather and at other locations shown on the Drawings.

AD. Conduits passing from heated to unheated spaces, exterior spaces, refrigerated spaces, cold air plenums, etc, shall be sealed with "Duxseal" as manufactured by Manville or seal fitting to prevent the accumulation of condensation.

AE. All conduit, fittings, and boxes required in hazardous classified areas shall be suitably rated for the area and shall be provided in strict accordance with NEC requirements.

AF. PVC Coated Rigid Galvanized Steel Installation (PVCRGS):

1. Installation of the PVCRGS Conduit System shall be performed in accordance with the manufacturer's Installation Manual. To assure correct installation, the installer shall be certified by the manufacturer to install coated conduit.

2. Clamping: If a power drive unit that spins the conduit is used, the chuck should be equipped with inserts designed specifically for PVC coated conduit. When

using a pipe vise it is recommended that the jaw assembly be replaced with PVCRGS Jaws vise adapters.

3. Cutting: Use a roller cutter to cut coated conduit. In addition to producing a square cut end, the roller cutter will remove approximately 1/4" of the PVC coating, aiding in conduit threading. Conventional manual or power saws may also be used to cut conduit. Use a reamer to remove any rough edges from the conduit interior caused by the cutting operation. This ensures that the wire pulled through the conduit will not be damaged. On larger model power threaders with open die heads, use optional grip inserts for PVC coated conduit. Use a good quality thread cutting oil to flush away the metal and PVC chips. After threading use a degreasing spray to thoroughly clean the threads and the interior of the pipe. Use care not to contaminate the cutting oil with the degreasing spray. Degreasing is important in order to insure that the touch up compound will adhere to the unprotected steel. Bare steel is the most vulnerable area to corrosion in any conduit system, therefore, touch up compound must be used on all field cut threads and internal reams. When an access fitting or coupling is attached to the newly threaded conduit a colored compound band will form at the end of the sleeve. This indicates proper installation procedures have been followed.

4. Bending: Use manufacturer's standard, special and large radius elbows. When field bending is necessary, to accommodate the PVC coating when using a hand bender, select the next larger size shoe. For optimum results use equipment specially designed for bending PVC coated conduit. When bending Plasti-Bond with powered equipment, use rubbing alcohol to clean the inside of the shoe and the area of the conduit to be bent.

5. Assembly: Use touch up compound is used to repair nicks, cuts, and abrasions to the outer surface of coated conduit. Apply the exterior touch up compound liberally over damaged areas. Overlap existing PVC coating. Apply several coats in order to obtain adequate coverage. Allow the first coat to dry completely for before applying additional coats. Use exterior touch up compound as a sealant at access fitting openings. In wet locations apply the compound to the factory conduit threads at each joint before installation. Use PVCRGS Z Wrenches featuring extra wide jaws which spread the clamping force enabling the tools to grip securely without marring the surface of the conduit. Use PVCRGS Spin-It to avoid touching the coating, to tighten conduit. Use the PVCRGS Socket and standard ratchet for u-bolt and beam clamp installation. On couplings, use molded ribs to protect the coating from cuts and abrasions caused by the teeth of wrenches and pliers. Hand-tighten using strap wrenches.

AG. Maintain physical separation between power and communication conduits to avoid interference on the communications circuits. If power and communication conduits have to cross one another, they shall do so at right angles. For 480VAVC systems, keep 2 feet horizontal separation between power and communication conduits.

3.04 MEASUREMENT

A. Measurement for payment for the work under this section shall be on a Lump Sum basis as specified herein.

3.05 PAYMENT

A. Payment for the work under this section will be made under:

Item	Description	Unit Price
NS-16	Conduit & Wire	Lump Sum

END OF SECTION 16110

SECTION 16111

UNDERGROUND RACEWAY SYSTEMS

PART 1: GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall provide underground raceway systems, complete and in place, in accordance with the Contract Documents.

1.02 CONTRACTOR SUBMITTALS

A. General: Submittals shall be furnished in accordance with Sections 01340 – Contractor Submittals, and 16010 – Electrical Work, General.

B. Shop Drawings

1. Complete catalog cuts of all raceways, fittings, pullboxes, manholes, handholes, marked where applicable to show proposed materials and finishes.

2. Dimensioned layout drawings of all cable tray routings, including elevations.

1.03 PROJECT CONDITIONS:

A. Existing Utilities: Locate and protect existing utilities and other underground systems in a manner, which will ensure that no damage to personnel or property or service interruption will result from excavating and backfilling.

B. Protect property from damages which might result from excavating and backfilling.

C. Protect persons from injury at excavations by barricades, warnings and illumination.

D. Coordinate excavations with weather conditions, to minimize possibility of washouts, settlements and other damages and hazards.

E. Contractor is instructed to exercise extreme caution during excavation and, if used, horizontal directional drilling operations because no subsurface utility engineering according to ASCE Standard - CI/ASCE 38-02 is provided for this project.

1.04 RELATED SECTIONS

A. Section 03301 – Cast in place concrete

PART 2: PRODUCTS

2.01 GENERAL

A. Manholes, handholes, pullboxes and fittings which are dedicated to the underground raceway system shall comply with the requirements of this section. The manholes shall be designed at the Contractor's expense by a licensed professional Engineer registered in the state of Louisiana.

2.02 MANHOLES AND HANDHOLES

A. Manholes and pullboxes shall be cast in place with construction and size as indicated. Precast manholes and handholes of similar size and loading may be accepted, subject to approval by the ENGINEER.

1. Covers shall be traffic type, H 20 loading, except as indicated otherwise. Manhole and pullbox covers shall be identified as "Electric" by raised letters cast into the covers. Manhole frames and covers shall be Neenah Foundry No. R 1755 G or equal.

2. Manholes shall have frost proof and water tight grey iron frames and covers with solid lids and inner lids with 28 inch clear openings. All covers and lids shall be bolted to cast in place steel frames with corrosion resistant hardware. Frames shall be factory primed; covers shall be cast iron and shall have pick holes.

3. The concrete envelope shall have a compression strength of 3,000 psi in accordance with the requirements of Section 03300 – Cast in Place Concrete.

B. Manholes and pullboxes shall be equipped with pulling in irons opposite and below each ductway entrance.

C. PVC ductbank conduits shall be provided with end bells.

D. Manhole brackets: Underground Devices heavy duty non metallic cable rack CR36 with 8" arms, stainless steel drop-in anchors and 316ss hardware.

E. Precast manholes and pullboxes shall be Brooks Mack, Quikset, U.S. Precast, or equal. Cast iron covers shall be by U.S. Foundry, or equal.

F. Cable Tags: Provide tags of polyethylene 0.1-inch thick minimum, resistive to acids alkalis, organic solvents, Provide a 0.05-inch polyethylene tag holder. Provide a one piece nylon, self locking tie at each end of the cable tag. Ties shall have a minimum loop tensile strength of 175 pounds. The cable tags shall have black block letters, numbers, and symbols one inch high on a yellow background.

2.03 DUCTBANKS

A. Underground ducts shall be Schedule 40 PVC, or Schedule 80 PVC.

B. Ducts shall be encased in red dyed throughout concrete with steel reinforcing bars. Concrete shall have 4,000 psi compressive strength conforming to Section 03301 Cast In Place Concrete. Colorant shall be an integral red oxide coloring pigment in the proportion of 8 pounds per cubic yard of concrete. Concrete shall be dyed red throughout the ducts. Surface treatment will not be accepted. The costs, if any, of cleaning coloring pigment from the concrete delivery equipment and other related cleanings shall be included in the Bid.

C. Ductbanks shall contain a No. 4/0 bare stranded copper ground wire. The ground wire shall be continuous through the ductbank and terminate at power distribution equipment and grounding grid.

D. Identification Tape: Continuous lengths of underground warning tapes shall be installed 12 inches above and parallel to all ductbanks. Tape shall be 6 inches wide polyethylene

film imprinted "CAUTION – ELECTRIC UTILITIES BELOW." Tapes shall be as manufactured by Brady, or equal.

2.04 HORIZONTAL DIRECTIONAL DRILLING (HDD) FOR ELECTRICAL WORK:

A. Contractor shall use a high-density polyethylene (HDPE) pipe, UL listed as a conduit for the electric power industry, Drisco Plex 3100, or equal.

B. The PE Conduit shall be SDR11 or IPEC Terra Con with an interior diameter (ID) equal to or greater than the ID of the specified Schedule 40 PVC Conduit. Also approved for short HDD distance of less than 250' is UL Listed HDPE Schedule 80 nonmetallic flexible raceway as manufactured by Blue Diamond Industries, LLC, or approved equal. The UL Listed HDPE is compliant with the applicable NEC and is listed to UL 651. The requirement of the ID of the HDPE conduit equal to or greater than the specified ID of the Schedule 40 PVC will assure adequate cross-sectional area for conductor cooling and installation.

C. To make a piping transition from PE pipe to PVC Conduit, use a special industry compression coupling that is specifically designed and applicable for the transition. The coupling (ETCO Specialty Products, Inc., E-loc transition coupling, or equal) shall not reduce the interior diameter of either pipe.

D. The color preference for the PE Conduit is black exterior with three red stripes for the identification of an electrical conduit.

PART 3: EXECUTION

3.01 GENERAL

A. Underground raceways shall be installed between manholes, handholes and pullboxes as indicated. Raceway systems shall be electrically and mechanically complete before conductors are installed. Bends and offsets shall be smooth and symmetrical, and shall be fabricated with tools designed for this purpose. Factory elbows shall be utilized wherever possible.

B. Raceway routings on plan views shall be followed to the extent possible.

C. Routings shall be adjusted to avoid obstructions. Coordinate with all other trades prior to installation of raceways. Lack of coordination shall not be justification for extra compensation, and removal and reinstallation to resolve conflicts shall be at no extra cost to the OWNER.

3.02 DUCTBANKS

A. Ductbank installation:

1. All duct banks shall be pile supported as shown on the drawings. Provide pile supports on the centerlines as shown on the drawings. Provide pile supports on each side of duct bank where it crosses other subsurface piping, at each change of direction of the duct bank, and at all duct bank starting and termination points.

2. Where practical, duct bank system extending parallel to other subsurface structures should not be located directly over or under other subsurface structures.

3. Where duct bank must be installed longitudinally under roadway, it should be installed in the shoulder. If this is not practical, install within the limits of 1 lane.

4. The separation between a ductbank system and other underground structures should be as large as possible to permit maintenance.

5. Where a ductbank is parallel to a sewer line or water line, it shall be suitably supported. Where a ductbank crosses a sewer line or a water line, it shall have a support on each side of the sewer line to limit the likely hood of transferring any load to the sewer line.

B. Ductbanks shall be installed in accordance with the additional criteria below:

1. Duct shall be assembled using high impact non metallic spacers and saddles to provide conduits with vertical and horizontal separation. Plastic spacers shall be set every 5 feet. The duct array shall be anchored every 5 feet to prevent movement during placement of concrete.

2. The duct shall be laid on a grade line of at least 3 inches per 100 feet, sloping towards pullboxes or manholes. Duct shall be installed and pullbox and manhole depths adjusted so that the top of the concrete envelope is a minimum of 24 inches below grade and a minimum of 30 inches below roadways.

3. Changes in direction of the duct envelope by more than 10 degrees horizontally or vertically shall be accomplished using bends with a minimum radius 24 times the duct diameter.

4. Duct couplings shall be staggered a minimum of 6 inches.

5. The bottom of trench shall be of select backfill or sand.

6. Each bore of the completed ductbank shall be cleaned by drawing through it a standard flexible mandrel one foot long and ¼ inch smaller than the nominal size of the duct. After passing of the mandrel, a wire brush and swab shall be drawn through.

7. Spare raceways which are not indicated to contain conductors shall have a 1/8 inch polypropylene pull cord installed throughout the entire length of the raceway.

8. All concrete encased conduit ducts shall be formed to prevent concrete over spills and excesses that exceed the 3 inch minimum cover for the conduits in the duct.

C. Duct entrances shall be grouted smooth; ducts shall be terminated with flush end bells. Sections of pre fabricated manholes and pullboxes shall be assembled with waterproof mastic and shall be set on a 12-inch bed of gravel as recommended by the manufacturer or as required by field conditions.

D. Ductbank penetration through walls of manholes, pullboxes, and building walls below grade shall be watertight. Where installed through building walls, the conduit shall internal and external seals to limit the likelihood of the entrance of gas into the building.

E. Concrete encased ductbank and building foundations.

1. When a concrete encased ductbank enters under a building constructed with a concrete slab on grade, or a concrete slab on piles, the concrete encased duct bank shall be continued to just beyond the building slab perimeter. To support the concrete encased duct bank where it penetrates the building slab perimeter, the concrete encased duct bank resteel shall be tied to the building slab resteel with 5/8" 316ss hangers. Minimum resteel overlap shall be 12 inches. All duct bank conduit and conduit stub ups under the slab shall be PVC Sch 80.

2. The concrete encased duct bank shall be supported from underside of the building slab with 5/8" 316ss hangers. The first hangar shall be installed at the building slab edge and additional hangars shall be spaced at 2 foot intervals. There shall be a minimum of 2 hangars for each duct bank. Each hanger shall consist of two (2) 5/8" 316ss hangar rods , with one 5/8" rod on each side of the duct bank. The hanger rods shall be bent to run parallel with and tied to the concrete encased duct bank steel and shall be bent to run parallel with and tied to the building slab steel. Minimum resteel overlap shall be 12 inches.

3.03 MANHOLES

A. Pile support all manholes – 1 pile at each corner.

B. Rack all cables in manholes including existing manholes used in this contract, and in manholes where cables are spliced.

C. Provide cable racks in existing manholes where none exist.

D. Provide as many 36 inch high concrete inserts as required for racking wiring through manholes and to allow for the installation of 2 future cables.

E. Grounding: Ground all non-current carrying metal items inside the manhole including frames etc. Extend #6 copper from 4/0 main grounding conductor.

F. Provide tags for each cable or wire located in manholes, handholes, or vaults.

G. The horizontal clear working space shall not be less than 3 feet. The vertical dimension shall not be less than 7 feet.

H. Manhole covers shall be sufficient size to allow entry via portable ladder.

I. Provide hot dipped galvanized pull-in irons on each wall and on roof. One removable pulling in iron shall be installed in the floor under the cover opening.

J. Provide racks as shown on the drawings. Additional racks shall be mounted at not more than 12" from the corners at duct entrances. Racks shall be spaced at not more than 40" between racks on the walls.

3.04 COMMUNICATION DUCTS

A. Provide separate ducts for power and communication circuits such that there is no interference on the communication circuits. For 480 VAC circuits, a minimum separation of 3 feet shall be required. This separation requirement is not applicable to fiber optic circuits.

3.05 HORIZONTAL DIRECTIONAL DRILLING: (HDD)

A. Prior to performing work involving HDD, the Contractor (or its sub-Contractor) shall implement the following safety guidelines:

1. Perform all operations in compliance with OSHA guidelines and insure that all personnel are properly trained and equipped to work in the public right-of-way.

2. Ensure that the approved traffic control plan is implemented and followed at all times.

3. Ensure that all storm water pollution prevention measures are implemented and followed at all times.

4. Ensure all setbacks, offsets, and clearances are maintained.

5. Ensure that utility One-Calls and other utility coordination requirements have been met.

6. Positively locate/expose (by potholing) all crossed utilities.

7. Positively locate/expose (by potholing) all parallel utilities at the beginning and ending of all bores, and:

   a. Every 200' if it is within 5' of the proposed alignment,

   b. Every 50' if it is within 3' of the proposed alignment, and

   c. Additionally as requested by the Engineer.

8. The HDD Contractor shall have a planned response in the event of a utility strike including utility owner notification and how to avoid:

   a. Electrocution in the event of an electric strike.

   b. Combustion in the event of a gas line strike.

   c. Contamination in the case of a sewer strike.

B. Prior to all construction work, the Contractor shall perform the following requirements as outlined below:

1. The HDD Contractor shall familiarize itself with the work area and the technical requirements of the plans.

2. The Contractor shall establish construction marking/staking, prior to construction, to indicate:

   a. HDD entry and exit locations, and

   b. Proposed HDD alignment at 50 foot (max) intervals.

   c. Provide the Engineer with a contact list of all crew foreman.

C. During the construction phase, the Contractor shall perform the following:

1. The HDD Contractor shall calibrate its tracking and locating equipment at the beginning of each work day. A log shall be maintained and submitted to the Engineer.

2. The HDD Contractor shall monitor and record the alignment and depth readings provided by the tracking system.

    a. Every 25 to 30 feet (8 to 9 meters) for normal conditions,

    b. Every 5 to 10 feet (2 to 3 meters) where precise alignment control is necessary.

3. The HDD Contractor shall complete the HDD installation as designed, both horizontally and vertically, unless otherwise authorized by the Engineer.

4. The HDD Contractor shall attempt to maintain drilling fluid circulation throughout the HDD process during:

    a. The initial pilot hole installation.

    b. The reaming and back pull process (es). (The pull back should not exceed the fluid circulation rate capabilities).

5. The HDD Contractor should backream as required to accommodate the product size. It is preferable that the use of compaction reamers be avoided. However, the Contractor shall not expand the bore hole by more than six inches (6") using only a compaction reamer.

6. The HDD Contractor shall plan its reaming and back pulling operations carefully to ensure that, once started, all reaming and back pulling operations can be completed without stopping and within the permitted work hours.

7. The HDD Contractor shall at all times and for the entire length of the HDD alignment should be able to demonstrate and provide the:

    a. The horizontal and vertical position of the alignment.

    b. The fluid volume used, return rate, and pressures.

8. A Project Representative should monitor and verify the alignment measurements provided by the HDD Contractor.

9. The HDD Contractor shall inspect the work and surrounding area to ensure that no construction-related damage has occurred including:

    a. Heaving or humping of paved surfaces, and

    b. Drilling fluid fractures or releases.

10. At the request of the Engineer, the Contractor shall provide access for inspection of the HDD operations.

D. Following Construction, the Contractor shall perform the following:

1. Prior to the start of backfilling excavations under paved surfaces, the Contractor shall notify the Engineer to schedule an inspection.

2. The Contractor shall ensure that all cleanup and restoration is in compliance with the construction document requirements for right-of-way restoration. Upon completion of all right-of-way restoration activities, the Contractor will schedule a closeout inspection.

3. The Contractor shall notify the Engineer upon completion of all project work including final punch list items.

4. The Contractor's 1-year warranty period will not begin until any corrective actions required have been completed and subsequently approved by the Engineer.

E. Drilling Fluid Containment and Disposal Requirements: The HDD Contractor shall contain, handle, and dispose of drilling fluids in accordance with the following requirements:

1. All drilling fluid and fluid additives shall be disclosed, and Material Safety Data Sheets (MSDS) shall be provided to the Engineer upon request.

2. Excess drilling fluid shall be confined in a containment pit at the entry and exit locations until recycled or removed from the site.

3. Precautions shall be taken to insure that drilling fluid does not enter roadways, streams, municipal storm or sanitary sewer lines, and/or any other drainage system or body of water.

4. Unintended surfacing of drilling fluid shall be contained at the point of discharge and recycled or removed from the site.

5. Drilling fluids that are not recycled and reused shall be removed from the site and disposed at an approved disposal site.

6. Drilling fluids shall be completely removed from the construction site prior to back filling or restoring the site.

7. Collection, transportation, and disposal of drilling fluids shall be environmentally safe and comply with local ordinances and government regulations.

F. All construction activities shall be performed in accordance with the National Pollution Discharge Elimination System (NPDES) as regulated by the Environmental Protection Agency (EPA), as well as state and local requirements.

G. The HDD Contractor shall keep detailed and accurate records of all activities associated with the HDD process. Upon completion of HDD installations, the Contractor shall provide the Engineer with as-built plans and any supporting documents within 45 days of project completion. As-built plans should be in electronic format, but hard copy format may be approved on a case-by-case basis by the Engineer. HDD construction records and as-built plans shall include the following:

1. HDD tracking data and operator logs shall be maintained daily and shall be made available upon request to the Engineer. These field records and operator notes shall specify:

a. The type of tracking equipment used.

b. The length and depth of the HDD installation.

c. Additional information that may include steering adjustments and other equipment performance parameters.

2. As-built plans shall be derived from the tracking data and operator logs. At a minimum, the drawings shall indicate:

a. Horizontal and vertical HDD alignment (dimensioned).

b. Existing utility horizontal locations and depths at all exposed or potholed locations.

c. Existing utility horizontal locations where indicated with field locates.

3. As-built plans shall conform to the construction document requirements.

3.06 PAYMENT

A. Measurement for payment for the work under this section shall be at NO DIRECT PAY and shall be included with the related work bid items.

END OF SECTION 16111

SECTION 16120

WIRES AND CABLES (600 VOLT MAXIMUM)

PART 1: GENERAL

1.01 SCOPE OF WORK

A. Furnish, install and test all wire, cable and appurtenances as shown on the Drawings and as specified herein.

B. Install any specialty cables and I/O cables furnished under Instrumentation and Control Systems Division.

1.02 RELATED WORK

A. Instrumentation and Control Systems are specified in a separate Division of these specifications.

B. Section 16110: Raceways, Boxes, Fittings and Supports

C. Drawings and general provisions of Contract, including General and Special Provisions and Division 1 Specification sections, apply to work of this section.

D. This section is a Division 16 Basic Materials and Methods section, and is part of each Division 16 section making reference to wires and cables specified herein.

E. Refer to Section 16055, "Electrical Identification," for wire and cable color-coding instructions.

1.03 SUBMITTALS

A. Submit samples of proposed wire for approval. Each sample shall have the size, type of insulation and voltage stenciled on the jacket.

B. Approved samples will be sent to the project location for comparison by the Resident Engineer with the wire actually installed.

C. Installed unapproved wire shall be removed and replaced at no additional cost to the Owner.

1.04 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of electrical wire and cable products of types, sizes, and ratings required, whose products have been in satisfactory use in similar service for not less than five (5) years.

B. Installer's Qualifications: Firm with at least five (5) years of successful installation experience with projects utilizing electrical wiring and cabling work similar to that required for this project.

C. UL Compliance: Comply with applicable requirements of UL Std. 83, "Thermoplastic-Insulated Wires and Cables," and Std. 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors."

D. UL Compliance: Provide wiring/cabling and connector products which are UL-listed and labeled.

E. ETL Compliance: Provide wiring/cabling and connector product which are ETL-listed and labeled.

F. NEMA/ICEA Compliance: Comply with NEMA/ICEA Std. Pub./No.'s WC 5, "Thermoplastic-Insulated Wire and Cable for the Transmission and20Distribution of Electrical Energy," and WC-30, "Color Coding of Wires and Cables," pertaining to electrical power type wires and cables.

G. IEEE Compliance: Comply with applicable requirements of IEEE Stds. 82, "Test Procedures for Impulse Voltage Tests on Insulated Conductors," and Std. 241, "IEEE Recommended Practice for Electrical Power Systems in Commercial Buildings" pertaining to wiring systems.

H. ASTM Compliance: Comply with applicable requirements of ASTM B1, 2, 3, 8 and D-753. Provide copper conductors with conductivity of not less than 98% at 20°C (68°F).

1.05 DELIVERY, STORAGE AND HANDLING

A. Carefully handle all conductors to avoid kinks and damage to insulation.

PART 2: PRODUCTS

2.01 GENERAL

A. All conductors, include grounding conductors, shall be copper. Aluminum conductor wire and cable will not be permitted. Insulation shall bear UL label, the manufacturer's trademark, and identify the type, voltage, and conductor size. All conductors (except flexible cords and cables, fixture wires, and conductors that form an integral part of equipment such as motors and controllers) shall conform to the requirements of Article 310 of the National Electric Code, latest edition, for current carrying capacity. Flexible cords and cables shall conform to Article 400 and fixture wires shall conform to Article 402. All wiring shall have wire markers at each end.

B. Wires and cables shall be of annealed, 98 percent conductivity, soft drawn copper.

C. All conductors shall be stranded.

D. Except for control, signal and instrumentation circuits, wire smaller than No. 12 AWG shall not be used.

2.02 BUILDING WIRE

A. Power and Lighting Wire

1. All wire rated for 600 volts in duct or conduit for all power and lighting circuits shall be Class B Type XHHW-2 cross linked polyethylene conforming to UL 44 UL Standard for Safety Rubber Insulated Wires and Cables. Cables shall be sunlight resistant, gas and oil resistant II, and pass the Flame exposure test (VW-1).

2. Conductors for feeders as defined in Article 100 of the NEC shall be sized to prevent a voltage drop exceeding 3 percent at the farthest outlet of power, heating, and lighting loads, or combinations of such loads, and where the maximum total

voltage drop on both feeders and branch circuits to the farthest connected load does not exceed 5 percent.

3. Conductors for branch circuits as defined in Article 100 of the NEC, shall be sized to prevent voltage drop exceeding 3 percent at the farthest connected load or combinations of such loads and where the maximum total voltage drop on both feeders and branch circuits to the farthest connected load does not exceed 5 percent.

4. Wiring for 600 volt class power and lighting shall be as manufactured by Southwire Simpull, Okonite Co., or equal.

5. Minimum size is #12 AWG.

B. VFC Cable

1. Comply with UL 1277 (2000v), and NFPA 70 for Type TC-ER cable.

2. Type TC-ER with oversized cross-linked polyethylene insulation, dual spirally wrapped copper tape shields and three bare symmetrically applied ground wires, and sunlight- and oil-resistant outer PVC jacket.

3. Cable shall be rated 90-degress Celsius.

2.02 CONTROL, STATUS AND ALARM WIRE

A. Single conductor shall be 600V, No.14 AWG NEC type XHHW-2, stranded as manufactured by the Southwire, Okonite Co. or equal.

B. Multi-conductor control cable, where shown on the Drawings, shall be stranded, No.14 AWG 600V, XHHW-2 conductor insulation, PVC jacket over individual conductors, as manufactured by the Southwire CO., Okonite Co. or equal.

C. Control wiring in switchboards shall be SIS.

2.03 INSTRUMENTATION WIRE

A. Wire for 4-20 ma, R.T.D., potentiometer and similar signals shall be:

1. Single pair cable:

a. Conductors: Size as called for on the drawings (2 #16), tinned stranded and twisted on 2-in lay

b. Insulation: Polyethylene with 600 volt, 80 degree C rating

c. Shield: 100 percent mylar tape with drain wire

d. Jacket: PVC with UL and manufacturers identification

e. Max overall diameter: 0.313-in

f. Misc: UL listed for underground wet location use

g. Manufacturers: Belden or equal

2. Three conductor (triad) cable:

   a. Conductors: Size as called for on the drawings (3 #16) tinned stranded and twisted on 2-in lay

   b. Insulation: PE with 600 volt, 80 degree C rating

   c. Shield: 100 percent mylar tape with drain wire

   d. Jacket: PVC with UL and manufacturers identification

   e. Max overall diameter: 0.327-in

   f. Misc: UL listed for underground wet location use

   g. Manufacturers: Belden or equal

3. Multiple pair cables (where shown on the Drawings):

   a. Conductor: multiple 2 #16 stranded and twisted on a 2-in lay

   b. Insulation: XLPE with 600 volt, 80 degree C rating

   c. Shield: Individual pairs shielded with 100 percent mylar tape and drain wire

   d. Jacket: CPE with UL manufacturer's identification

   e. Misc: UL listed for underground wet location use

   f. Manufacturers: Belden or equal

B. Ethernet Cable

1. Screened Twisted Pair (ScTP), 4-pair 100 ohm UTP, with a single foil or braided screen surrounding all four pairs in order to minimize EMI radiation and susceptibility to outside noise. ScTP shall be equivalent to a shielded version of the Category 5e UTP cables. It shall be suitable for use in Ethernet applications in the same manner as the equivalent Category of UTP cabling.

2. For normal locations, Belden Data Twist 5e #1533R or approved equal. (Provide teflon or polyethylene overall jacket for all outdoor, or interior wet locations, Belden #1533P.)

C. Modbus Cable

1. Industrial twinax, 600V, 18AWG, polyolefin insulation, PVC jacket, Belden #3074F.

2.05 MOTOR CONNECTIONS

A. Motor connections shall be ring type mechanical compression terminations installed on the branch circuit wires and the motor leads and secured with bolt, nut and springwasher.

1. Outdoor connections subject to moisture ingress, shall be insulated with Raychem

Type RVC, roll-on stub insulator or equal.

2. Normally Dry locations, provide a quick seal multi splice insulator, suitable for motor T lead connections, waterproof, 600VAC rated, long lasting, reusable, reenterable, inspectable, flame retardant, impact resistant, suitable for multiple wire ranges, as manufactured by T&B type MSC.

2.06 TERMINATION (CONTROL & INSTRUMENTATION CONDUCTORS)

A. Termination connectors shall be of the pre insulated locking fork-end (upturned leg ends) type as manufactured by Ideal Industries; 3M Co.; Panduit Corp. or equal.

B. Splices shall not be allowed.

2.07 WIRE AND CABLE MARKERS

A. Wire and cable markers shall be "Omni-Grip" as manufactured by the W.H. Brady Co.; Thomas & Betts Co.; 3M Co. or equal.

B. Wire and cables with diameters exceeding the capacity of the "Omni-Grip" shall be marked with pre-printed, self-adhesive vinyl tapes as manufactured by the W.H. Brady Co.; Panduit Corp. or equal.

2.08 WALL AND FLOOR SLAB OPENING SEALS

A. Wall and floor slab openings shall be sealed with "FLAME-SAFE" as manufactured by the Thomas & Betts Corp. or equal.

2.09 CONDUCTOR AND CABLE TAGS

A. Tags relying on adhesives or taped-on markers are not acceptable.

B. Wire tags shall be heat shrink type "Brady" or approved equal with the tag numbers typed with an indelible marking process. Character size shall be a minimum of 18/" in height. Hand written tags shall not be acceptable.

C. Cable tags shall be engraved plastic (phenolic) with an approved color coded background (see below) and white characters of a minimum character size 3/16" in height. Cable tags (background color) shall be color coded as follows. Attach these tags to cables with nylon tie cord.

Cable Type	Tag Color
600 V and less Power & Control	Orange
Instrumentation Cable	Black
Data Communications Cable	Blue

D. Tagging shall be done in accordance with the execution portion of these Specifications.

2.10 WIRE COLOR CODE

A. All wire shall be color coded or coded using electrical tape in sizes where colored insulation is not available. Where tape is used as the identification system, it shall be applied in all

junction boxes, manholes and other accessible intermediate locations as well as at each termination.

B. The following coding shall be used:

System	Wire	Color
240/120 Volts	Neutral	White
1-Phase, 3-Wire	Line 1	Black
	Line 2	Red
208Y/120, Volts	Neutral	White
3-Phase, 4-Wire	Phase A	Black
	Phase B	Red
	Phase C	Blue
240/120, Volts	Neutral	White
3-Phase, 4-Wire	Phase A	Black
	Phase B	Orange (High-Leg to ground)
	Phase C	Blue
480Y/277 Volts	Neutral	Gray/White with one or more
3-Phase, 4-Wire		colored stripes
	Phase A	Brown
	Phase B	Orange
	Phase C	Yellow

2.11 CONNECTORS

A. Provide UL-type, solderless, factory-fabricated, metal connectors or sizes, ampacity ratings, materials, type and classes for applications and services indicated. Where not indicated, provide proper selection as determined by Installer to comply with project's installation requirements, NEC, and NEMA standards.

B. Compression connectors shall be Burndy "HYLUG" or equal.

C. Mechanical Connectors: For #6 and smaller conductors, use pre-insulated thread-on connectors. For larger conductors, use two-bolt connectors insulated with rubber tape and covered with vinyl plastic electrical tape. Do not use split-bolt type connectors.

D. For control wiring terminations, use terminal blocks with 20-ampere, screw-pressure box terminals with insulating barriers and numbered terminals. Provide ten percent spare terminals with a minimum of two spare terminals.

E. General purpose insulating tape shall be Scotch No. 33, Plymouth "Slipknot:, or equal. High temperature tape shall be polyvinyl by Plymouth, 3M, or equal.

F. Submersible Tap Connectors shall be Burndy Unitap series or NSI Industries Polaris series. Connectors shall be listed for terminating copper conductors of sizes required to be terminated and have sufficient ports for the required splice, plus a minimum of one spare port.

PART 3: EXECUTION

3.01 GENERAL

A. Do not exceed cable manufacturer's recommendations for maximum pulling tensions and minimum bending radii. Where pulling compound issued, use only UL listed compound compatible with the cable outer jacket and with the raceway involved.

B. Tighten all screws and terminal bolts using torque type wrenches and/or drivers to tighten to the inch-pound requirements of the NEC and UL.

C. Where single conductors and cables in manholes, handholes, vaults, cable trays, and other indicated locations are not wrapped together by some other means such as arc and fireproofing tapes, bundle throughout their exposed length all conductors entering from each conduit with nylon, self-locking, releasable, cable ties placed at intervals not exceeding 4 inches on centers.

D. All connections outdoors shall be made using oxidation inhibiting compound, penetrox, or equal. This includes power and grounding connections inside panels, wiring troughs, boxes, disconnect switches and other switchgear, electrical and mechanical eqpt., and lighting fixture poles (but not the actual lighting fixtures).

3.02 INSTALLATION

A. Conductors shall not be pulled into raceway until raceway has been cleared of moisture and debris.

B. Pulling tensions on raceway cables shall be within the limits recommended by the cable manufacturer. Wire pulling lubricant, where needed, shall be UL approved.

C. Instrumentation wire shall not be run in the same raceway with power and control wiring except where specifically indicated.

D. Wire in panels, cabinets, and wireways shall be neatly grouped using nylon tie straps, and shall be fanned out to terminals.

E. Single conductor cable in cable trays shall be No. 1/0 or larger and shall be of a type listed and marked for use in cable trays. Tray cable smaller than 1/0 shall be multi conductor, with outer jacket.

F. Branch circuit conductors shall not be smaller than #12 AWG and shall be sized as required by the load served and for specific N.E.C. requirements.

G. Branch circuit wires which come within 3" of a ballast within a light fixture, e.g., wires running through end-to-end connected fluorescent fixtures, must be rated for 90□C.

H. Wiring, Emergency System: Wiring from emergency source or emergency source

distribution overcurrent protection to emergency loads shall be kept entirely independent of other wiring and equipment and shall not enter the same raceway, cable, box or cables with other wiring.

I. Coordinate cable and wire installation work with electrical raceway and equipment installation work, as necessary for proper interface.

J. Do not pull conductors into raceway until raceway system (including all outlets, cabinets, bushings and fittings) is completed. Verify that all work of other trades, which may cause conductor damage, is completed. Use only approved cable lubricants when necessary.

K. Pull conductors together when more than one is being installed in a raceway.

L. Use pulling compound or lubricant, where necessary; compound must not deteriorate conductor or insulation.

M. Use UL-listed pulling means, including fish tape, cable or rope, which cannot damage raceway.

N. In general, conductors shall be of the same size from the last protective device to the load.

O. Use splice and tap connectors which are compatible with conductor material.

P. The system shall be properly grounded and continuously polarized (phase) throughout.

Q. On termination at branch circuit outlets leave a minimum of eight inches (8") free conductor for installation of devices and fixtures.

R. Cover uninsulated splices, joints, and free ends of conductor with rubber tape and PVC electrical tape. Plastic insulating caps may serve as insulation for wire sizes through #6, in combinations listed by the insulating cap manufacturer.

S. Do not use mechanical means to pull wire No. 8 or smaller.

T. All single conductor cables shall be installed in conduit.

U. Grounding conductors shall either have green insulation, or shall have green tape applied at all accessible places.

V. Control circuit conductors, unless indicated otherwise, shall be #14 AWG, minimum.

W. Shielded cables shall be installed with outer jacket and shield tape cut back no more than 6 inches from terminations and dressed with heat shrink tubing or lapped insulating tape so that only conductors and drain wire protrude and cut end of jacket and shield are concealed.

X. Solid conductors shall be terminated at equipment terminal screws with proper care that conductor is tightly wound around screw and does not protrude beyond screw head. Stranded conductors shall be terminated directly on equipment box lugs making sure that all conductor strands are confined within lug. Use fork-tongue lugs where equipment box lugs have not been provided.

Y. The Contractor shall provide, install, and terminate the conductors required to interconnect control and instrumentation equipment specified in any section of these specifications except as may be otherwise specified in other sections. Control conductors shall not be spliced and shall be terminated only terminal strips of vendor furnished and existing equipment. Control

conductors are defined as conductors operating at 120-volts or less in circuits that indicate equipment status or that control the electric energy delivered to a power consuming device.

Z. 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.

3.03 CONDUCTOR 600 VOLTS AND BELOW

A. Provide conductor sizes indicated on Drawings.

B. Use crimp connectors of all stranded conductors.

C. Soldered mechanical joints insulated with tape will not be acceptable.

D. Provide terminals and connectors acceptable for the type of material used.

E. Arrange wiring in cabinets, panels, and motor control centers neatly cut to proper length, remove surplus wire, and bridle and secure in an acceptable manner. Identify all circuits entering motor control centers or other control cabinets in accordance with the conductor identification system specified herein.

F. Terminate control and instrumentation wiring with methods consistent with terminals provided, and in accordance with terminal manufacturer's instructions. Where terminals provided will accept such lugs, terminate all control and instrumentation wiring with insulated, locking-fork compression lugs, Thomas & Betts Sta-Kon, or equal.

G. Attach compression lugs with a tool specifically designed for that purpose which provides a complete, controlled crimp where the tool will not release until the crimp is complete. Use of plier type crimpers is not acceptable.

H. Cap spare conductors and conductors not terminated with the UL listed end caps.

I. Where conductors pass through holes or over edges in sheet metal, remove all burrs, chamfer all edges, and install bushings and protective strips of insulating material to protect the conductors.

J. For conductors that will be connected by others, provide at least 6 feet spare conductors in freestanding panels and at least 2 feet spare in other assemblies. Provide more spare conductor in any particular assembly where it is obvious that more conductor will be needed to reach the termination point.

3.04 CONDUCTOR ARC AND FIREPROOFING TAPES

A. Use arc and fireproofing tapes on all 600-volt single conductors and cables except those rated Type TC throughout their entire exposed length at splices in all manholes, handholes, vaults, cable trays, and other indicated locations.

B. Wrap together as a single cable all conductors entering from each conduit.

C. Follow tape manufacturer's installation instructions. Secure the arc and fireproofing tape at frequent intervals with bands of the specified glass cloth electrical tape. Make each band of at least two wraps of tape directly over each other.

3.05 TERMINATIONS AND SPLICES

A. General

1. All wire taps and splices shall be properly taped and insulated according to their respective classes.

2. In general, there shall be no cable splices in underground manholes or pullboxes. If splices are necessary, the cables shall be brought aboveground and terminated in a NEMA 4X, stainless steel terminal or splice cabinet on a concrete pad. Splices in underground manholes and pullboxes may be made only with the approval of the ENGINEER.

3. Stranded conductors shall be terminated directly on equipment box lugs making sure that all conductor strands are confined within lug. Use forked tongue lugs where equipment box lugs have not been provided.

4. Excess control and instrumentation wire shall be properly taped and terminated as spares.

B. Control Wire and Cable

1. Control conductors shall be spliced or terminated only at the locations indicated and only on terminal strips or terminal lugs of vendor furnished equipment.

2. In junction boxes, motor control centers, and control panels, all control wire and spare wire shall be terminated to terminal strips.

3. Where multiple units perform parallel operations, do not group all devices on same branch circuit.

4. Do not exceed the ampacity of the branch circuit, or 12 amperes continuous.

C. Instrumentation Wire and Cable

1. Shielded instrumentation cables shall be grounded at one end only, preferably the receiving end on a 4 20 mA system.

2. Two and three conductor shielded cables installed in conduit runs which exceed 2,000 feet may be spliced in pullboxes. Such cable runs shall have only one splice per conductor.

3. Splices allowed at instrumentation terminal boxes only.

D. Power Wire and Cable

1. Power conductors: Terminations shall be die type or set screw type pressure connectors as specified. Splices (allowed in junction box only) shall be die type compression connector and waterproof with heat shrink boot or epoxy filling. All cables rated above 2,000 volt shall be spliced or terminated only at equipment terminals indicated.

2. Shielded power cable shall be terminated with pre assembled stress cones in a manner approved by the cable and terminal manufacturer. The CONTRACTOR shall submit the proposed termination procedure as described for shop drawings.

F. Except where permitted by the Engineer and Owner, no splices will be allowed in manholes, handholes or other below grade located boxes.

G. Splices shall not be made in push button control stations, control devices (i.e., pressure switches, flow switches, etc), panel boards, MCC's, VFD's conduit bodies, etc.

3.06 INSTRUMENTATION CABLES

A. Instrumentation cables shall be installed in rigid raceways as specified. All circuits shall be installed as twisted pairs or triads. In no case shall a circuit be made up using conductors from different pairs or triads. Triads shall be used wherever three wire circuits are required.

B. Terminal blocks shall be provided at all instrument cable junction, and all circuits shall be identified at such junctions.

C. Shielded instrumentation wire, coaxial, data highway, I/O and fiber optic cables shall be run without splices between instruments, terminal boxes, or panels.

D. Shields shall be grounded as recommended by the instrument manufacturer and isolated at all other locations. Terminal blocks shall be provided for inter-connecting shield drain wires at all junction boxes. Where individual circuit shielding is required, each shield circuit shall be provided with its own block.

E. Seal openings in slabs and walls through which wires and cables pass.

3.07 WIRE TAGGING

A. All wiring shall be tagged at all termination points and at all major access points in the electrical raceways. A termination point in defined as any point or junction where a wire or cable is physically connected. This includes terminal blocks and device terminals. A major access point to a raceway is defined as any enclosure, box or space designed for wire or cable pulling or inspection and includes pull boxes, manholes, and junction boxes.

Wire tags shall show both origination and destination information to allow for a wire or cable to be traced from point in the field. Information regarding its origination shall be shown in parenthesis.

For multiconductor cables, both the individual conducts and the overall cable shall be tagged. Conductors that are part of a multiconductor cable shall reference the cable identification number that they are a part of, as well as a unique conductor number within the cable. The tag format will be different for single conductor wires versus single conductors in a multiple conductor cable. See the appropriate section for each type.

B. Single Conductor Wire Tagging

The following is the format to use for single conductor wire tags. Tag information to the left refers to the termination point. Tag information in parenthesis refers to point of origination.

XXXX	-XX	(XXXX-)
Device Identifier	Terminal Number	* Equipment Tag No. Identifier

* For wiring within a piece of equipment, the Equipment Tag No. is not required, only the Device Identifier and Terminal Number from the point of origination.

1. Device Identifier: The Device Identifier uniquely identifies a device within a piece of equipment. Examples are: TB1, for terminal bloc number 1, and CR02 for control relay # 02.

2. Terminal Number: The Terminal Number along with the Device Identifier identify which specific point in the equipment the wire must be terminated to. Refer to manufacturer's labeling or record drawings for device terminal numbers.

3. Equipment Tag No: The Equipment Tag Number is the physical tag attached to the equipment.

   EXAMPLE: Refer to the end of this Section for examples on wire tagging within a piece of equipment and between two pieces of equipment.

3.08 FIELD TESTS

A. Conductors Under 600 Volts

1. Perform insulation resistance testing of all power circuits below 600 volts with a 1000-volt megger.

2. Prepare a written test report of the results and submit to the Engineer prior to final inspection.

3. Minimum acceptable value for insulation resistance is 5 megohm. Lower values shall be acceptable only by Engineer's and Owner's specific written approval.

4. Disconnect equipment that might be damaged by this test. Perform tests with all other equipment connected to the circuit.

5. Cables failing the tests shall be replaced with a new cable or be repaired. Repair methods shall be as recommended by the cable manufacturer and shall be performed by persons certified by the industry.

B. Continuity Test: All control and instrumentation cables shall be tested for continuity, polarity, undesirable ground, and origination. Such tests shall be performed after installation and prior to placing cables in service. After instrumentation cable installation and conductor termination by the instrumentation and control supplier, perform tests witnessed by the Engineer to ensure that instrumentation cable shields are isolated from ground, except at the grounding point. Remove all improper grounds.

C. Title: After instrumentation cable installation and conductor termination by the instrumentation and control supplier, perform tests witnessed by the Engineer to ensure that instrumentation cable shields are isolated from ground, except at the grounding point. Remove all improper grounds.

3.09 FIELD QUALITY CONTROL

A. Branch Circuit Power Wiring and Control Circuit Wiring:

1. Prior to energization, test conductors and cables for continuity and for short circuits.

B. Feeder Circuit Wiring:

1. Prior to energization, test cables and wire for continuity of circuitry, and also for short circuits.

2. Megger test all feeder conductors and record results. This requirement shall include all 3-phase feeders from the new distribution panel to connected loads (feeders to motors, control panels, etc.) and from the control panel to the pump station motors. Submit results to Engineer for record purposes. All cable tested shall read 50 (fifty) mega-ohms or better, at 1000 volts DC, after 60 seconds. Use 120 volt motorized megger.

C. Conductors will be considered defective if they do not pass tests.

D. Submit test results to Engineer for record purposes.

3.10 MEASUREMENT

A. Measurement for payment for the work under this section shall be on a Lump Sum basis as specified herein.

3.11 PAYMENT

A. Payment for the work under this section will be made under:

Item	**Description**	**Unit Price**
NS-16	Conduit & Wire	Lump Sum

END OF SECTION 16120

SECTION 16140

WIRING DEVICES

PART 1: GENERAL

1.01 REFERENCES

A. All applicable requirements of other portions of Contract Documents apply to the Work of this Section.

1.02 DESCRIPTION OF WORK

A. Furnish and install all devices herein specified.

B. Conduit and conductors shall be as described in other Sections of the Specifications.

C. All connections shall be made complete, and all devices shall be energized and in proper operating condition.

1.03 SUBMITTALS

A. All submittals shall conform completely to the requirements of the Contract Documents.

B. Product Data: Catalog Sheets, Specifications and Installation Instructions.

C. Samples: One of each product if different from manufacturer or catalog number specified. One of each faceplate, engraving, and abbreviations proposed.

PART 2: PRODUCTS

2.01 LOCAL SWITCHES, SINGLE POLE

A. Local Switches, Single Pole: Hubbell # 1101-X, P & S # 5011 or Leviton # 1101-X.

B. Local Switches, Three-Way: 20A, 120/277 VAC; Hubbell's 1103-X, P & S # 5013

C. Local Switches, Key-Operated: Similar to toggle type lock switches, except operated by removable key instead of lever. Furnish one key with each switch.

D. Momentary Contact Switches: Provide momentary contact switches where shown on the drawings. Components shall consist of momentary contact switches, the produce of Arrow-Hart (A-H), and switch plates and mountings the product of Mulberry Metal Products (MMP), or approved equals.

E. Horsepower Rated Switches: These switches are to be furnished and installed at locations indicated on Drawings. The following switches are for a minimum of 1 HP, 1 phase and 3 phase. The equal of Arrow-Hart will be acceptable.

1. Two Pole: A-H #6808F

2. Three Pole: A-H #7810F

F. Switches for hazardous locations shall be factory sealed, rated at 20 amperes, 120-277 vAC, capable of controlling 100 percent tungsten filament, fluorescent and HID lamp loads and shall be as manufactured by Crouse-Hinds, Appleton, or Killark.

G. Weatherproof cover for standard toggle switches - Crouse-Hinds Catalog No. DS181, or equal by Appleton Electric Co., L.E. Mason Co., or equal.

2.02 RECEPTACLES

A. Hubbell extra heavy duty industrial series, three wire grounded, 20A, 125V, Leviton or Equal

B. Weatherproof receptacle "while in use" shall be a three wire, grounded, 20 ampere, 125 volt duplex receptacle. This receptacle shall be extra heavy duty industrial series, corrosion resistant, and have a corrosion resistant, aluminum, weatherproof lift lid cover. The receptacle shall be GFCI Breaker Protected by Westinghouse (Eaton) #QBGF 1020 circuit breaker or approved equal.

C. GFCI receptacles shall be utilized for wet location power receptacles when the circuit in which these receptacles are connected are not protected by a GFCI circuit breaker back at the panel. These GFCI receptacles shall be the approved equal of the following types: Hubbell 20 amp, extra heavy duty industrial GFCI or equal, and have a corrosion resistant, aluminum, while in use weatherproof lift lid cover.

D. Receptacles for hazardous locations shall be single gang receptacles with spring door. Receptacles shall have a factory sealed chamber. The receptacles shall have a delayed action feature requiring the plug to be inserted in the receptacle and rotated before the electrical connection is made. The receptacle shall not work with non-hazardous rated plugs. One plug shall be furnished with each receptacle. The receptacles shall be rated for 20 amps at 125 VAC. Hazardous location receptacles shall be Appleton EFSB, Crouse-Hinds ENR, rated for the hazardous area classification, or equal. Where indicated, hazardous location receptacles shall be provided with ground fault protection. Ground fault protection shall be Appleton EFSR-GFI, Crouse-Hinds GFS-1, or equal.

2.03 ENCLOSURES AND COVERS

A. Surface mounted switches and receptacles shall be in FS or FD type weatherproof conduit fittings.

B. Switch and receptacle covers on surface mounted boxes shall be die cast copper-free aluminum.

C. In finished areas, switch and receptacle boxes shall be provided with SUPER STAINLESS STEEL COVERS as manufactured by Harvey Hubbell, Arrow Hart, Bryant, or equal.

D. In areas where cast boxes are used, switch covers shall be Crouse-Hinds Catalogue No. DS185 or equal. Receptacles in wet locations shall be with a cast aluminum hinged cover/enclosure marked "Suitable for Wet Locations when in use" and "UL Listed." There shall be a gasket between the enclosure and the mounting surface and between the hinged cover and mounting plate/base.

2.04 NAMEPLATES

A. Nameplates shall be fabricated from white-center, black-face laminated plastic engraving stock, Formica type ES-1, or equal. Each shall be fastened securely using fasteners of brass, cadmium plate, or stainless steel, screwed into inserts or tapped holes, as required. Engraved characters shall be block style of adequate size to be read easily at a distance of 6 feet with no character smaller than 1/8 inch high.

PART 3: EXECUTION

3.01 INSTALLATION

A. Install wiring devices in outlet boxes.

B. Local Switches

1. Install local switches rated 20A, 120/277 vac for lighting control unless otherwise shown on the Drawings or specified.

2. Where more than one switch occur at the same location in a 120 volt system, arrange switches in gangs and cover with one face plate.

3. Install single and double pole switches so that switch handle is up when switch is in the "On" position.

C. Receptacles

Install convenience receptacles at existing heights above floor, grounding pole on top. Install specific-use receptacles at heights shown on Contract Drawings. Install super stainless steel plates on outlet boxes and junction boxes in unfinished areas.

D. Wall Plates

1. Install wall plates on all wiring devices in dry; locations, with finish to match hardware in each area.

2. Install blank wall plates on outlet boxes which are for future equipment except telephone outlets.

3. Install 5/8" bushed wall plates on telephone outlets.

F. Weatherproof Covers: Install weatherproof covers on wiring devices in damp and wet locations.

3.02 Field Tests

A. Prior to energizing circuitry, test wiring for electrical continuity and short circuits. Ensure proper polarity of connections is maintained. Subsequent to energization, test wiring devices to demonstrate compliance with requirements of these Specifications.

3.03 MEASUREMENT AND PAYMENT

A. Measurement for payment for the work under this section shall be at NO DIRECT PAY and shall be included with the related work bid items.

END OF SECTION 16040

SECTION 16190

FASTENERS, ATTACHMENTS, AND SUPPORTING DEVICES

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Conduit and equipment supports.

B. Anchors and fasteners.

C. Multi-Transit Cable Entry Seal

1.02 REFERENCES

A. NECA Standard of Installation (National Electrical Contractors Association).

B. NFPA 70 - National Electrical Code.

1.03 SUBMITTALS FOR REVIEW

A. Section 01340 - Submittals: Procedures for submittals.

B. Product Data: Provide manufacturer's catalog data for fastening systems, Multi-Transit Cable Entry Seal.

1.04 REGULATORY REQUIREMENTS

A. Products: Listed and classified by Underwriters Laboratories Inc.

PART 2: PRODUCTS

2.01 PRODUCT REQUIREMENTS

A. Materials and Finishes: 316 Stainless Steel

B. Select materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit, including weight of wire in conduit.

C. Anchors and Fasteners

1. Concrete Structural Elements: Use precast inserts, expansion anchors, and preset inserts.

2. Steel Structural Elements: Use beam clamps.

3. Concrete Surfaces: Use expansion anchors.

4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts.

5. Solid Masonry Walls: Use expansion anchors and preset inserts.

6. Sheet Metal: Use sheet metal screws.

7. Wood Elements: Use wood screws.

2.02 FORMED STEEL CHANNEL

A. Manufacturers: Unistrut, B-LINE, Kindorf

B. Description: 316 Stainless Steel

C. Channel Fittings and Hardware: 316ss or same material.

2.03 HANGER RODS

A. Minimum size ¼". Size to support load. Material 316ss.

B. Hardware: nuts, bolts, flat washers, lock washers, -- all 316ss.

2.04 MULTI-TRANSIT CABLE ENTRY SEAL

A. The cable penetration system shall create an intrusion proof cable entry by using adaptable sealing module together a frame and a compression unit. This shall allow fast and easy installation as well as simple future expansion.

B. The sealing module shall be a multi diameter module consisting of two halves made from EDPM rubber, with removable layers and a center core. One module shall be able to seal cables of different diameters by pealing layers away from the module half until a fit is achieved.

C. The compression unit shall be wedge shaped and fitted into the frame as a single component. The wedge shall be equipped with a 316ss double threaded bolt which shall automatically return the wedge to it's original shape when dismantling it. This shall facilitate future changes and reinstallation.

D. The frame shall be a welded flanged frame that can be bolted in place. The frame shall be manufactured from acid proof 316ss. The flange shall be 60 mm wide and 6mm thickness

E. Provide all accessories for a fully assembled system such as lubricants, sealing strips, compression tool etc.

F. The system shall be as manufactured by Roxtec, with type G frame.

PART 3: EXECUTION

3.01 INSTALLATION

A. Locate and install anchors, fasteners, and supports in accordance with NECA "Standard of Installation."

1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.

2. Obtain permission from Architect/Engineer before drilling or cutting structural members.

B. Fabricate specialty supports from structural steel or formed steel members. Rigidly weld members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. All steel to be stainless or hot dipped galvanized after fabrication. Use spring lock washers under all nuts. All fasteners to be 316 ss.

C. Install surface-mounted cabinets and panelboards with minimum of four anchors.

D. In wet and damp locations use stainless steel channel supports to stand cabinets and panelboards 1 inch off wall.

E. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

F. In MCC-1, and associated supports, supply hardware same as called for in Part 2 – Products this specification.

3.02 MEASUREMENT AND PAYMENT

A. Measurement for payment for the work under this section shall be at NO DIRECT PAY and shall be included with the related work bid items.

END OF SECTION 16190

SECTION 16250

GROUNDING

PART 1: GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall provide the electrical grounding system, complete and operable, in accordance with the Contract Documents.

B. The requirements of Section 16010 Electrical Work, General apply to this Section.

C. Single Manufacturer: Like products shall be the end product of one manufacturer in order to achieve standardization of appearance, operation, maintenance, spare parts and manufacturer's services.

1.02 CONTRACTOR SUBMITTALS

A. General: Submittals shall be in accordance with the requirements of Section 01300 Contractor Submittals.

B. Shop Drawings: Manufacturer's product information for connections, clamps, and grounding system components, showing compliance with the requirements of this Section.

PART 2: PRODUCTS

2.01 GENERAL

A. All components of the grounding electrode system shall be manufactured in accordance with ANSI/UL 467 – Standard for Safety Grounding and Bonding Equipment, and shall conform to the applicable requirements of National Electrical Code Article 250 and local codes.

2.02 GROUNDING ELECTRODE SYSTEM

A. Grounding loop conductors shall be bare annealed copper conductors suitable for direct burial. Conductors shall be #4/0 unless indicated otherwise.

B. Ground rods shall be copper clad steel conforming to ANSI/UL 467.

1. Ground rods shall be ¾ inch diameter and 10 feet long unless indicated otherwise.

2. Where ground rod lengths indicated on the Contract Drawings are unavailable, ground rods shall be coupled together using threaded copper alloy couplings.

C. Cable to cable and cable to ground rod connections, and buried grounding connections, shall be made using exothermic welds. Exothermic welds shall be by Cadweld, Erico Products, or equal.

D. Grounding clamps shall be used to bond each separately derived system to the grounding electrode conductors.

E. Manufacturers of grounding materials shall be Lyncole, Copperweld, Blackburn, Burndy, or equal.

2.03 MAIN GROUND BUS BAR (MGB)

The ground bus bar shall be

A. Material Bare, solid Alloy 110 (99.9%) copper bus bar or plate of one piece construction

B. MGB shall be electrotin-plated.

C. Minimum Dimensions Width: 8 in.(MGB), 4in.(EGB and "X"GB)

D. Minimum Length: 12 in. --

E. Thickness: 1/4 in.

F. Mounting brackets 316 Stainless steel

G. Insulators polyester fiberglass; 15 kV minimum dielectric strength, flame resistant per UL 94 VO classification

H. Conductor mounting holes Number dependent on number of conductors to be attached. Holes to be 7/16 in. minimum on 3/4 in. centers to permit the convenient use of two-hole lugs.

I. Method of attachment of grounding electrode conductor. Exothermic welding or Irreversible hydraulic crimp connection.

PART 3: EXECUTION

3.01 GROUNDING

A. General: When sizes are not specifically indicated on the Drawings, grounding cable shall be sized by the CONTRACTOR in accordance with all applicable code requirements. The location of ground rods shall be as indicated. The lengths of rods forming an individual ground array shall be equal and shall be of the quantity required to obtain a ground resistance of no more than 5 ohms. Resistance may be less where specific code or utility requirements apply. The grounding system shall be in strict accordance with Article 250 of the N.E.C.

B. Equipment Ground: Ground continuity throughout the facility shall be maintained by means of a ground conductor run in all conduits. Grounding conductors run in conduit shall be insulated copper conductors, sized in accordance with the N.E.C. and the Drawings and Section 16120 – Wire and Cables.

1. Metal equipment platforms which support any electrical equipment shall be bonded to the nearest ground bus or to the nearest switchgear ground bus. This grounding requirement is in addition to the raceway grounding required in the

preceding paragraph. The Bonding jumper shall be sized per NEC 250, Part V, Bonding. Run the bonding wire in a PVC Sch 80 conduit.

2. Copper bonding jumpers shall be used to obtain a continuous metallic ground for equipment such as expansion joints, cable trays, switchgear, and motor control centers.

C. Grounding Electrode System: The CONTRACTOR shall install the grounding electrode system with all required components in strict accordance with National Electrical Code Article 250.

1. Connection to ground electrodes and ground conductors shall be exothermic welded where concealed and shall be bolted pressure type where exposed. Bolted connectors shall be assembled wrench tight to manufacturer's requirements.

2. Insulated grounding bushings shall be employed for all grounding connections to steel conduits in switchboards, switchgear, in motor control centers, in pullboxes, sheet metal enclosures, and elsewhere where conduits do not terminate at a threaded hub. Where insulated bushings are required, fasten with double locknuts. Where hubs are required, use Myers hubs with grounding attachment.

3. Copper bonding jumpers shall be used to obtain a continuous metallic ground across non conductive structural members.

4. Within buildings, the grounding cable shall, where possible, be embedded in or installed beneath the slabs.

5. Bond all required NEC components to the Grounding Electrode System, such as water line, structural steel, foundation rebar etc.

D. Shield Grounding

1. Shields on power cable shall be grounded at each termination in a manner recommended by the cable manufacturer.

2. Shielded instrumentation cable shall be grounded at one end only; this shall typically be at the "receiving" end of the signal carried by the cable.

3. Termination of each shield drain wire shall be on its own terminal screw. All of these terminal screws in one rack shall be jumpered with No. 16 solid tinned bare copper wire; connection to ground shall be accomplished with a No. 12 green insulated conductor to the main ground bus.

3.02 INSTALLATION – MISCELLANEOUS

A. Run grounding electrode conductors in schedule 80 PVC conduits. If RGS conduit is used, bond the protecting conduits to the grounding electrode conductors at both ends. Do not allow water pipe connections to be painted. If the connections are painted, dis-assemble them and re-make them with new fittings.

B. Install equipment grounding conductors with all feeders and branch circuits.

C. Bond all steel building columns in new structures together with ground wire in rigid conduit and connect to the distribution equipment ground bus, as shown on the Drawings.

D. Ground wire connections to structural steel columns shall be made with long barrel type one-hole heavy duty copper compression lugs, bolted through 1/2-in maximum diameter holes drilled in the column web, with stainless steel hex head cap screws and nuts.

E. Metal conduits stubbed into a motor control center shall be terminated with insulated grounding bushings and connect to the motor control center ground bus. Bond boxes mounted below motor control centers to the motor control center ground bus. Size the bonding wire in accordance with Article 250 of the National Electrical Code, except that a minimum No. 12 AWG shall be used. Contractor shall note the different requirements in NEC Article 250, between supply side and load side of main disconnect.

F. Liquid tight flexible metal conduit in sizes 1-1/2-in and larger shall have bonding jumpers. Bonding jumpers shall be external, run parallel (not spiraled) and fastened with plastic tie wraps.

G. Ground transformer neutrals to the nearest available grounding electrode with a conductor sized in accordance with NEC Article 250.

H. Drive grounding electrodes as shown on the Drawings.

I. All equipment enclosures, motor and transformer frames, conduits systems, cable armor, exposed structural steel and all other equipment and materials required by the N.E.C. to be grounded, shall be grounded and bonded in accordance with the N.E.C.

J. Seal exposed connections between different metals with No-Oxide Paint Grade A or equal.

K. Lay all underground grounding conductors slack and, where exposed to mechanical injury, protect by pipes or other substantial guards. If guards are iron pipe, or other magnetic material, electrically connect conductors to both ends of the guard. Make connections as specified herein.

L. Care shall be taken to ensure good ground continuity, in particular between the conduit system and equipment frames and enclosures. Where necessary, jumper wires shall be installed.

M. All grounding type receptacles shall be grounded to the outlet boxes with a No. 12 THWN/ THHN green conductor connected to the ground terminal of the receptacle and fastened to the outlet box by means of a grounding screw.

N. Tie all grounds installed under this project, to existing ground grids using 4/0 bare copper ground wire. Where there is an underground duct bank, tie the 4/0 bare ground wire carried in the duct bank, into the ground grid at both ends of the duct bank.

3.04 MAIN GROUND BUS BAR

A. The MGB shall be the single termination point for all internal ground bus conductors, internal perimeter ground bus conductors, or equipment grounding conductors as shown on the drawings and as described herein. All equipment and ancillary support apparatus

within the building area shall be bonded to the MGB. This MGB typically serves as the single point ground termination.

B. When the equipment area is within a larger structure or multi-story building, a grounding conductor shall extend to the building ground electrode system conductor. The ground bus conductors, equipment grounding conductors, and internal perimeter ground bus conductors are terminated to the MGB.

C. Conductors shall be bonded to the MGB in a specific sequence or order determined by PANI. PANI allocates specific areas of the MGB for bonding surge energy Producers, Absorbers, Non-isolated equipment, and isolated equipment.

3.05 INSPECTION AND TESTING

A. Inspect the grounding and bonding system conductors and connections for tightness and proper installation.

B. Use Biddle Direct Reading Earth Resistance Tester or equivalent test instrument to measure resistance to ground of the system. Perform testing in accordance with test instrument manufacturer's recommendations using the fall-of-potential method.

C. All test equipment shall be provided under this Section and approved by the Engineer.

D. Resistance to ground testing shall be performed during dry season. Submit test results in the form of a graph showing the number of points measured (12 minimum) and the numerical resistance to ground.

E. Testing shall be performed before energizing the distribution system.

F. A separate test shall be conducted for each building or system.

G. Notify the Engineer immediately if the resistance to ground for any building or system is greater than five ohms.

3.06 MEASUREMENT AND PAYMENT

A. Measurement for payment for the work under this section shall be at NO DIRECT PAY and shall be included with the related work bid items.

END OF SECTION 16250

SECTION 16426

STANDBY POWER SYSTEM GENSET

Part 1. GENERAL

1.01 Scope

A. Owner Provided 800KW generator set as shown on the drawings for the Reserve Relief Homewood Pump Station, St. John the Baptist Parish, Louisiana. The generator set shall be a complete equipment assembled generator set, stage I outdoor weatherproof enclosure, sub-base fuel tank, battery charger, at bid date EPA stationary emergency emission standards, with digital (microprocessor-based) electronic generator set controls, digital governor, and digital voltage regulator.

B. Provide Contractor test, startup by a supplier authorized by the equipment manufacturer(s), and on-site testing of the system.

C. Technicians specifically trained and certified by the manufacturer to support the product and employed by the generator set supplier shall service the generator sets.

D. Contractor shall include in his bid the work to transfer the diesel fuel from the existing diesel tanks to the sub base tanks provided under this project. Coordinate this work with the Owner such that the existing diesel fuel tank contains adequate operating fuel until the proposed installation is substantially complete and the existing system is ready for demolition.

1.02 Codes and Standards

A. The generator set installation and on-site testing shall conform to the requirements of the following codes and standards, as applicable. The generator set shall include necessary features to meet the requirements of these standards.

1. CSA 282, 1989 Emergency Electrical Power Supply for Buildings
2. IEEE446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
3. NFPA37 – Standard for the installation and use of stationary combustion engines and gas turbines.
4. NFPA70 – National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702.
5. NFPA99 – Essential Electrical Systems for Health Care Facilities
6. NFPA110 – Emergency and Standby Power Systems. The generator set shall meet all requirements for Level 1 systems. Level 1prototype tests required by this standard

shall have been performed on a complete and functional unit, component level type tests will not substitute for this requirement.

7. IEEE 587 for voltage surge resistance.

B. The generator set and supplied accessories shall meet the requirements of the following standards:

1. NEMA MG1. Alternator shall comply with the requirements of the current version this standard as they apply to AC alternators.
2. UL142 – Sub-base Tanks
3. UL1236 – Battery Chargers
4. UL2200. The generator set shall be listed to UL2200 or submit to an independent third party certification process to verify compliance as installed.

C. The control system for the generator set shall comply with the following requirements.

1. CSA C22.2, No. 14 – M91 Industrial Control Equipment.
2. EN50082-2, Electromagnetic Compatibility – Generic Immunity Requirements, Part 2: Industrial.
3. EN55011, Limits and Methods of Measurement of Radio Interference Characteristics of Industrial, Scientific and Medical Equipment.
4. FCC Part 15, Subpart B.
5. IEC8528 part 4. Control Systems for Generator Sets
6. IEC Std 801.2, 801.3, and 801.5 for susceptibility, conducted, and radiated electromagnetic emissions.
7. UL508. The entire control system of the generator set shall be UL508 listed and labeled.
8. UL1236 –Battery Chargers.
9. FCC Part 15, Subpart B
10. NEMA ICS10 – 1993 AC Generator Sets
11. Mil Std 461 – Electromagnetic Interference Characteristics
12. Mil Std 462D – Measurement of Electromagnetic Interference Characteristics

D. The generator set manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001.

1.03 RELATED SECTIONS

A. See the following specification for related information.

1. Section 16250 - Grounding
2. Section 16429 – Load Bank
3. Section 16470 - Panelboards
4. Section 16482 – Motor Control Center
5. Section 16496 – Automatic Transfer Switch
6. Section 16671 - SPD
7. Section 16904 - Pump Control Panel
8. Section 16950 – Electrical Tests

B. The Contractor shall also coordinate all generator interconnects with the System Supplier as defined in specification 16904, Pump Control Panel. Prior to initial shop drawing submittal, the Generator manufacturer shall coordinate all details with the Section 16904 System Supplier.

C. The Contractor shall coordinate start up testing, and training activities with generator manufacturer. The genset shall be compatible with the plant equipment loads such that the generator set normal and transient operating conditions is guaranteed and field tested under operating conditions.

D. The Contractor shall coordinate the generator protective devices selection with the requirements of the Protective Device Study. The Protective Device Study is specified in Section 16482. The coordination shall be completed prior to the StandBy Power system submittal such that the generator protective devices provide full selective coordination with the load protective devices. The generator submittal and the Protective Device Study shall include the same protective devices.

E. The Standby Power System Genset and the Automatic Transfer Switch (ATS-1) manufacturers provide documentation that demonstrate start signal compatibility between the specific models of Generator and ATS per code requirements of NEC 2017 and TIA 17-17.

1.04 Acceptable Manufacturers:

A. Owner provided 800kw generator.

Part 2. PRODUCTS

2.01 Generator set:

A. Ratings

1. The generator set shall be a owner provided 800kw and operate at 1800 rpm and at a voltage of 480Volts AC, Three phase, four(4)-wire, 60 hertz.
2. The generator sets rating shall be as follows:
   a. 0.8 PF, continuous standby rating, 105 degree C alternator rise, based on site conditions of : Altitude 0 ft., ambient temperatures of 104 degrees F.

   b. The minimum kW ratings shall be as follows:

      Reserve Relief Homewood: 800kW

3. The generator set rating shall be based on standby service.
4. The genset shall be UL 2200 listed.
5. The generator sets shall include inherent overcurrent, short circuit and overload protection, digital AC metering equipment, sensor failure detection, and remote monitoring and control capability. No exceptions or deviations to these requirements will be permitted.

B. Prototype Tests and Evaluation:

Prototype tests shall have been performed on a complete and functional unit, component level type tests will not substitute for this requirement. The performance test of the generating set series shall be in accordance with procedures certified by an independent testing laboratory. Prototype testing shall comply with the requirements of NFPA 110 for level 1 systems, which will include:

Maximum power level, maximum motor starting capacity, structural soundness torsion graph analysis per MIL-STD-705B, Method 504.2 fuel consumption, engine alternator temperature rise per NEMA MG1-22.40 single step load pick up, harmonic analysis & voltage wave for deviation per MIL-STD-705B, Method 601.4, 3 phase, short circuit test for mechanical & electrical strength.

C. Performance

1. Voltage regulation shall be plus or minus 0.5 percent for any constant load between no load and rated load. Random voltage variation with any steady load from no load to full load shall not exceed plus or minus 0.5 percent.

2. Frequency regulation shall be isochronous from steady state no load to steady state rated load. Random frequency variation with any steady load from no load to full load shall not exceed plus or minus 0.25%.
3. The diesel engine-generator set shall accept a single step load of 100% nameplate kW and power factor, less applicable derating factors, with the engine-generator set at operating temperature.
4. The motor starting capability of the generator set shall be a minimum of existing SKVA @ 30% voltage dip at Reserve Relief Homewood. The generator sets shall be capable of sustaining a minimum of 90% of rated no load voltage with the specified KVA load at near zero power factor applied to the generator set. In addition to the above specified requirements, the generator shall be capable of starting and carrying all the loads, at 100% HP loading, shown on the Proposed One Line Diagrams. The generator shall also be capable of starting all loads, including the specific pump-motor and motor drive supplied to the project. The drainage pumps shall be stagger time started. The Generator manufacturer shall submit calculations for Engineer approval to show the generator performance. The analysis shall include data for the specific pump motor and drive supplied on the project. If the generator supplied to the project is of a greater KW rating than shown on the drawings, the Contractor shall pay all costs to modify all associated generator required installation details such as wiring, conduit size, breaker size, etc.,.
5. The alternator shall produce a clean AC voltage waveform, with not more than 5% total harmonic distortion at full linear load, when measured from line to neutral, and with not more than 3% in any single harmonic, and no 3rd order harmonics or their multiples. Telephone influence factor shall be less than 40.
6. The generator set shall be certified by the engine manufacturer to be suitable for use at the installed location and rating, and shall meet all applicable exhaust emission requirements at the time of commissioning.

D. Construction

1. The engine-generator set shall be mounted on a heavy-duty steel base to maintain alignment between components. The base shall incorporate a battery tray with hold-down clamps within the rails.
2. All switches, lamps, and meters in the control system shall be oil-tight and dust-tight. All active control components shall be installed within a UL/NEMA 3R enclosure. There shall be no exposed points in the control (with the door open) that operate in excess of 50 volts.

E. Connections

1. The generator set load connections shall be composed of tin plated copper bus bars, drilled to accept mechanical or compression terminations of the number and type as shown on the drawings. Sufficient lug space shall be provided for use with cables of the number and size as shown on the drawings.
2. Power connections to auxiliary devices shall be made at the devices, with required protection located at a wall-mounted common distribution panel.
3. Generator set control interfaces to other system components shall be made on a permanently labeled terminal block assembly. Labels describing connection point functions shall be provided.

2.02 Engine and Engine Equipment

A. The engine shall be diesel, 4 cycle, US Non-road Source Emission Standards, C1 Stationary Emergency.

1. The generator on the Reserve Relief Homewood 800kw shall be owner provided.

2. Engine accessories and features shall include items 2.02.B through items 2.02.P:

B. An electronic governor system shall provide automatic isochronous frequency regulation. The governing system dynamic capabilities shall be controlled as a function of engine coolant temperature to provide fast, stable operation at varying engine operating temperature conditions. The control system shall actively control the fuel rate and excitation as appropriate to the state of the generator set. Fuel rate shall be regulated as a function of starting, accelerating to start disconnect speed, accelerating to rated speed. The governing system shall include a programmable warm up at idle and cooldown at idle function. While operating in idle state, the control system shall disable the alternator excitation system. The engine governing system shall not utilize any exposed operating linkage.

C. Cooling:

Skid-mounted radiator and cooling system rated for full load operation in 122 degrees F (50 degrees C) ambient as measured at the alternator air inlet. Radiator fan shall be suitable for use in a system with 0.5 in H2O restriction. Radiator shall be sized based on a core temperature that is 20F higher than the rated operation temperature, or prototype tested to verify cooling performance of the engine/radiator/fan operation in a controlled environment. Radiator shall be provided with a duct adapter flange. The equipment manufacturer shall fill the cooling system with a 50/50-ethylene glycol/water mixture prior to shipping. Rotating parts shall be guarded against accidental contact. Radiators shall be provided with a duct adapter flange.

D. Electric starter(s) capable of three complete cranking cycles without overheating.

E. Positive displacement, mechanical, full pressure, lubrication oil pump.

F. Provide the following:

1. Full flow lubrication oil filters with replaceable spin-on canister elements and dipstick oil level indicator.
2. Fuel Supply Line: Provide a dual element Racor filter separator unit rated for fuel transfer capacity, complete with vacuum gauges on inlet and outlet sides of filter/separator and with delta P alarm contact to indicate a clogged filter. The Racor unit shall be configured to allow the engine to continue run while a clogged filter is removed for maintenance. Wire the clogged filter switch to the engine control panel and provide a retransmitted alarm signal.

G. An engine driven, mechanical, positive displacement fuel pump. Fuel filter with replaceable spin-on canister element. Fuel cooler, suitable for operation of the generator set at full rated load in the ambient temperature specified shall be provided if required for operation due to the design of the engine and the installation.

H. Replaceable dry element air cleaner with restriction indicator.

I. Flexible supply and return fuel lines.

J. Engine mounted battery charging alternator, 100-ampere minimum, and solid-state voltage regulator.

K. Coolant heater

1. Engine mounted, thermostatically controlled, coolant heater(s) for each engine. Heater voltage shall be as shown on the project drawings. The coolant heater shall be UL499 listed and labeled.
2. The coolant heater shall be installed on the engine with silicone hose connections. Steel tubing shall be used for connections into the engine coolant system wherever the length of pipe run exceeds 12 inches. The coolant heater installation shall be specifically designed to provide proper venting of the system. The coolant heaters shall provisions to isolate the heater for replacement of the heater element without draining the coolant from the generator set. The quick disconnect/automatic sealing couplers shall allow the heater element to be replaced without draining the engine cooling system or significant coolant loss.
3. The coolant heater shall be provided with a DC thermostat, installed at the engine thermostat housing. An AC power connection box shall be provided for a single AC power connection to the coolant heater system.
4. The coolant heater(s) shall be sized as recommended by the engine manufacturer to warm the engine to a minimum of 104F (40C) in a 40F (4C) ambient, in compliance with NFPA110 requirements, or the temperature required for starting and load pickup requirements of this specification.

L. Provide vibration isolators, spring/pad type, quantity as recommended by the generator set manufacturer. Isolators shall include seismic restraints if required by site location. See drawings for vibration isolation requirements and vibration pads.

M. Starting and Control Batteries shall be calcium/lead antimony type, 24 volt DC, sized as recommended by the engine manufacturer, complete with battery cables and connectors. The batteries shall be capable of a minimum of three complete 15-second cranking cycles at 40F ambient temperature when fully charged.

N. Provide exhaust silencer(s) for each engine of size, quantity, and type as recommended by the generator set manufacturer and approved by the engine manufacturer. The mufflers shall be critical grade. Exhaust system shall be installed according to the engine manufacturer's recommendations, applicable codes and standards.

O. Provide a minimum 10 amp battery charger for each generator set battery bank. Charger shall be equipped with float, taper and equalize charge. Generator sets incorporating two battery banks shall be provided with two chargers connected together and operating in parallel, with alarm output(s) connected in parallel. The charger(s) shall include the following capabilities:

1. Chargers shall be UL 1236-BBHH listed and CSA or CUL certified for use in emergency applications.
2. The charger shall be compliant with UL991 requirements for vibration resistance.
3. The charger shall comply with the requirements of EN61000-4-5 for voltage surge resistance; EN50082-2 for immunity; EN61000-4-2 for ESD; EN61000-4-3 for radiated immunity; ANSI/IEEE C62.41 category B and IN61000-4-4 for electrically fast transient; EN61000-4-6 for conducted emissions; and FCC Part 15 Class A for radiated emissions.
4. The charger shall be capable of charging a fully discharged battery without damage to the charger. It shall be capable of returning a fully discharged battery to fully charged condition within 24 hours. The charger shall be UL-labeled with the maximum battery amp-hour rating that can be recharged within 24 hours. The label shall indicate that the charger is suitable for charging of batteries per NFPA requirements.
5. The charger shall incorporate a 4-state charging algorithm, to provide trickle charge rate to restore fully discharged batteries, a bulk charge rate to provide fastest possible recharge after normal discharge, an absorption state to return the battery to 100 percent of charge, and a float stage to maintain a fully charge battery and supply battery loads when the generator set is not operating. In addition, the charger shall include an equalization timer. Charge rates shall be temperature compensated based on the temperature directly sensed at the battery.
6. The DC output voltage regulation shall be within plus or minus 1%. The DC output ripple current shall not exceed 1 amp at rated output current level.
7. The charger shall include the following features:

a) two line alphanumeric display with programming keys to allow display of DC output ammeter and voltmeters (5% accuracy or better), display alarm messages, and perform programming;
b) LED indicating lamp(s) to indicating normal charging condition (green), equalize charge state (amber), and fault condition (red);
c) AC input overcurrent, over voltage, and undervoltage protection;
d) DC output overcurrent protection;
e) Alarm output relay
f) Corrosion resistant aluminum enclosure
g) Individual form C contacts rated at 4 amps, 120 VAC, 30VDC for remote indication of:

Loss of AC power - red light
Low battery voltage - red light
High battery voltage - red light
Power ON - green light (no relay contact)
Analog DC ammeter, 12 hour equalize charge timer, AC and DC fuses shall also be provided on the charger.

P. Provide a dual wall sub-base fuel storage tank. The tank shall be constructed of corrosion resistant steel and shall be UL listed. The equipment, as installed, shall meet all local and regional requirements for above ground tanks.

Reserve Relief Homewood Tank Capacity: 5,500 gallon

1. Manufacturer Qualifications
a) Manufacturer shall have a minimum ten years' experience in the design and construction of Underwriters Laboratories (UL) listed day tank systems.

2.03 AC Generator

A. The AC generator shall be; synchronous, four pole, 2/3 pitch, revolving field, drip-proof construction, single prelubricated sealed bearing, air cooled by a direct drive centrifugal blower fan, and directly connected to the engine with flexible drive disc. All insulation system components shall meet NEMA MG1 temperature limits for Class H insulation system and shall be UL1446 listed. Actual temperature rise measured by resistance method at full load shall not exceed 105 degrees Centigrade.

B. The generator shall be capable of delivering rated output (kVA) at rated frequency and power factor, at any voltage not more than 5 percent above or below rated voltage.

C. A permanent magnet generator (PMG) shall be included to provide a reliable source of excitation power for optimum motor starting and short circuit performance. The PMG and controls shall be capable of sustaining and regulating current supplied to a single phase or three phase fault at approximately 300% of rated current for not more than 10 seconds.

D. The subtransient reactance of the alternator shall not exceed 15 percent, based on the standby rating of the generator set.

E. Provide anti-condensation heater for the alternator.

F. All insulation system components shall meet NEMA MG1 temperature limits for Class H insulation system.

G. The generator shall be capable of delivering rated output (KVA) at rated frequency and power factor, at any voltage not more than 5 percent above or below rated voltage.

2.04 Generator set Control.

The generator set shall be provided with a microprocessor-based control system that is designed to provide automatic starting, monitoring, and control functions for the generator set. The control system shall also be designed to allow local monitoring and control of the generator set, and remote monitoring and control as described in this specification.

The control shall be mounted on the generator set, or may be mounted in a free-standing panel next to the generator set if adequate space and accessibility is available. The control shall be vibration isolated and prototype tested to verify the durability of all components in the system under the vibration conditions encountered. The control shall be UL508 labeled, CSA282-M1989 certified, and meet IEC8528 part 4. All switches, lamps and meters shall be oil-tight and dust-tight, and the enclosure door shall be gasketed. There shall be no exposed points in the control (with the door open) that operate in excess of 50 volts. The controls shall meet or exceed the requirements of Mil-Std 461C part 9, and IEC Std 801.2, 801.3., and 801.5 for susceptibility, conducted, and radiated electromagnetic emissions. The entire control shall be tested and meet the requirements of IEEE587 for voltage surge resistance.

The generator set mounted control shall include the following features and functions:

A. Control Switches

1. Mode Select Switch. The mode select switch shall initiate the following control modes. When in the RUN or MANUAL position the generator set shall start, and accelerate to rated speed and voltage as directed by the operator. A separate push-button to initiate starting is acceptable. In the OFF position the generator set shall immediately stop, bypassing all time delays. In the AUTO position the generator set shall be ready to accept a signal from a remote device to start and accelerate to rated speed and voltage.
2. EMERGENCY STOP switch. Switch shall be Red "mushroom-head" push-button. Depressing the emergency stop switch shall cause the generator set to immediately shut down, and be locked out from automatic restarting.

3. RESET switch. The RESET switch shall be used to clear a fault and allow restarting the generator set after it has shut down for any fault condition.
4. PANEL LAMP switch. Depressing the panel lamp switch shall cause the entire panel to be lighted with DC control power. The panel lamps shall automatically be switched off 10 minutes after the switch is depressed, or after the switch is depressed a second time.

B. Generator Set AC Output Metering. The generator set shall be provided with a metering set including the following features and functions:

1. Digital metering set, 1% accuracy, to indicate generator RMS voltage and current, frequency, output current, output KW, KW-hours, and power factor. Generator output voltage shall be available in line-to-line and line-to-neutral voltages, and shall display all three-phase voltages (line to neutral or line to line) simultaneously.
2. Digital metering is required. Analog metering is not required.
3. The control system shall monitor the total load on the generator set, and maintain data logs of total operating hours at specific load levels ranging from 0 to 110% of rated load, in 10% increments. The control shall display hours of operation at less than 30% load and total hours of operation at more than 90% of rated load.
4. The control system shall log total number of operating hours, total kWH, and total control on hours, as well as total values since reset.

C. Generator Set Alarm and Status Display.

1. The generator set control shall include LED alarm and status indication lamps. The lamps shall be high-intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. Functions indicated by the lamps shall include:

   - The control shall include five configurable alarm-indicating lamps. The lamps shall be field adjustable for any status, warning, or shutdown function monitored by the genset. They shall also be configurable for color, and control action (status, warning, or shutdown).
   - The control shall include green lamps to indicate that the generator set is running at rated frequency and voltage, and that a remote start signal has been received at the generator set. The running signal shall be based on actual sensed voltage and frequency on the output terminals of the generator set.
   - The control shall include a flashing red lamp to indicate that the control is not in automatic state, and red common shutdown lamp.
   - The control shall include an amber common warning indication lamp.

2. The generator set control shall indicate the existence of the warning and shutdown conditions on the control panel. All conditions indicated below for warning shall be field-configurable for shutdown. Conditions required to be annunciated shall include:

   low oil pressure (warning)
   low oil pressure (shutdown)

oil pressure sender failure (warning)
low coolant temperature (warning)
high coolant temperature (warning)
high coolant temperature (shutdown)
high oil temperature (warning)
engine temperature sender failure (warning)
low coolant level (warning)
fail to crank (shutdown)
fail to start/overcrank (shutdown)
overspeed (shutdown)
low DC voltage (warning)
high DC voltage (warning)
weak battery (warning)
low fuel-daytank (warning)
high AC voltage (shutdown)
low AC voltage (shutdown)
under frequency (shutdown)
over current (warning)
over current (shutdown)
short circuit (shutdown)
ground fault (warning)
over load (warning)
emergency stop (shutdown)
(4) configurable conditions
See specifications Item 2.05.B for four the items marked with an asterick "*". Wire these devices to the configurable inputs on the generator set control. The generator set control shall have the capability to transmit these signals to the Pump Control Panel and to a Remote Annunciator where called for on the drawings.

The Generator shall provide the following dry contacts to connect to the Pump Control Panel:

1. Generator Run
2. Generator Pre Alarm signal (General pre alarm prior to shutdown)
3. Generator Fail Signal (General shutdown signal)
4. Generator running under load (load set point is field adjustable)

3. Provisions shall be made for indication of four customer-specified alarm or shutdown conditions. Labeling of the customer-specified alarm or shutdown conditions shall be of the same type and quality as the above-specified conditions. The non-automatic indicating lamp shall be red, and shall flash to indicate that the generator set is not able to automatically respond to a command to start from a remote location.

D. Engine Status Monitoring.

1. The following information shall be available from a digital status panel on the generator set control:

   engine oil pressure (psi or kPA)
   engine coolant temperature (degrees F or C)
   engine oil temperature (degrees F or C)
   engine speed (rpm)
   number of hours of operation (hours)
   number of start attempts
   battery voltage (DC volts)

2. The control system shall also incorporate a data logging and display provision to allow logging of the last 10 warning or shutdown indications on the generator set, as well as total time of operation at various loads, as a percent of the standby rating of the generator set.

E. Engine Control Functions.

1. The control system provided shall include a cycle cranking system, which allows for user selected crank time, rest time, and # of cycles. Initial settings shall be for 3 cranking periods of 15 seconds each, with 15-second rest period between cranking periods.
2. The control system shall include an idle mode control, which allows the engine to run in idle mode in the RUN position only. In this mode, the alternator excitation system shall be disabled.
3. The control system shall include an engine governor control, which functions to provide steady state frequency regulation as noted elsewhere in this specification. The governor control shall include adjustments for gain, damping, and a ramping function to control engine speed and limit exhaust smoke while the unit is starting.
4. The control system shall include time delay start (adjustable 0-300 seconds) and time delay stop (adjustable 0-600 seconds) functions.
5. The control system shall include sender failure monitoring logic for speed sensing, oil pressure, and engine temperature which is capable of discriminating between failed sender or wiring components, and an actual failure conditions.

F. Alternator Control Functions:

1. The generator set shall include a full wave rectified automatic digital voltage regulation system that is matched and prototype tested by the engine manufacturer with the governing system provided. It shall be immune from misoperation due to load-induced voltage waveform distortion and provide a pulse width modulated output to the alternator exciter. The voltage regulation system shall be equipped with

three-phase line to neutral RMS sensing and shall control buildup of AC generator voltage to provide a linear rise and limit overshoot. The system shall include a torque-matching characteristic, which shall reduce output voltage in proportion to frequency below an adjustable frequency threshold. Torque matching characteristic shall be adjustable for roll-off frequency and rate, and be capable of being curve-matched to the engine torque curve with adjustments in the field. The voltage regulator shall include adjustments for gain, damping, and frequency roll-off. Adjustments shall be broad range, and made via digital raise-lower switches, with an alphanumeric LED readout to indicate setting level. Rotary potentiometers for system adjustments are not acceptable.

2. A microprocessor-based protection device shall be provided to individually monitor all phases of the output current of the generator set and initiate an alarm (over current warning) when load current exceeds 110% of the rated current of the generator set on any phase for more than 60 seconds. The device shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (over current shutdown). The protective functions provided shall be in compliance to the requirements of NFPA 70 article 445.
3. A microprocessor-based protection device shall be provided to monitor all phases of the output current for short circuit conditions. The control/protection system shall monitor the current level and voltage. The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (short circuit shutdown). The protective functions provided shall be in compliance to the requirements of NFPA 70 article 445.
4. Controls shall be provided to monitor the KW load on the generator set, and initiate an alarm condition (over load) when total load on the generator set exceeds the generator set rating for in excess of 5 seconds. Controls shall include a load shed control, to operate a set of dry contacts (for use in shedding customer load devices) when the generator set is overloaded.
5. A microprocessor-based AC over/under voltage monitoring system that responds only to true RMS voltage conditions shall be provided. The system shall initiate shutdown of the generator set when alternator output voltage exceeds 110% of the operator-set voltage level for more than 10 seconds, or with no intentional delay when voltage exceeds 130%. Under voltage shutdown shall occur when the output voltage of the alternator is less than 85% for more than 10 seconds. The system shall monitor individual phases and be connected line to neutral on 3-phase 4-wire generator sets, and for systems that are solidly grounded.
6. The control system shall include a ground fault monitoring relay. The relay shall be adjustable from 3.8-1200 amps, and include adjustable time delay of 0-10.0 seconds. The relay shall be for indication only, and not trip or shut down the generator set. Note bonding and grounding requirements for the generator set, and provide relay that will function correctly in system as installed.

7. The generator set control shall include a 120VAC-control heater.

G. Other Control Functions
   1. The generator set shall be provided with a network communication module to allow a non-proprietary protocol (Modbus)/Ethernet/IP compliant communication with the generator set

H. A battery monitoring system shall be provided which initiates alarms when the DC control and starting voltage is less than 25VDC or more than 32 VDC. During engine cranking (starter engaged), the low voltage limit shall be disabled, and DC voltage shall be monitored as load is applied to the battery, to detect impending battery failure or deteriorated battery condition.

I. Control Interfaces for Remote Monitoring:
   1. The control system shall provide four programmable output relays. These relay outputs shall be configurable for any alarm, shutdown, or status condition monitored by the control. The relays shall be configured to indicate: (1) generator set operating at rated voltage and frequency, (2) common warning, (3) common shutdown, (4) Generator Running. All control and interconnection points from the generator set to remote components shall be brought to a separate connection box. No field connections shall be made in the control enclosure or in the AC power output enclosure."
   2. A fused 10 amp switched 24VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit whenever the generator set is running.
   3. A fused 10 amp 24VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit at all times from the engine starting/control batteries.
   4. The control shall be provided with a direct serial communication link for the LonWorks communication network interface and Ethernet /IP network converter as described elsewhere in this specification and shown on the drawings.
   5. Provide the following dry contacts, and analog measurements as signals the Pump Control Panel:
      Generator Run
      Generator Supplying Loads
      Generator – General Fail alarm
      Generator – Not in Auto
      Sub Base Tank - Leak
      Fuel Tank Level – (4-20)mA isolated signal.

2.05 Other equipment to be provided with the generator set:

A. The generator set shall be provided with a mounted main line mounted circuit breaker sized to carry the output current of the generator set. The circuit breaker shall incorporate an electronic trip unit that operates to protect the alternator under all overcurrent conditions. The supplier shall submit time overcurrent characteristic curves and thermal damage curve for the alternator, demonstrating the effectiveness of the protection provided. The circuit breaker frame size shall be sized such that the generator decrement curve shall trip the breaker in the breaker trip short time region, i.e. the breaker instantaneous setting shall be capable of being set to exceed the generator decrement asymmetrical current to allow the generator time to clear a downstream fault. The breaker shall have an Arc Reduction switch and pilot light. Generator breaker shall be rated for 65KAIC.

The System Protective Device Studies is specified in specification 16482. The Generator manufacturer shall supply the Generator breaker data and all generator overcurrent protection data to the MCC manufacturer for inclusion in the Protective Device Studies. Engineer approval of the Protective Device Studies including the Generator protection, is required prior to Engineer approval of the Generator submittal. The generator breaker shall provide full selective coordination with the MCC-1 equipment protective settings.

B. Outdoor Weather-Protective Enclosure

1. The generator set shall be provided with an outdoor aluminum enclosure, with the entire package listed under UL2200. The package shall comply with the requirements of the National Electrical Code for all wiring materials and component spacing. The total assembly of generator set, enclosure, and sub-base fuel tank shall be designed to be lifted into place using spreader bars. Housing shall provide ample airflow for generator set operation at rated load in an ambient temperature of 100F. The housing shall have hinged access doors as required to maintain easy access for all operating and service functions. All doors shall open 180 degrees, be lockable, and include retainers to hold the door open during service. Enclosure roof shall be cambered to prevent rainwater accumulation. Openings shall be screened to limit access of rodents into the enclosure. All electrical power and control interconnections shall be made within the perimeter of the enclosure.
2. All sheet metal shall be primed for corrosion protection and finish painted with the manufacturers standard color using a two step electrocoating paint process, or equal meeting the performance requirements specified below. All surfaces of all metal parts shall be primed and painted. The painting process shall result in a coating that meets the following requirements:

   Primer thickness, 0.5-2.0 mils. Top coat thickness, 0.8-1.2 mils.

   Gloss, per ASTM D523-89, 80% plus or minus 5%. Gloss retention after one year shall exceed 50%.

   Crosshatch adhesion, per ASTM D3359-93, 4B-5B.

   Impact resistance, per ASTM D2794-93, 120-160 inch-pounds.

   Salt Spray, per ASTM B117-90, 1000+ hours.

   Humidity, per ASTM D2247-92, 1000+ hours.

   Water Soak, per ASTM D2247-92, 1000+ hours.
3. Painting of hoses, clamps, wiring harnesses, and other non-metallic service parts shall not be acceptable. Fasteners used shall be corrosion resistant, and designed to minimize marring of the painted surface when removed for normal installation or service work.

4. Enclosure shall be constructed of minimum 12 gauge aluminum for framework and 14 gauge aluminum for panels. All hardware and hinges shall be stainless steel. Enclosure shall withstand 150mph wind. Enclosure shall be manufactured to limit the ingress of wind driven rain such that the rain does not accumulate and sit on top of the sub base tank resulting in rusting of the tank steel.
5. A factory-mounted exhaust silencer shall be installed inside the enclosure. The exhaust shall exit the enclosure through a rain collar and terminate with a rain cap. Exhaust connections to the generator set shall be through seamless flexible connections.
6. The enclosure shall include the following maintenance provisions:
   - Flexible coolant and lubricating oil drain lines, that extend to the exterior of the enclosure, with internal drain valves
   - External radiator fill provision.
7. Inlet ducts shall include rain hoods
8. Provide power for generator accessories via 208V/3P panel located in prefab building. The provisions required include:
   - One switche controlling three AC lamps mounted in vapor tight and gasketed fixtures.
   - Factory-wired normal AC service from the panelboard to the engine coolant and alternator heaters, control panel heater, and battery charger.
   - 30Amp, 125V receptacle weather proof while in use, mounted on the exterior of the enclosure. The receptacle shall be used to power a portable roll up fuel polisher.
9. The generator set shall be provided with a sound-attenuated housing which allows the generator set to operate at full rated load in an ambient temperature of up to 100F. The enclosure shall reduce the sound level of the generator set while operating at full rated load to an average sound pressure of 72dBA at 23 feet. The enclosure shall be based on Cummins sound attenuated enclosure, Level II.
10. The enclosure shall be insulated with non-hydroscopic materials.
11. The radiator shall discharge vertically.
12. The enclosure shall be provided with a critical grade exhaust silencer, mounted inside the enclosure. Mounting the muffler outside the enclosure shall not be allowed.
13. Provide vibration isolators, installed between the engine-generator set and engine-generator skid base or sub-base diesel fuel storage tank, quantity as recommended

by the generator set manufacturer. Isolators shall include seismic restraints if required by site location.

C. Provide a sub-base fuel tank for the generator set, sized to allow for full load operation of the generator set. See this specification item 2.02.P. The sub-base fuel tank shall be UL142 listed and labeled. Installation shall be in compliance to NFPA37. The fuel tank shall be a double-walled, steel construction and include the following features:

1. Emergency tank and basin vents.
2. Mechanical level gauge.
3. Fuel supply and return lines, connected to generator set with flexible fuel lines as recommended by the engine manufacturer and in compliance to UL2200 and NFPA 37 requirements.
4. Leak detection provisions, wired to the generator set control for local and remote alarm indication.
5. High (90% full), Mid (50% full), Low(30% full) level float switches to indicate fuel level. Wire switches to generator control for local and remote indication of fuel level.
6. Fuel Level (4-20)mA transmitter.
7. Basin drain.
8. Integral lifting provisions.
9. Spill prevention fill pan.
10. Venting: Normal venting shall be sized in accordance with the American Petroleum Institute Standard No 2000, Venting Atmospheric and Low Pressure Storage Tanks not less than 1-1/4" (3 cm.) nominal inside diameter. A 1 -1/4" atmospheric mushroom cap shall be furnished and the installing contractor shall pipe above the highest fill point as a minimum
11. Emergency Venting: The emergency vent opening shall be sized to accommodate the total capacity of both normal and emergency venting and shall be not less than that derived from NFPA 30, table 2-8, and based on the wetted surface area of the tank. The wetted area of the tank shall be calculated on the basis of 100 percent of the primary tank. A zinc plated emergency pressure relief vent cap shall be furnished for the primary tank. The vent is spring-pressure operated: opening pressure is 0.5/psig and full opening pressure is 2.5 psig. Limits are stamp marked on top of each vent. The emergency relief vent is sized to accommodate the total venting capacity of both normal and emergency vents.

11. Construction:

    Primary Tank: It will be rectangular in shape and constructed in clam shell fashion to ensure maximum structural integrity and allow the use of a full throat fillet weld.

    Steel Channel Support System: Reinforced steel box channel for generator support, with a load rating of 5,000 Ibs. per gen set mounting hole location. Full height gussets at either end of channel and at gen set mounting holes shall be utilized.

    Exterior Finish: The exterior coating has been tested to withstand continuous salt spray testing at 100 percent exposure for 244 hours to a 5 percent salt solution at 92-97° F. The coating has been subjected to full exposure humidity testing to 100 percent humidity at 100° F for 24 hours. Tests are to be conducted in accordance with The American Standard Testing Methods Society.

12. Provide riser on sub base fuel tank fill cap, to prevent rainwater ingress during filling. Fill cap shall not be flush with tank top. Provide a fill/spill container suitable for filling from delivery truck hose. The fill/spill container shall be complete with shut off valve, poppet dry disconnect adapter with dust cap and a ½" diameter drain valve.

13. Provide piping connections for the Parish portable roll up fuel polisher. Provide a 2 inch suction pipe with lift piping and a 2 inch return pipe connection. Mount connections at opposite ends of tank to assist with fuel polishing. Locate connection on tank such that there is easy maintenance access.

D. Roof Mounted Outdoor Load Bank:

The Generator manufacturer shall be responsible for the supply, installation and integration of a Load Bank as called for in specification 16429 into the generator assembly such that the Load Bank and Generator form a complete integrated manufactured assembly.

E. 24VDC motor Operated Louvers:

Provide 24VDC motor operated louvers. Provide a Hand/Off/Auto switch to control louver operation. In Auto mode, the louvers shall be closed when generator is not in-use to prevent driving rain from entering the enclosure. In Auto Mode, when generator is running, the louvers shall automatically open.

2.06 Sequence of Operation

A. Generator set shall start on receipt of a start signal from remote equipment. The start signal shall be via hardwired connection to the generator set control and a redundant signal over the required network connection.

B. The generator set shall complete a time delay start period as programmed into the control.

C. The generator set control shall initiate the starting sequence for the generator set. The starting sequence shall include the following functions:

D. The control system shall verify that the engine is rotating when the starter is signaled to operate. If the engine does not rotate after two attempts, the control system shall shut down and lock out the generator set, and indicate "fail to crank" shutdown.

E. The engine shall fire and accelerate as quickly as practical to start disconnect speed. If the engine does not start, it shall complete a cycle cranking process as described elsewhere in this specification. If the engine has not started by the completion of the cycle cranking sequence, it shall be shut down and locked out, and the control system shall indicate "fail to start".

F. The engine shall accelerate to rated speed and the alternator to rated voltage. Excitation shall be disabled until the engine has exceeded programmed idle speed, and regulated to prevent over voltage conditions and oscillation as the engine accelerates and the alternator builds to rated voltage.

G. On reaching rated speed and voltage, the generator set shall operate as dictated by the control system in isochronous state.

H. When all start signals have been removed from the generator set, it shall complete a time delay stop sequence. The duration of the time delay stop period shall be adjustable by the operator.

I. On completion of the time delay stop period, the generator set control shall switch off the excitation system and shall shut down.

J. Any start signal received after the time stop sequence has begun shall immediately terminate the stopping sequence and return the generator set to isochronous operation.

2.07 System Communications:

A. As part of system responsibility in supplying the equipment related to the gensets, as outlined in Section 1.03, the genset manufacturer shall coordinate interconnects for all of this equipment. As part of the submittal process, the genset manufacturer shall provide a full interconnect drawing showing all the required components to implement the interconnect system. The diagram shall also identify all device power sources. The genset manufacturer shall supply all auxiliary interconnect relays, communication interfaces, components required to implement the system.

2.08 Spare Parts:

A. Provide 2 sets of each of the following:
All Oil Filters
Fuel filters
Air Filters with pre filter
Vapor recovery system filters
Water Filters

B. Provide specified gallons of engine oil for the next oil change.

C. Provide specified gallons of coolant for next complete coolant change/flush.

Part 3. EXECUTION

3.01 Submittals.

A. Within 10 days after award of contract, provide six sets of the following information for review:

- Manufacturer's product literature and performance data, sufficient to verify compliance to specification requirements.
- A paragraph by paragraph specification compliance statement, describing the differences between the specified and the proposed equipment.
- Manufacturer's certification of prototype testing.
- Manufacturer's published warranty documents.
- Shop drawings showing plan and elevation views with certified overall dimensions, as well as wiring interconnection details.
- Interconnection wiring diagrams showing all external connections required; with field wiring terminals marked in a consistent point-to-point manner.
- Manufacturer's installation instructions.

3.02 Factory Testing.

A. The generator set manufacturer shall perform a complete operational test on the generator set prior to shipping from the factory. A certified test report shall be provided. Equipment supplied shall be fully tested at the factory for function and performance.

B. Factory testing may be witnessed by the owner and consulting engineer. Supplier is responsible to provide three weeks notice for testing.

C. Generator set factory tests on the equipment shall be performed at rated load and rated power factor. Generator sets that have not been factory tested at rated power factor will not be acceptable. Tests shall include: run at full load, maximum power, voltage regulation, transient and steady-state governing, single step load pickup, and function of safety shutdowns.

3.03 Installation

A. Equipment shall be installed by the contractor in accordance with final submittals and contract documents. Installation shall comply with applicable state and local codes as required by the authority having jurisdiction. Install equipment in accordance with manufacturer's instructions and instructions included in the listing or labeling of UL listed products.

B. Installation of equipment shall include furnishing and installing all interconnecting wiring between all major equipment provided for the on-site power system. The contractor shall also perform interconnecting wiring between equipment sections (when required), under the supervision of the equipment supplier.

C. Equipment shall be installed on concrete housekeeping pads. Equipment shall be permanently fastened to the pad in accordance with manufacturer's instructions and seismic requirements of the site.

D. Equipment shall be initially started and operated by representatives of the manufacturer.

E. All equipment shall be physically inspected for damage. Scratches and other installation damage shall be repaired prior to final system testing. Equipment shall be thoroughly cleaned to remove all dirt and construction debris prior to initial operation and final testing of the system.

3.04 On-Site Acceptance Test:

A. The complete installation shall be tested for compliance with the specification following completion of all site work. Testing shall be conducted by representatives of the manufacturer, with required fuel supplied by Contractor. The Engineer shall be notified in advance and shall have the option to witness the tests.

B. Installation acceptance tests to be conducted on-site shall include a "cold start" test, a two hour full load test, and a one step rated load pickup test in accordance with NFPA 110. Provide a reactive load bank, 0.8pf, interconnect cables, and make temporary connections for full load test.

C. Perform a power failure test on the entire installed system. This test shall be conducted by opening the power supply from the utility service, and observing proper operation of the system for at least 2 hours. Coordinate timing and obtain approval for start of test with site personnel.

D Installation acceptance tests conducted on-site shall include testing the local and remote panels, simulate engine shutdowns, conduct a "cold start" test, a two hour full load test using a resistive load bank, and a one step rated load pickup test in accordance with NFPA 110. Demonstrate that the batteries and starting motor are capable of 3 starting attempts of 15 second cranking at 15 second intervals. If during the load test a shutdown should occur, the cause of the shutdown will be corrected and the 2 hour test restarted.

During the load test, record at 30 minute intervals:
Time of day
KW
Voltage and amperes on each phase
Engine RPM
Frequency
Engine coolant temperature
Oil pressure
Ambient temperature

The genset manufacturer's engineer shall be on-site, to coordinate and assist with the field testing and acceptance testing of the ATS-1 transfer switch. See specification Sections 16496.

3.05 Training

A. The equipment supplier shall provide training for the facility operating personnel covering operation and maintenance of the equipment provided. The training program shall be not less than two (2) non-consecutive sessions, 4 hours in duration and the class size shall be limited to 5 persons. Training date shall be coordinated with the facility owner. Training shall commence after all equipment is tested, operational and accepted. Provide eight (8) manuals for training purposes.

3.06 Service and support

A. The manufacturer of the generator set shall maintain service parts inventory at a central location which is accessible to the service location 24 hours per day, 365 days per year.

B. The generator set shall be serviced by a local service organization that is trained and factory certified in generator set service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year.

C. The manufacturer shall maintain model and serial number records of each generator set provided for at least 20 years.

3.07 Warranty

A. The generator set and associated equipment shall be warranted for a period of not less than 5 years from the date of commissioning against defects in materials and workmanship.

B. The warranty shall be comprehensive. No deductibles shall be allowed for travel time, service hours, repair parts cost, milage, etc. with the exception of consumable items such as filters, belts, hoses etc.

3.08 Measurement

Measurement for payment for standby power system will be per EACH as specified herein.

3.09 Payment

Payment for the work under this section will be made under:

Item	**Description**	**Unit Price**
NS-11	Installation of Diesel – driven prime existing generator set with sound insulation enclosure and integral sub-base tank & service platforms, including new diesel tank	Lump Sum

END OF SECTION

SECTION 16429
LOAD BANK

PART 1: GENERAL

1.1 SCOPE

A. The contractor shall verify existing generator is equipped with integrated Load Bank within the generator assembly such that the Load Bank and Generator form a complete integrated manufactured assembly. If no load bank is installed coordinate with generator manufacturer requirements for installing equipment in existing generator and notify engineer and owner prior to commencement of work.

B. This specification contains the minimum requirements for the testing of a UL listed radiator or enclosure top mounted style resistive load bank.

C. The load bank is required for periodic exercising and testing of the (standby) emergency power source. The load bank shall use the air discharge from the generator radiator for cooling.

D. This specification shall apply if the load bank is supplied to the purchaser, or as a part of other equipment.

E. Should the vendor take exception to any part of this specification, it shall be stated in the bid, and referenced to the specification line number.

1.2 SUBMITTALS

A. The manufacturer shall submit for review technical data including features, performance, electrical characteristics, physical characteristics, ratings, accessories, and finishes.

B. Shop drawings shall include dimensional plans and mounting details sufficient to properly install the load bank. Load bus configuration and load connections termination area shall be clearly identified.

C. Electrical schematic drawings shall be provided to detail the operation of the load bank and the provided safety circuits. Over-current protection and control devices shall be identified and their ratings marked. An interconnection drawing shall be included for control wiring related to the load bank.

1.3 STANDARDS

A. The equipment covered by this specification shall be designed with the latest applicable NFPA-70, NEMA, NEC, IEEE, and ANSI standards.

B. The load bank certified to a Nationally Recognized Training Laboratory (NRTL) such as UL or CSA.

1.4 RELATED SECTIONS

A. See the following specification for related information.
Section 16426 – Standby Power System Genset

Section 16950 – Electrical Tests

PART 2: PRODUCTS

2.1 RATINGS

A. The total capacity of the load bank shall be rated 100 kW at 480 Volts, 3-Phase, 3-Wire, 60 Hertz.

B. The load step resolution shall be a nominal 20% of the load bank rating.

C. The load bank shall be designed for continuous duty cycle operation with no limitations.

D. Radiator/Duct mounted load banks are designed as a supplemental load to the generator set.

2.2 MATERIAL AND CONSTRUCTION

A. The load bank shall be suitable for installation outdoor on the roof of the generator set enclosure.

B. Due to the high radiator exhaust from the generator, the load bank shall be constructed of heavy gauge of aluminized steel per ASTM A463. Aluminized steel provides superior corrosion protection and extended service life, with a better tolerance to high heat exposure compared to the more common galvanized steel.

C. The main input load bus, load step relays, fuses and control relays shall be located within the load bank enclosure.

D. The Generator manufacturer shall coordinate with the Load Bank manufacturer to determine the load bank core dimensions. The core shall have a self-contained 2" flange on the top and bottom edges for mounting. Load banks with a depth of 13" shall have provisions for overhead lifting and duct adaptors.

E. The load bank shall be designed for installation and operation outdoors. Outdoor load bank shall have a screened exhaust or a louver. Load bank will be painted ASA-61 grey and have a baked polyester powder coated finish with a film thickness of 2.8 +/- 0.4 mils per coat.

F. Load bank to be ROOF MOUNTED

2.3 RESISTIVE LOAD ELEMENTS

A. Load elements shall be ASCO Helidyne, helically wound chromium alloy rated to operate at approximately ½ of maximum continuous rating of wire. Elements must be fully supported across the entire length within the air stream by segmented ceramic insulators on stainless steel rods. Element supports shall be designed to prevent a short circuit to adjacent elements or to ground.

B. The change in resistance due to temperature shall be minimized by maintaining conservative watt densities.

C. The overall tolerance of the load bank shall be –0% to +5% kW at rated voltage. A –5%, +5% rating allows the load bank to deliver less than rated kW and shall not be used. The load bank must deliver full rated kW at rated voltage.

D. Sealed wire type elements (which have the internal resistance wire totally

enclosed) prevent internal cooling of the element wire and shall not be used.

2.4 COOLING

A. The engine generator manufacturer shall coordinate with the Load Bank manufacturer on the CFM of air to properly cool the load bank under all operating conditions. The load bank shall have a static pressure drop of approximately 0.1" H2O at design velocity (50 ft.min).

2.5 PROTECTIVE DEVICES

A. An over-temperature switch shall be provided to sense the load bank exhaust. The switch shall be electrically interlocked with the load application controls to prevent load from being applied in the event of an over temperature condition.

B. To provide for major fault protection, branch fuses shall be provided on all three phases of switched of all load steps. Branch fuses shall be current limiting type with an interrupting rating of 200K A.I.C.

C. The exterior of the load bank shall have appropriate warning/caution statements on access panels.

2.6 CONTROL SYSTEMS – REMOTE CONTROLS

A. Remote Controls: The control panel shall be remote 19" control panel housed in a NEMA 4 type wall mount enclosure shall be provided.

B. The control panel shall contain the following manual controls:

1. Power ON/OFF switch
2. Master load ON/OFF switch.
3. Load step switches for ON/OFF application of individual load steps.

Control panel visual indicators shall be as follows:

1. Power ON indication light.
2. OVERTEMPERATURE light.

C. A standard remote load dump circuit shall be provided as part of the load bank control circuit. Provisions shall be provided to remove the load bank off-line from the operation of a remote normally closed set of auxiliary contacts from a transfer switch or other device. In the event of the remote contact opening, all load is removed.

D. A digital meter shall be installed in the control panel to show 3 line digital display of voltage, current, frequency, and power measurement. The software interface to the meter shall allow for real-time data acquisition and data logging from a laptop PC.

E. An integral control power transformer shall be provided to supply 120V, 1 phase, 60 Hz to the load banks control and safety circuitry. Transformer primary and secondary control circuits shall be fuse protected.

2.7 DOCUMENTATION

A. Installation and operation manuals shall be provided with the equipment and shall include complete details for the installation, commissioning, operation, and

maintenance of the load bank.

B. The manuals shall include the electrical schematic and interconnect drawings for the power and control wiring for the load bank and all control devices.

C. A complete parts list with part numbers, device identification, and rating shall be included in the manuals. The original manufacturers name and part number shall be included in the parts listing.

D. The manuals shall be provided electronically on a USB drive.

PART 3: QUALITY ASSURANCE

3.1 QUALITY CONTROL

A. The load bank shall be fully tested using a test specification written by the supplier. Tests shall include electrical functional testing, verifying conformance to assembly drawings and specifications. Each load step shall be cold resistance checked to verify proper calibration of resistive load steps and proper ohmic value.

B. The manufacturer shall maintain this data on file for inspection purposes by the purchaser. Tests using high potential equipment shall be performed to ensure isolation of the load circuits from the control circuits and to determine isolation of the load circuits from the load bank frame. Tests of all safety circuits shall be performed to verify conformance to the specification.

C. All electrical circuits shall have a high potential insulation resistance test performed at twice rated voltage plus 1000 VAC to assure insulation integrity.

D. All quality control test equipment shall be regularly maintained and calibrated to traceable national standards.

E. The Company's Quality System shall be at least ISO9001:2015 Certified.

3.2 QUALIFICATIONS OF MANUFACTURER

A. The load bank shall be manufactured by a firm regularly engaged in the manufacture of load banks and who can demonstrate at least twenty five (25) years of experience with at least twenty five (25) installations of load banks similar or equal to the ones specified herein.

B. The manufacturer shall have a written Quality Control procedure available for review by the purchaser, which will document all phases of operations, engineering, and manufacturing.

C. Manufacturer must have a field service organization with service personnel having a minimum of an Associate Degree in Electrical Engineering.

D. The manufacturer shall have a service organization capable of providing service within a 4 hour time frame.

E. A 5 Year warranty shall be provided for both the resistors and the load bank.

3.3 MEASUREMENT AND PAYMENT

A. Measurement for payment for the work under this section shall be at NO DIRECT PAY and shall be included with the related work bid items.

END OF SECTION 16429

SECTION 16441

SAFETY SWITCHES

PART 1: GENERAL

1.01 REFERENCES

A. All applicable requirements of other portions of Contract Documents apply to the Work of this Section.

B. Drawings and general provisions of Contract, including General and Special Provisions and Division 1 Specification sections, apply to work of this section.

C. This section is a Division 16 Basic Materials and Methods section, and is part of each Division 16 section-making reference to motor and circuit disconnect switches specified herin.

1.02 DESCRIPTION OF WORK

A. Provide Safety Switches as and where shown on the Drawings for service or motor disconnect use. Switches shall be fusible type where noted with Service Entrance Label as required.

1.03 SUBMITTALS

A. All submittals shall conform completely to the requirements of the Contract Documents.

B. Product Data

Catalog Sheets, Specifications and Installation Instructions.

C. Product Data: For each type of enclosed switch, accessory, and component. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical date on features, performance, electrical characteristics, ratings, accessories, and finishes.

D. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

E. Field Quality Control Test Reports.

1.04 SPARE PARTS

A. Three spare fuses for each type and size installed.

1.05 REFERENCES

A. The switches and all components shall be designed, manufactured and tested in accordance with the latest applicable standards:

1. NEMA KS-1

2. UL 98

1.06 REGULATORY

A. The switches shall bear a UL label.

1.07 QUALITY ASSURANCE

A. UL Compliance: Comply with requirements of UL 98, "Enclosed and Dead-Front Switches". Provide circuit and motor disconnect switches which have been UL-listed and labeled.

B. NEMA Compliance: Comply with applicable requirements of NEMA Stds. Pub. No. KS 1, "Enclosed Switches" and 250, "Enclosures for Electrical Equipment (1000 Volts Maximum".

PART 2: PRODUCTS

2.01 SAFETY SWITCHES (SINGLE THROW)

A. General

Cutler-Hammer Inc.'s, General Electric Co. Square D Co. or Westinghouse Electric Corp., Siemens, Heavy Duty type, having:

1. Fused, or unfused as indicated on Drawings.
2. Fused switches equipped with fuseholders to accept only the fuses specified in Sections 16475.
3. NEMA 7 in hazardous areas rated for the area classification, NEMA 4X 316 stainless steel enclosure in all other areas, unless otherwise indicated on Drawing.
4. Solid neutral bus when neutral conductor is included with circuit.
5. Ground bus when equipment grounding conductor is included with circuit.
6. Current rating and number of poles as indicated on Drawings – 6 pole for 2 speed motors.
7. Auxiliary control contact as applicable and as indicated.
8. The switch shall be Horse Power rated and Short Circuit rated for the intended application.

B. Source Limitations: Obtain enclosed switches, components, and accessories within same product category, from single manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. Switches shall be heavy-duty, fusible type, with quick-make, quick-break operating mechanism. Switches shall have characteristics listed in 2.01A. Use time delay fuses.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

F. Comply with NFPA 70.

2.02 NAMEPLATES

A. General

Precision engrave letters and numbers with uniforms margins, character size minimum 3/16" high.

1. Phenolic: Two color laminated engravers stock, 1/16" minimum thickness, machine engraved to expose inner core color (white).
2. Aluminum: Standard aluminum alloy plate stock, minimum .032" thick, engraved areas enamel filled or background enameled with natural aluminum engraved characters.
3. Materials for Outdoor Applications: As recommended by nameplate manufacturer to suit environmental conditions.

2.03 FUSIBLE SWITCHES

A. Heavy-Duty Safety Switches: Provide surface-mounted, heavy-duty type sheet-steel enclosed safety switches, of types, sizes, and electrical characteristics indicated, horsepower rated, solid neutral, incorporating quick-make, quick-break type switches; so constructed that blades are visible in OFF position with door open. Equipment with operating handle which is integral part of enclosure base and whose position is easily recognizable, and is padlockable in OFF position; construct current carrying parts of high-conductivity copper, with silver-tungsten type switch contacts, and positive pressure type reinforced fuse clips. Unless otherwise noted on drawings, provide NEMA Type 4XSS enclosure outdoors, NEMA Type 12 indoord.

B. All fusible switches shall accept only Class R fuses, and shall have U.L. listed Class R fuse rejection clips.

C. The U.L. short circuit rating shall be 200,000 RMS symmetrical amperes when Class R fuses are used.

D. All switches shall be U.L. listed for use with copper or aluminum wire whose ampacity and temperature rating are in compliance with NEC 110-14(C).

E. Lugs: Mechanical type, suitable for number, size, and conductor material.

PART 3: EXECUTION

3.01 INSTALLATION

A. Install switches so that the maximum height above the floor to the center of the operating handle does not exceed 6'-6". When shown as wall mounted switches shall be mounted to horizontal strut supports. Free standing units shall be mounted on a free-standing strut system anchored to the floor, ceiling, or both.

B. Identify each safety switch, indicating purpose or load served:

1. NEMA 1 Enclosures: Rivet or bolt nameplate to the cover.

2. NEMA 4X Enclosures: Attach nameplate to the cover using adhesive specifically designed for the purpose, or mount nameplate on wall or other conspicuous location adjacent to switch. Do not penetrate enclosure with fasteners.

3. Explosion Proof Enclosures. Attach per manufacturers instructions.

3.02 FIELD QUALITY CONTROL

A. Inspect switches for damage.

B. Verify fuse sizes match the connected load and that fuses have adequate contact and support.

C. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.

D. Measure contact resistance across each switchblade fuseholder. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.

E. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.

F. Perform ground fault test according to NETA ATS 7.14 "Ground Fault Protection Systems, Low-Voltage."

G. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

H. Prepare test and inspection reports. Indicate test procedures used, deficiencies detected, remedial action taken, and observations after remedial action. Uniquely identify each switch for reference.

I. Subsequent to completion of tests, energize circuitry and demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at project site, then retest to demonstrate compliance; otherwise remove and replace with new units and retest.

3.03 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

3.04 PAYMENT

Payment for the work under this section will be made under:

Item	Description	Unit Price
NS-19	Gear Package	Lump Sum

END OF SECTION 16441

SECTION 16461

DRY-TYPE DISTRIBUTION TRANSFORMERS

PART 1: GENERAL

1.01 SCOPE

A. The Contractor shall furnish and install single-phase and three-phase general purpose individually mounted dry-type transformers of the two-windings type, self-cooled as specified herein and as shown on the contract drawings.

1.02 RELATED SECTIONS

1.03 REFERENCES

A. The transformers and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of ANSI and NEMA.

B. Transformers shall meet the energy efficiency requirements of federal law 10 CFR Part 431 "Energy Efficiency Program for Certain Commercial and Industrial Equipment", and all other energy efficiency federal laws applicable to this type equipment.

1.04 SUBMITTALS – FOR REVIEW/APPROVAL

A. The following information shall be submitted to the Engineer.

1. Dimension drawing.
2. Technical certification sheet.
3. Conduit entry/exit locations.
4. Transformer ratings including:
   a. Voltage.
   b. Continuous current.
   c. Basic Impulse level for equipment over 600 volts.
   d. kVA.
   e. Impedance.

B. Submit ten (10) copies of the above information.

1.05 SUBMITTALS – FOR INFORMATION

A. When requested by the Engineer the following product information shall be submitted:

1. Descriptive bulletins.
2. Product sheets.

1.06 SUBMITTALS – FOR CLOSEOUT

A. The following information shall be submitted for record purposes prior to final payment.

1. Final as-built drawings and information for items listed section 1.04.
2. Certified production test reports.
3. Installation information.
4. Seismic certification and equipment anchorage details.

B. Submit ten (10) copies of the above information.

1.07 QUALIFICATIONS

A. For the equipment specified herein, the manufacturer shall be ISO 9000, 9001 or 9002 certified.

B. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

1.08 REGULATORY REQUIREMENTS

A. All transformers shall be UL-listed and bear the UL label.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.10 FIELD MEASUREMENTS

A. Measure primary and secondary voltages and make appropriate tap adjustments.

1.11 OPERATION AND MAINTENANCE MANUALS

A. Ten (10) copies of the equipment operation and maintenance manuals shall be provided prior to final payment.

B. Operation and maintenance manuals shall include the following information:

1. Instruction books and /or leaflets.
2. Recommended renewal parts list.
3. Drawings and information required by section 1.06.

PART 2: PRODUCTS

2.01 MANUFACTURERS

A. Eaton

B. Square D

2.02 RATINGS

A. KVA and voltage ratings shall be as shown on the drawings.

B. Transformers shall be designed for continuous operation at rated kVA, for 24 hours a day, 365 days a year operation, with normal life expectancy as defined in ANSI C57.96.

C. Transformer sound levels shall not exceed the following ANSI and NEMA levels for self-cooled ratings:

Up	to	9 kVA 40 db
10	to	50 kVA 45 db
51	to	150 kVA 50 db
151	to	300 kVA 55 db
301	to	500 kVA 60 db
501	to	700 kVA 62 db
701	to	1000 kVA 64 db

2.03 CONSTRUCTION

A. Insulation Systems

1. Transformers shall be insulated as follows:

a. 2 kVA and below: 150 degrees C insulation system based upon 80 degree C rise.

b. 3 to 15 kVA: 185 degrees C insulation system based upon 115 degree C rise.

c. 15 kVA and above: 220 degrees C insulation system based upon 150 degree C rise.

2. Required performance shall be obtained without exceeding the above indicated temperature rise in a 40 degrees C maximum ambient.

3. All insulation materials shall be flame-retardant and shall not support combustion as defined in ASTM Standard Test Method D635.

B. Core and Coil Assemblies

1. Transformer core shall be constructed with high-grade, nonaging, grain-oriented silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Maximum magnetic flux densities shall be substantially below the saturation point. The transformer core volume shall allow efficient transformer

operation at 10% above the highest tap voltage. The core laminations shall be tightly clamped and compressed. Coils shall be wound of electrical grade aluminum with continuous wound construction.

2. On units rated 30 kVA and below the core and coil assembly shall be completely encapsulated in a proportioned mixture of resin and aggregate to provide a moistureproof, shock-resistant seal. The core and coil encapsulation system shall minimize the sound level. Taps shall be two steps below nominal voltage in 5% increments.

3. On units rated 45 kVA and above the core and coil assembly shall be impregnated with non-hydroscopic, thermosetting varnish and cured to reduce hot spots and seal out moisture. The assembly shall be installed on vibration-absorbing pads. Taps shall be two steps above and 4 steps below nominal voltage in 2.5% increments.

C. Electrostatic Shielding

1. Where shown on the drawings, provide isolation transformers with electrostatic shielding.

2. An electrostatic shield consisting of a single turn of aluminum shall be placed between the primary and secondary winding and grounded to the transformer core.

D. Motor Drive Isolation

1. Where shown on the drawings, provide motor drive isolation transformers.

2. Motor drive isolation transformers shall be designed for use with 3 phase Ac adjustable frequency drives 600 volts and below to provide isolation between the incoming line and drive circuitry. These drives minimize the line disturbances caused by SCR firing within the drive unit. Thermoguards shall be included in all motor drive isolation transformers to provide additional protection for the transformer from increased heating due to the non-sinusoidal characteristics of drive currents. The transformer shall provide reduced short circuit currents and voltage line transients. The transformer shall be specifically sized to the drive kVA requirements dictated by the horsepower of the motor, and as such will be mechanically braced to withstand the stress of current reversals and short circuit currents associated with the specific drive kVA rating.

2.04 WIRING/TERMINATIONS

A. Recommended external cable shall be rated 90 degrees C for encapsulated and 75 degrees C for ventilated designs. Connectors should be selected on the basis of the type and cable size used to wire the specific transformer.

2.05 ENCLOSURE

A. The enclosure shall be made of heavy-gauge steel. All transformers shall be equipped with a wiring compartment suitable for conduit entry and large enough to allow convenient wiring. The maximum temperature of the enclosure shall not exceed 90 degrees C. The core of the transformer shall be grounded to the enclosure.

B. On units rated 30 kVA and below encapsulated the enclosure construction shall be totally enclosed, non-ventilated, NEMA 3R, with lifting eyes.

C. On units rated 45 kVA and above the enclosure construction shall be ventilated, NEMA 2, drip-proof, with lifting holes. All ventilation openings shall be protected against falling dirt.

2.06 FINISH

A. Enclosures shall be finished with ANSI 61 color weather-resistant enamel.

PART 3: EXECUTION

3.01 FACTORY TESTING

A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of ANSI and NEMA standards.

1. Ratio tests at the rated voltage connection and at all tap connections.
2. Polarity and phase relation tests on the rated voltage connection.
3. Applied potential tests.
4. Induced potential test.
5. No-load and excitation current at rated voltage on the rated voltage connection.

B. The following special factory tests shall be performed on ratings above 500 kVA provided under this section. All tests shall be in accordance with the latest revision of ANSI and NEMA standards.

1. Resistance measurements on all windings at the rated voltage connection of each unit and at the tap extremes of the first unit made of a new design.

3.02 INSTALLATION

A. The Contractors shall install all equipment per the manufacturer's recommendations and the contract drawings.

3.03 FIELD ADJUSTMENTS

A. Adjust taps to deliver appropriate voltage.

3.04 FIELD TESTING

A. Measure primary and secondary voltages for proper tap settings.

3.05 PAYMENT

Payment for the work under this section will be made under:

Item	Description	Unit Price
NS-19	Gear Package	Lump Sum

END OF SECTION 16461

SECTION 16470

PANELBOARDS

PART 1: GENERAL

1.01 REFERENCES

A. All applicable requirements of other portions of Contract Documents apply to the Work of this Section.

1.02 RELATED SECTIONS

A. Section 16475 – Overcurrent Protective Devices - Circuit Breakers and Fusible Switches.
B. Section 16671 – Surge Protective Devices

1.03 DESCRIPTION OF WORK

A. This Section describes the construction and installation requirements of panelboards (circuit breakers type and switch fuse type to be provided by the Contractor.

B. Unless otherwise indicated, panels shall be of the type indicated on the Drawings. When required by the Drawings, panels shall be divided into sections and arranged so that each section shall be fed separately as indicated. Panelboards shall bear Underwriter Laboratories (U.L.) label and meet applicable NEMA Standards.

C. The bus work arrangement for distribution to protective device within each panel board and distribution center shall have electrical connections which comply with sequence phasing from main to branch buses in a manner described. The description shall apply to fused protective devices as well as circuit breakers.

D. Bus bars for panel boards shall be not less than 96% conductivity hard drawn solid copper based on current density of not more than 1,000 amperes per square inch of cross section. Bus bars shall be braced to withstand the available short circuit stresses.

E. Circuit Identification:

Each switch and/or each circuit breaker shall be equipped with an approved metal or plastic numbering marker. Numbering marker shall be attached adjacent to switch or breaker by pins or other approved means. Cement, glue or other such adhesive will not be approved.

1.04 SUBMITTALS

A. All submittals shall conform completely to the requirements of the Contract Documents.

B. Submittal Packages

Submit the Shop Drawings, and the product data specified below at the same time as a package.

C. Shop Drawings; include the following for each panelboard:

1. Cabinet and gutter size.
2. Voltage and current rating.
3. Panelboard short circuit rating. Indicate if rating is fully Rated Equipment Rating, or where acceptable, UL listed Integrated Equipment Short Circuit Rating.
4. Circuit breaker enumeration (frame, poles, I.C.): Indicate if circuit breakers are suitable for the panelboards' Fully Rated Equipment Rating, or where acceptable, are series connected devices which have been test verified and listed with UL (include documentation proving the compatibility of the proposed circuit breaker combinations).

E. Product Data

Catalog sheets, Specifications and Installation Instructions.

1.05 SPARE PARTS

A. Three spare fuses for each size installed.

1.06 SHOP DRAWINGS

A. The Contractor shall submit for approval complete sets of Shop Drawings showing panels, panel ratings, busbars, switches, etc.

PART 2: PRODUCTS

2.01 PANELBOARDS (CIRCUIT – BREAKER TYPE)

A. Square D Co., Siemens, Eaton-Cutler Hammer

1. 120/240V, single phase, 3 wire and 120/208V, 3 phase, 4 wire panelboards shall be Type Pow-R-Line C as manufactured by Eaton-Cutler Hammer, Sentron as manufactured by Siemens; Type NQOD as manufactured by Square D Co., or equal.
2. 277/480V, 3 phase, 4 wire panelboards shall be Sentron as manufactured by Siemens, Type Pow-R-Line C as manufactured by Eaton, Siemens; Type NEHB as manufactured by Square D Co., or equal.
3. 480V, 3 phase, 3 wire panelboards shall be Sentron as manufactured by Siemens, Type Pow-R-Line C as manufactured by Eaton, Siemens; I-Line series as manufactured by Square D Co., or equal.
4. NEMA 3, 4 and 12 panelboards shall be type DVP or DHP as required by voltage application; manufactured by the Crouse-Hinds Company, or equal

B. Panelboards shall have:

1. Fully rated equipment.

2. Flush or surface type cabinets as indicated on the Drawings.

3. Increased gutter space for gutter taps, sub-feed wiring, through-feed wiring, oversize lugs.

4. Door and one piece trim. Door fastened to trim with butt or piano hinges. Trim fastened to cabinet with devices having provision for trim adjustment.

5. Yale No. 511S locks with brass cylinder rosette, blind fastened from inside of door. One No. 47 key with each lock.

6. Solid copper busbars. Ampere rating of bus bars not less than frame size of main circuit breaker.

7. Full capacity copper neutral bus in panelboards where neutrals are required.

8. Copper equipment grounding bus.

9. Copper lugs where lugs are required.

10. Section designated "space" or "provision for future breaker" equipped to accept future circuit breakers.

11. Molded case, bolt-on circuit breakers: Unless otherwise indicated on Drawings, circuit breakers (local panelboards) shall conform to the following:

12. Short circuit rating 22KAIC minimum (240VAC), 25KAIC (480VAC), but not less than indicated on panelboard schedule. Furnish panelboards having Fully Rated Equipment Rating (the short circuit rating of the panelboard is equal to the lowest interrupting rating of any device installed in the panelboard).

13. Each circuit breaker panelboard shall consist of an assembly of the number of automatic single pole, double-pole and triple-pole circuit breakers of trip ratings indicated on the Drawings or required to permit proper protection to the connected branch circuits.

14. Circuit beakers shall be mounted on both sides of three enclosed vertical bus bars. Starting from the top of each vertical row of circuit breakers, connections to the three vertical bus bars shall be in the following order A-B-C-A-B-C- (sequence phasing) etc., where A-B-C- refers to the three phases.

15. All buses shall be securely fastened to approved insulating bases to support bus structure and prevent flash-overs to ground.

16. A neutral bus bar shall be provided for each panel or panel section and shall be equipped with a terminal for each 120 volt or 277 volt circuit. Neutral bus bar shall be at least ¼" thick at point where neutral feeder conductor is attached.

17. Terminals of feeder conductor (neutral and phase leg) shall be arranged so that lug cannot be rotated when in place. Bus bars shall have main lugs only.

18. Current carrying parts of panelboard exclusive of breakers, shall be designed for maximum density of 1,000 amperes per square inch based on capacity of overcurrent device protecting feeder to panel.

19. Circuit breakers shall be thermal-magnetic type with common type handle for all multiple pole circuit breakers. Circuit breakers shall be minimum 100-ampere frame and through 100-ampere trip sizes shall take up the same pole spacing.

20. Circuit breakers shall be UL listed as type SWD for lighting circuits.

21. Circuit breaker handle locks shall be provided for all circuits that supply exit signs, emergency lights, energy management, and control system (EMCS) panels and fire alarm panels.

C. GFCI circuit breakers shall be provided for designated circuits on the Drawings. GFCI (ground fault circuit interrupter) shall be provided for circuits where shown on the Drawings. GFCI units shall be 1 pole, 120 volt, molded case, bolt-on breakers, incorporating a solid state ground fault interrupter circuit insulated and isolated from the breaker mechanism. The unit shall be UL listed Class A Group I device (5 milliamp sensitivity, 25 millisecond trip time) and a minimum interrupting capacity of 10,000 amperes RMS. Provide arc fault interrupter breakers where required by NEC.

D. Panelboard Cabinets

Each panelboard shall be installed in a galvanized sheet steel cabinet not less that No. 12 gauge. Cabinets with back area greater than 1500 square inches or a linear dimension exceeding 60" shall be constructed from No. 10 gauge galvanized sheet steel.

1. Door and Trim: Each cabinet shall be provided with a steel trim having door-in-door construction. The fixed trim unless otherwise indicated on the Drawings shall be provided with a return trim, of sufficient depth and shall be fastened to the box by means of cadmium plated, flat oval head, steel machine screws. Trim shall be of same gauge as panel box.

   Each cabinet with an inner door not greater than 24" shall have the circuit breaker and wiring compartment covered by a single large door attached to one vertical side of the trim by concealed steel hinges, equipped with approved pins, and shall close against rabbets on the other three sides. This door shall be fastened to the rabbets by cadmium plated flat, oval headed, steel machine screws. The circuit breaker compartment shall be covered by a single small door attached to the large door by single concealed steel hinges, equipped with approved pins, on one vertical side and shall close against rabbets on the other three sides. A door less that 48" high shall be equipped with a lock having a rosette for exposed barrel. A door with vertical dimension greater than 48" shall have a vault handle and three-point catch (arranged to fasten door at top, bottom and center) in addition to lock.

   Each cabinet with inner door access greater than 24" wide shall have the circuit breaker and wiring compartments covered by double doors. Each door shall be

attached to a vertical side of the trim by steel hinges equipped with approved pins, and shall close against rabbets at top and bottom. Doors shall be fastened to the rabbets by cadmium plated, flat, oval headed and machine screws. The circuit breaker compartments shall be covered by double over-lapping small doors. Each small door shall be attached on the vertical side to the larger door by single steel hinges equipped with approved pins, and shall close against rabbets at top and bottom. The right hand small door shall be equipped with a vault handle and a three-point catch (arranged to fasten the small door to the larger door at the top and bottom, and to fasten to the left hand small door at the side) and a lock having a rosette for exposed barrel.

Hinges shall be located not more than 4" from top and bottom of door. Where distance between hinges is greater than 26" additional hinges shall be provided.

Where building construction does not permit cabinets being set flush or where cabinet is extra deep, the front shall project out from the wall and the sides of the cabinet shall be trimmed and finished with a metal return molding of approved design, fastened to cabinet so as to conceal the intersection between the wall and the cabinet.

2. Gutters: For the toggle switch and circuit breaker type panels instead of a transite or ebony asbestos frame provide a steel barrier spot welded on inside of trim to form a rabbet not less than ¾" wide on all four sides of door and to enclose the gutter. Cabinets for lighting panelboards having more than 32 circuits shall have gutter at least 6" wide. All panelboards shall have gutters sufficiently wide to provide a clear opening of 4" between the edge of gutter and the edge of trim when the gutter door is open for access to wiring. Gutters of main distribution panels shall be not less than 6" all around or larger where necessary to accommodate wiring and connections.

E. Locks

Locks for all panelboard cabinets, shall be of approved cylinder, paracentric type, Yale No. 5-11-S, or Eagle 03101, Key change No. 47 (No. 9 Key). One key shall be supplied with each lock.

F. Directories

A directory consisting of a steel or aluminum frame with a non-breakable, non-inflammable plastic face and cardboard or heavy white paper shall be installed on the inside of the door of cabinets for all panels or panelboards. Frame shall be welded to door or fastened by approved screws to a mat in such a manner as not to leave anything projecting on the outside of the door. The cardboard or heavy paper shall have typewritten directory thereon stating the following: The number of each circuit together with the name of circuits, light or motors controlled, size of circuit feeder and subfeeder conductors, sizes of fuses and/or trip rating of circuit breakers greater than 15 amperes and date of installation. Directory frames shall be not less than 8" high x 5" wide for panelboards containing not more than 24 branch circuit devices. Where the number exceeds 24, an 8" x 8" or a 12" x 12" x 5" wide frame shall be provided.

G. Surge Protective Devices(SPD)

1. Provide SPD as called for in Section 16671, and as shown on the drawings.

H. Computer Panelboards

1. Panelboards shall be suitable for non-linear loads.

2. Neutral bus shall be double the rating of the phase bus bars.

PART 3: EXECUTION

3.01 INSTALLATION

A. Install panelboards in accordance with NEMA Publication No. PB1.1 "General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less."

B. Cabinet Supports

1. Light and power panelboard cabinets set in chases shall be supported to chase structural members as directed and approved by the Architect.

2. Light and Power panelboard cabinets, set in walls where a chase is not provided by others, shall be furnished with Kindorf channels on both sides of the panel with these channels running from floor slab to ceiling slab and secured to the slab.

3. Surface mounted panels shall be fastened to walls by expansion shields, or the equivalent. Heavy panelboards shall be supported from the floor by means of approved angle iron framework.

C. Setting of Cabinets

Panelboards shall be set so that top of cabinet is approximately 6 feet 6 inches above floor.

D. Deep Cabinets

In rooms having facings for architectural terra cotta or structural facing tile panel cabinets shall be not less than 5" deep so that conduits to panel cabinet may be installed behind the facings.

E. Flush Cabinets

Set flush cabinets so that edges will be flush with the finished wall line. Where space will not permit flush type cabinets to be set entirely in the wall, set cabinet as nearly flush as possible, and cover the protruding sides with the trim extending over the exposed sides of the cabinet and back to the finished wall line.

F. Circuit Identification

Each switch and/or each circuit breaker shall be equipped with an approved metal or plastic numbering marker. Numbering marker shall be attached adjacent to switch or breaker by pins or other approved means. Cement, glue or other such adhesive will not be approved.

G. Painting

Each cabinet shall be delivered to building equipped with a priming coat of paint on all surfaces of box, trim and door.

In unfinished areas of the building, exposed surfaces of box, trim and doors shall be painted with two coats of paint, color as selected. Elsewhere in the building, exposed surfaces of door and trim will be painted to match surroundings.

H. Stenciling

On the inside of the door of each cabinet, there shall be stenciled a designation similar to that on the name plate of the switch on the main switchboard, which controls the respective panelboard, identical to that noted on the Drawings.

3.02 PAYMENT

Payment for the work under this section will be made under:

Item	**Description**	**Unit Price**
NS-19	Gear Package	Lump Sum

END OF SECTION 16470

SECTION 16475

OVERCURRENT PROTECTIVE DEVICES
CIRCUIT BREAKERS AND FUSES

PART 1: GENERAL

1.01 THE REQUIREMENT

A. All applicable requirements of other portions of Contract Documents apply to the Work of this Section.

1.02 DESCRIPTION OF WORK

A. This Section describes the type of circuit breakers and fuses to be provided in safety switches, switchboards, and panelboards.

1.03 RELATED SECTIONS

A. Section 16470 - Panelboards

1.04 SPARES

A. Furnish and deliver the following spare fuses:

1. One set of three for each Service Switch
2. Three (3) fuses of each type and size for all other fuses.

PART 2: PRODUCTS

2.01 CIRCUIT BREAKERS

A. General

Circuit breakers shall be either all magnetic type or thermal - magnetic type, conforming to the following Specifications:

1. Connection to bus shall be on "bolt-on". Plug-in type circuit breakers are not acceptable.
2. Breakers shall be equipped with arc chutes or other approved suitable means of quenching arcs.
3. Breakers shall have a quick-break operating mechanism on automatic operation.
4. Handles of breakers shall be "trip free".
5. Handles of breakers shall plainly indicate whether breaker is in "ON", "OFF" or tripped position.

6. Breakers shall be designed to carry 100% of trip rating continuously; to have inverse time delay tripping above 125% of trip rating; and to trip instantaneously at 1000% of trip rating.

7. Multi-pole breakers shall have barriers between poles.

8. Multi-pole breakers shall have a separate tripping element for each pole. Each tripping element shall open all poles. Multi-pole breakers shall have one handle controlling all poles.

9. Breakers of 225-ampere trip rating or less shall have non-tamperable, permanently set trip elements enclosed and sealed in molded composition housing. Electronic trip breakers shall be provided where shown on the drawings.

10. Breakers 400 ampere and greater shall be electronic trip type, LSI adjustable trip settings or trip type as shown on the drawings. Where a short circuit & coordination study is called for as part of the scope of work, the study shall be used to determine the breaker frame rating and trip selectivity settings required. Provide electronic trip on breakers less than 400 amps where shown on the drawings.

11. Single pole breakers shall be rated for not less than 120 volts or 208 volts as indicated on Drawings, multi-pole breakers shall be rated for not less than 250 volts or 480 volts as indicated on Drawings.

12. All breakers shall be manufactured in accordance with standards of the National Electrical Manufacturers Association and shall bear Underwriters Laboratories label.

13. Circuit breakers shall have minimum 15-ampere trip ratings for single pole circuits, unless otherwise indicated on Drawing or required for the circuit protected.

14. Circuit breakers protecting single phase, 2 wire, 208 volt or 480 volt circuits as indicated on Drawings, shall be of the two-pole type.

15. Circuit breakers protecting three phase circuits shall be of the three pole type.

16. Where spaces for future breakers are required, copper connections for mounting of future breakers shall be provided.

17. Where two or three pole breakers are called for in lighting panels, quicklag type, the two or three pole breaker shall be of the quicklag common trip, to maintain required depth for flush mounting in nominal 4" walls.

2.02 FUSES

A. Fuse holders for distribution equipment and panelboards (except as otherwise specified for service switches) for 30 to 600 amperes shall be equipped with cartridge fuses of type approved with interchangeable stud mounting. All fuses including spares shall have a minimum interrupting rating of 200,000 R.M.S. amperes the equal of Bussman or Chase Shawmut.

1. Dual Element: (Motor and Power Loads)

   a. Time delay, 600 amp maximum rating at required voltage, and 200,000 amp interrupting capacity.

   b. Fuses, similar to type Fusetron FRN, 250 volt, 15-600 amp. Fusetron.

c. Fuses similar to type Lo-Peak, LPN-RK, 250 volt, 15-600 amp Lo-Peak, (U.L. Class R.)

2. Current limiting: (Mains, feeders and branch circuits)

Fuses in Par a, below are slow acting for motor protection exceeding 600 amp. This slow acting fuse is used for backup to fast acting fuse.

a. Time-delay type with 200,000 amp interrupting capacity similar to type Hi-Cap KRPC, 600 volt, 601-5000 amp (U.L. Class L).

Fuses in Par b. below are fast acting for CB protection and downstream from type and in par. a above.

b. 200,000 amp. interrupting capacity similar to type Limitron KTN, 250 volt, 15-600 amp. (U.L. Class R, up to 600 amp, Class L, over 600 amp).

3. All fuses shall be the product of the same manufacturer.

PART 3: EXECUTION

3.01 PAYMENT

Payment for the work under this section will be made under:

Item	Description	Unit Price
NS-19	Gear Package	Lump Sum

END OF SECTION 16475

SECTION 16482

MOTOR CONTROL CENTERS

PART 1 GENERAL

1.1 SCOPE

A. The CONTRACTOR shall furnish and install the motor control centers as specified herein and as shown on the contract drawings.

1. MCC-1

B. The Contractor shall coordinate the MCC package with the Pump Control Panel System Supplier as outlined in Section 16904, item 1.01.B.

1.2 RELATED SECTIONS

A. Section 16250 – Grounding
B. Section 16475 – Overcurrent Devices - Circuit Breakers and Fusible Switches
C. Section 16426 – Standby Power System Genset
D. Section 16429 – Load Bank
E. Section 16496 – ATS-1
F. Section 16671 – Surge Protective Devices
G. Section 16904 -- Pump Control Panel
H. Section 16950 – Electrical Tests

1.3 REFERENCES

A. The Motor Control Centers and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of NEMA, ANSI and UL 845.

1.4 SUBMITTALS – FOR REVIEW/APPROVAL

A. The following information shall be submitted to the ENGINEER:

1. Master drawing index
2. Front view elevation
3. Floor plan
4. Top view
5. Single line
6. Unit wiring diagrams depicting remote devices
7. Nameplate schedule
8. Starter and component schedule
9. Conduit entry/exit locations
10. Assembly ratings including:

a. Short-circuit rating
b. Voltage
c. Continuous current

11. Major component ratings including:
    a. Voltage
    b. Continuous current
    c. Interrupting ratings
12. Cable terminal sizes
13. Product data sheet
14. Motor Control schematic drawings

B. Where applicable the following information shall be submitted to the ENGINEER:

1. Busway connection
2. Connection details between close-coupled assemblies
3. Composite floor plan of close-coupled assemblies
4. Key interlock scheme drawing and sequence of operations.

1.5 SUBMITTALS – FOR CONSTRUCTION

A. The following information shall be submitted for record purposes:

1. Final as-built drawings and information for items listed in paragraph 1.4
2. Unit wiring diagrams
3. Certified production test reports
4. Installation information
5. Seismic certification and equipment anchorage details.

B. The final (as-built) drawings shall include the same drawings as the construction drawings and shall incorporate all changes made during the manufacturing process.

1.6 QUALIFICATIONS

A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.

B. For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.

C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the ENGINEER, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

1.7 REGULATORY REQUIREMENTS

A. The motor control centers shall bear a UL label.

1.8 DELIVERY, STORAGE AND HANDLING

A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.9 OPERATION AND MAINTENANCE MANUALS

A. Equipment operation and maintenance manuals shall be provided with each assembly shipped and shall include instruction leaflets, instruction bulletins and renewal parts lists where applicable, for the complete assembly and each major component.

PART 2 PRODUCTS

2.1 MCC MANUFACTURERS

A. Eaton – Freedom
B. Sq D
C. Allen Bradley – Centerline

The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety.

2.2 RATINGS

A. The Motor Control Center(s) shall be 600 volt class suitable for operation on a three-phase, 60 Hz system. The system operating voltage and number of wires shall be as indicated on the drawings.

2.3 MCC SPECIAL FEATURES

A. GENERAL:

1. The motor control center shall be manufactured as shown on the drawings. The motor control center shall be compartmentalized such that the incoming utility power and motor control are isolated from the Pump Control Panel (PCP) and telemetry sections using metal barriers. The MCC shall house the main circuit breaker, automatic transfer switch, motor starters, motor control and Pump Control Panel (PCP). Interlocks and circuit breaker operation shall be possible without opening each compartment door. Breaker cutouts for breaker toggle protrusion shall be supplied, to eliminate exposure to hazardous potentials. A physical lockout device shall be supplied on each motor circuit breaker. Lightning/surge protection and PFR power fail relay shall be furnished to protect the panel equipment from lightning strikes, loss of power or utility power surges.

2. Individual pump elapsed time meters, indicating devices and H.O.A. switches shall be mounted on each motor control compartment door. Provide a GFCI receptacle, intrusion switch, florescent light with door activated switch in the control panel section. The control panel shall be thermostatically controlled by heating and cooling systems, without the use of an air conditioner to maintain suitable climate conditions within the control panel. Project specific heating/cooling calculations are to be submitted showing enclosure internal temperature requirement. All bussing shall be copper tin plated. All wire shall be stranded and labeled with heat shrink permanent wire markers. All wires from the interior deadfront door shall be neatly bundled with spiral wrap per U/L 508A requirements. All circuit breakers and door-mounted devices (lights and switches) shall be equipped with engraved lamacoid nameplates and mounted with stainless steel screws. A custom drawing/schematic holder shall be installed in the control panel section of the MCC which will contain all of the site specific drawings and technical documentation.
3. The control panel section, PCP and all internal components shall be an integral part of the MCC and shall be factory tested as one complete unit with the MCC. The owner shall be notified at least 3 weeks in advance of any factory testing to allow travel arrangements for a witnessed test.
4. The MCC manufacturer's standard control wiring (not power) shall be removed and replaced by the PCP System Integrator (See Section 16904, Item 1.01.B) to meet the custom requirements of the contract drawings and specifications. The System Integrator's panel shop shall perform and be responsible for all control wiring within the MCC. The System Integrator shall be responsible for supplying the MCC, motor controls, PCP, factory testing and startup services as one complete unit.
5. The MCC internal control wiring shall be factory installed and wired to all internal equipment such as the PCP, etc. The only control wiring required by the Contractor shall be that to external field devices.
6. The MCC manufacturer shall be Eaton Electrical Inc., Square D, AB, or pre-approved equal.
7. The System Integrator shall be the PCP System Integrator (See Section 16904, Item 1.01.B).

B. MCC ENCLOSURE

1. Furnish and install all equipment as shown on the drawings in 304 stainless steel enclosure with a custom-fitted NEMA 3RX 304 stainless steel weatherwrap. The weatherwrap shall have an additional bullet resistant steel plate on all the exterior surfaces to prevent damage from rifle shots. The motor control center shall include U/L 508A rating. Removable end plates on each end of the NEMA 3RX MCC structure shall cover all horizontal bus and horizontal wireway openings. Each section shall be equipped with two full metal side sheets to isolate each vertical section. All interior and exterior surfaces including weatherwrap, interior MCC structure, deadfront interior doors, separation barriers, mounting

backpans and mounting brackets shall be painted "White" using a polyester dry powder coating process on both the front and back sides. All metal shall be prepared with the following five-stage dip-tank preparation process: 1) Alkaline cleaner, 2) Clear water rinse, 3) Iron phosphate application, 4) Clear water rinse, and 5) Inhibitive rinse to seal phosphated surfaces. All unpainted parts shall be plates for corrosion resistance.

2. The MCC shall be of dead front construction and shall consist of one or more vertical sections bolted together to form a rigid, freestanding assembly. The systems shall be designed to allow for the addition of future sections at either end and to permit the interchanging of units. Vertical sections shall be rigid, free-standing structures and shall have internal mounting angles running continuously within the shipping block. Vertical sections shall be 90 inches high, 15 or 20 inches deep and 20 inches wide except where larger dimensions are required as shown on the drawings. Vertical sections shall be provided with a removable steel lifting angle on all shipping blocks. The angle shall run the length of the shipping block. Provide full depth horizontal wireways at the top and bottom of the MCC. The horizontal wireways shall be isolated from the bus. The horizontal wireways shall have removable covers held in place by captive screws. Provide a full height vertical wireway, independent of the plugin units, in each standard vertical section. The vertical wireway shall be isolated from the vertical and horizontal buses. The vertical wireway shall be covered with a hinged and secured door. Wireway tie bars shall be provided. Isolation between the wireway and units shall be provided.

3. The MCC shall include an 11 inch open space within the weatherwrap construction in front of the MCC dead front interior doors.

4. The MCC supplier shall custom-fabricate a metal roof that extends a minimum 42" from the outer-door of the structure. The roof shall be 304 stainless steel and shall be painted "White" and meet all powder-coating requirements above.

C. TERMINAL AND DISTRIBUTION BLOCKS

1. Distribution blocks shall be furnished and installed as required for "fan-out" of control power and other 120V sources within the enclosure. The blocks shall be rated 300V at a minimum of 20 amperes and sized for the conductors served. Distribution blocks shall be Allen-Bradley, Connectron or equal.

D. CIRCUIT BREAKERS

1. All 480 volt circuit breakers shall have minimum interrupting capacities at 50,000 amperes. All 120 volt breakers shall be rated 10,000 amperes interrupting capacity. Circuit breakers shall be of the indicating type, providing ON, OFF and TRIPPED positions of the operating handle. Circuit breakers shall be quick-make, quick-break, with a thermal-magnetic action. Circuit breakers shall be the bolted on type. The use of tandem or dual circuit breakers in a normal single-pole space to provide the number of poles or spaces specified is not acceptable. All multi-pole circuit breakers shall be designed so that an overload on one pole automatically causes all poles to open. Circuit breakers shall meet the

requirements of UL and NEMA AB l. Breakers shall be Cutler Hammer "F" Frame, QC no equal. All circuit breakers shall be heavy duty molded case circuit breakers conforming to Federal specification W-C-375B and shall be UL listed.

E. NAMEPLATES

1. Nameplates shall be black UV stable lamicoid with white lettering. Nameplates shall be mounted with stainless steel screws; glue-type is not acceptable.

F. CONTROL POWER TRANSFORMER

1. A control power transformer shall be furnished with primary and secondary fusing. The transformer shall be encapsulated with electrical grade epoxy and silica sand to completely seal the core and coils from moisture and contaminants. Transformer shall be designed for quiet operation, 180 deg. C insulation system standard with 115 deg. C temperature rise for longer, more reliable life. Transformer shall and meet or exceed all applicable NEMA, ANSI, OSHA, UL and CSA requirements. Control Power Transformers shall be ACME, Jefferson, or pre-approved equal.

G. DISTRIBUTION CIRCUIT BREAKERS

1. Distribution circuit breakers shall be supplied to provide independent control circuits internal to the Pump Control Panel. The distribution circuit breakers shall be mounted on a custom standoff and shall be accessible through the deadfront interior door without opening the interior door. The circuit breakers shall be arranged to utilize minimum enclosure space. Circuit breakers shall be bolted on type. Each circuit breaker shall be furnished with UV stable lamicoid nameplates. The distribution circuit breakers shall be Cutler-Hammer QC type.

H. PANEL LIGHTS

1. Furnish and install push-to-test LED lights to indicate status and alarm conditions locally as shown on drawings. Engraved roundel UV stable lamicoid nameplates shall specify each light's function. Lights shall be wired as shown on drawings. Panel lights shall be full voltage Allen Bradley 800H series.

I. PUSH-BUTTONS AND SELECTOR SWITCHES

1. Furnish and install push buttons and selector switches as shown on drawings. Engraved roundel UV stable lamicoid nameplates shall specify each light's function. Switches shall be wired as shown on drawings. Switches shall be full voltage Allen Bradley 800H series.

J. ELAPSED TIME METERS

1. Elapsed running time meter for recording total elapsed running time for each motor shall be six digits, non-resettable, recording in hours and tenths. Elapsed time meters shall be Redington or equal.

K. RECEPTACLES, DUPLEX

1. Receptacles shall be of specification grade and of NEMA configuration and rated 2 pole, 3 wire grounding, 20 amperes, 125 volts, such as Hubbell extra heavy duty industrial grade, Leviton, or equal. Bases shall be of ivory phenolic composition. Wire terminals shall be suitable for 10 AWG wire and shall be screw type. Receptacles shall be UL listed. The receptacles shall have corrosion resistant conducting parts of nickel-plated brass and other metal parts of stainless steel. All external and dead front receptacles shall be installed as ground fault interrupter circuits "GFCI".

L. RELAYS, CONTROL

1. Control relays shall Idec Type RR with energized LED indication. Two form-C 10A contacts (minimum) shall be provided on each relay.

M. RELAYS, POWER FAIL

1. The power fail relay shall continuously monitor the three phases for power loss, low voltage, phase loss, phase reversal and have automatic reset. The power fail monitor shall have a drop-out voltage adjustment and a failure indicating LED. Provide Timemark B269 or C269.

N. RELAYS, TIME DELAY

1. Time delay relays shall be solid state relays with a timer adjustable over the range 1 to 60 seconds unless other ranges are indicated or required. Provide LED relay energized indicator lamp. Time delay relays shall be 10 amp contact rating, Idec RTE or equal.

2.4 CONSTRUCTION

A. Structures shall be totally enclosed deadfront, free-standing assemblies. They shall be 90 inches high and 21 inches deep for front-mounted units. Structures shall contain a horizontal wireway at the top, isolated from the horizontal bus and shall be readily accessible through a hinged cover. Adequate space for conduit and wiring to enter the top or bottom shall be provided without structural interference.

B. Compartments for mounting control units shall be incrementally arranged such that not more than six (6) Size 1 starters for front-mounted only can be mounted within each vertical structure. Guide rails shall be provided.

C. A vertical wireway with minimum of 35 square inches of cross-sectional area shall be adjacent to each vertical unit and shall be covered by a hinged door. Wireways shall contain steel rod cable supports.

D. All full voltage starter units through NEMA Size 5 shall be of the drawout type. Drawout provisions shall include a positive guide rail system and stab shrouds to absolutely ensure alignment of stabs with the vertical bus. Drawout units shall have a tin-plated stab

assembly for connection to the vertical bus. No wiring to these stabs shall extend into the bus compartment. Interior of all units shall be painted white for increased visibility. Units shall be equipped with side-mounted, positive latch pull-apart type control terminal blocks rated 600 volts. Knockouts shall be provided for the addition of future terminal blocks. In addition, a master terminal block, when Type C wiring is specified, shall be drawout and shall be located in the top wireway, readily accessible through a hinged cover. All control wire to be 14 gauge minimum.

E. All drawout units shall be secured by a spring-loaded quarter turn indicating type fastening device located at the top front of the unit. Each unit compartment shall be provided with an individual front door.

F. An operating mechanism shall be mounted on the primary disconnect of each starter unit. It shall be mechanically interlocked with the unit door to prevent access unless the disconnect is in the OFF position. A defeater shall be provided to bypass this interlock. With the door open, an interlock shall be provided to prevent inadvertent closing of the disconnect. A second interlock shall be provided to prevent removal or reinsertion of the unit while in the ON position. Padlocking facilities shall be provided to positively lock the disconnect in the OFF position with from one (1) to three (3) padlocks with the door open or closed. In addition, means shall be provided to padlock the unit in a partially withdrawn position with the stabs free of the vertical bus.

2.5 BUS

A. Each structure shall contain a main horizontal copper tin-plated bus, with minimum ampacity as shown on the drawings. The horizontal bus shall be rated at 50 degrees C temperature rise over a 40 degree C ambient in compliance with UL standards. Vertical bus feeding unit compartments shall be copper tin plated and shall be securely bolted to the horizontal main bus. All joints shall be front-accessible for ease of maintenance. The vertical bus shall have a minimum rating of 300 amperes for front-mounted units and 600 amperes for back-to-back mounted units or fully rated.

B. The vertical bus shall be completely isolated and insulated by means of a labyrinth design barrier. It shall effectively isolate the vertical buses to prevent any fault-generated gases to pass from one phase to another. The vertical bus shall include a shutter mechanism to provide complete isolation of the vertical bus when a unit is removed.

C. Buses shall be braced for 65,000 amperes rms symmetrical.

D. A copper tin plated ground bus shall be furnished firmly secured to each vertical section structure and shall extend the entire length of the motor control center.

E. Each structure shall contain tin plated vertical ground bus rated 300 amperes. The vertical ground bus shall be directly connected to the horizontal ground bus via a tin-plated copper connector. Units shall connect to the vertical bus via a tin-plated copper stab.

2.6 WIRING/TERMINATIONS

A. Wiring shall be NEMA Class II, Type B.

2.7 MOTOR CONTROLLERS

A. Combination starter units shall be full-voltage non-reversing, unless otherwise shown, and shall utilize Cutler-Hammer circuit breaker type with electronic trip, or equal.

1. Each combination unit shall be rated minimum same as MCC AIC symmetrical at 480V. The circuit breaker shall be electronic with adjustable long time pick up and delay, adjustable short time pick up and delay, adjustable instantaneous settings, and comply with NEC requirements. All circuit breakers shall have a "tripped" position on the unit disconnect.

B. Motor Starters

1. Magnetic starters through NEMA Size 9 shall be equipped with double-break silver alloy contacts. The starter must have straight-through wiring. Each starter shall have one (1) NO auxiliary contact.

2. Coils shall be of molded construction through NEMA Size 9. All coils to be color-coded through size 5 and permanently marked with voltage, frequency and part number.

3. Solid-State Overload Relay

a. Provide a solid-state overload relay for protection of the motors. The relay shall be Cutler-Hammer type Motor Insight or approved equal.
b. The overload relay shall provide high accuracy through the use of state-of-the-art microelectronic packaging technology. The relay shall be suitable for application with NEMA Size 1 through Size 7 motor starters.
c. The overload relay shall be modular in design, be an integral part of a family of relays to provide a choice of levels of protection, be designed to directly replace existing electromechanical overload relays, and be listed under UL Standard 508.
d. The overload relay shall have the following features:
    a. Be self-powered
    b. Class 10 or 20 fixed tripping characteristics
    c. Manual or automatic reset
    c. Phase loss protection. The relay shall trip in 2 seconds or less under phase loss condition when applied to a fully loaded motor
    d. Visible trip indication
    e. One NO and one NC isolated auxiliary contact
    f. Test button that operates the normally closed contact
    g. Test trip function that trips both the NO and NC contacts
    h. A current adjustment range of 3.2:1 or greater
    i. Ambient temperature compensated

j. Ground fault protection. Relay shall trip at 50% of full load ampere setting

k. Jam/Stall protection. Relay shall trip at 400% of full load ampere setting, after inrush.

4. NEMA Size 1 through 2 starters shall be suitable for the addition of at least six (6) external auxiliary contacts of any arrangement normally open or normally closed. Size 3 through 8 starters shall be suitable for the addition of up to eight (8) external auxiliary contacts of any arrangement normally open or normally closed.

5. Motor starters shall be Cutler-Hammer Freedom Series, or equal by AB, SqD, GE.

C. Each starter shall be equipped with a fused control power transformer, two (2) indicating lights, start/stop and selector switches as shown on the drawings, elapsed time meter, pump current monitor CT and transmitter (see pump control panel specification), and two (2) NO contacts, unless otherwise scheduled on the drawings. Device panel to have space to accommodate six (6) oil tight pilot-control devices or indicating ammeters, voltmeters. Elapsed running time meter for recording total elapsed running time for each motor shall be six digit, non-reset, recording in hours and tenths. Meters shall be mounted to dead front door with stainless steel machine screws.

2.8 SOLID-STATE REDUCED-VOLTAGE MOTOR CONTROL

A. Solid State Reduced Voltage Motor Starter

1. Controller shall be Cutler-Hammer type S811+ or equal by SqD, AB, GE. Unit shall be rated for severe duty, 1.15SF motors.
2. The solid-state reduced-voltage starter shall be UL and CSA listed. The solid-state reduced-voltage starter shall be an integrated unit with power SCRs, logic board, paralleling bypass contactor, and electronic overload relay enclosed in a single molded housing.
3. The SCR-based power section shall consist of six (6) back-to-back SCRs and shall be rated for a minimum peak inverse voltage rating of 1500 volts PIV.
4. Units using triacs or SCR/diode combinations shall not be acceptable.
5. Resistor/capacitor snubber networks shall be used to prevent false firing of SCRs due to dV/dT effects.
6. The logic board shall be mounted for ease of testing, service and replacement. It shall have quick disconnect plug-in connectors for current transformer inputs, line and load voltage inputs and SCR gate firing output circuits.
7. The logic board shall be identical for all ampere ratings and voltage classes and shall be conformally coated to protect environmental concerns.

8. The paralleling run bypass contactor shall energize when the motor reaches 90% of full speed and close/open under one (1) times motor current.
9. The paralleling run bypass contactor shall utilize an intelligent coil controller to limit contact bounce and optimize coil voltage during varying system conditions.
10. The coil shall have a lifetime warranty.
11. Starter shall be provided with electronic overload protection as standard and shall be based on inverse time-current algorithm. Overload protection shall be capable of being disabled during ramp start for long acceleration loads via a DIP switch setting on the device keypad.
12. Overload protection shall be adjusted via the device keypad and shall have a motor full load ampere adjustment from 30 to 100% of the maximum continuous ampere rating of the starter.
13. Starter shall have selectable overload class setting of 5, 10, 20 or 30 via a DIP switch setting on the device keypad.
14. Starter shall be capable of either an electronic or mechanical reset after a fault.
15. Units using bimetal overload relays are not acceptable.
16. Overtemperature protection (on heat sink) shall be standard.
17. Starters shall provide protection against improper line-side phase rotation as standard. Starter will shut down if a line-side phase rotation other than A-B-C exists. This feature can be disabled via a DIP switch on the device keypad.
18. Starters shall provide protection against a phase loss or unbalance condition as standard. Starter will shut down if a 50% current differential between any two phases is encountered. This feature can be disabled via a DIP switch on the device keypad.
19. Start shall provide protection against a motor stall condition as standard. This feature can be disabled via a DIP switch on the device keypad.
20. Starter shall provide protection against a motor jam condition as standard. This feature can be disabled via a DIP switch on the device keypad.
21. Starter shall be provided with a Form C normally open (NO), normally closed (NC) contact that shall change state when a fault condition exists. Contacts shall be rated 60 VA (resistive load) and 20 VA (inductive load). In addition, an LED display on the device keypad shall indicate type of fault (Overtemperature, Phase Loss, Jam, Stall, Phase Reversal and Overload).
22. The following control function adjustments on the device keypad are required:
    a. Selectable Torque Ramp Start or Current Limit Start
    b. Adjustable Kick Start Time: 0-2 seconds
    c. Adjustable Kick Start Torque: 0-85%
    d. Adjustable Ramp Start Time: 0.5-180 seconds
    e. Adjustable Initial Starting Ramp Torque: 0-85%
    f. Adjustable Smooth Stop Ramp Time: 0-60 seconds.
23. Units enclosed in motor control centers shall be of the same manufacturer as that of the circuit breaker and motor control center for coordination and design issues.
24. Unit shall be severe duty rated for continuous operation on 1.15SF motor. Maximum continuous rating shall be at 115% of continuous ampere rating.
25. Provide starter with pump control option to allow soft stopping the motor.

26. Unit shall have a Digital Interface Module (DIM) for configuration, testing and maintenance and for display of motor data, current, volts, etc. Default setting shall display motor amps, volts.
27. Unit shall have a communication port. The communication port shall support the Modbus protocol.

2.9 OVERCURRENT DEVICES

A. Circuit Breakers

1. Individual feeder breakers shall have a minimum interrupting capacity of 65 kAIC at rated voltage or as scheduled on the drawings.

2.10 ENCLOSURES

A. Enclosure shall be in accordance with NEMA standards and shall be as specified in Item 2.3.B.

2.11 NAMEPLATES

A. Each unit will have a 1.0 x 2.5-inch engraved nameplate. The lettering shall be black 3/16-inch high, on a white background.

2.12 FINISH

A. Finish shall be as specified in Item 2.3.B.

B. The control center finish shall pass 600 hours of corrosion-resistance testing per ASTM B 117.

2.13 SPARE PARTS

A. Provide one (1) spare solid-state overload relay for each motor size. Ship in crated box for storage.

B. 1 - contactor coil and one set of power contacts for each size used.

C. 2 - spare set of N.O. contacts on each motor Starter

2.14 CUSTOMER METERING

A. Provide customer metering devices "PQM" – power quality meter, where shown on the drawings. Provide a separate customer metering compartment with front hinged door and include the following:

1. Current transformers wired to shorting terminal blocks.

2. Potential transformers including primary and secondary fuses with disconnecting means.
3. The Normal source meter shall be microprocessor based Eaton IQ260, backlit graphic display, or equal by SqD. The meter shall provide a programmable output contact to the Scada PLC indicating a system "Healthy Voltage Supply".
4. Power metering to measure incoming power, KW, KVAR, power factor, amps, volts, etc., 0.5% FS, 1% revenue accuracy. Unit shall have an Ethernet port and communicate Modbus. Provide meter along with all ancillary wiring, and circuit fuse protection.
5. 128 KB memory for logging up to 8 parameters, every 15 minutes, for 30 days.

2.15 INCOMING FEEDER SECTION-- BREAKER, ATS-1, SPD, & MISC.

A. General:
   1. Provide as shown on the drawings.
   2. All equipment shall fit in the allotted space shown on the drawings

B. ATS-1: Provide per specification 16496.

C. SPD: Provide per Specification section 16671.

2.16 MOTORS EQUIPPED WITH THERMAL OVERLOAD SWITCHES

A. Wire overload switch in series with motor overload relay to shut motor down in event of over temperature. Make provisions for the over temperature switch, even if it is not shown on the control schematic drawings.

2.17 MISCELLANEOUS DEVICES

A. Provide a 120VAC space heater and adjustable thermostat in each vertical section.

B. Provide auxiliary contacts on MCC starter breakers to indicate Open/Closed position.

2.18 SYSTEM PROTECTIVE DEVICE STUDIES:

A. MCC-1 manufacturer scope of work shall include the required Studies. The studies shall include the 480V circuit breaker trip settings, and for trip settings at all equipment (entire station) furnished under this contract. The studies shall include station operation under both Utility power and Generator power sources. In particular, at the following locations:

   1. MCC -1 and associated loads.

   2. Coordination with all downstream 480V panelboards etc. MCC-1 manufacturer shall provide a complete short circuit study and protective device coordination

study for the entire electrical distribution system. This manufacturer shall obtain short circuit availability from the Utility, Utility installed 15kv protective devices i.e. pole top fusing, transformer size and impedances, service entrance cabling, and generate protective settings for all plant equipment. The study shall include Utility and Generator sources of power. Data collection for the study shall be the responsibility of the Contractor. The study shall utilize the generator furnished on the project.

B. The study shall include development of single-line and impedance diagrams of the power system. Diagrams shall identify components considered in the study and the ratings of power devices, including transformers, circuit breakers, relays, fuses, busses, and cables. The resistances, and reactances of cables shall be identified in the impedance diagram. The study shall contain written data from the electric utility company regarding maximum available short circuit current, voltage, and X/R ratio of the utility power system. The study shall include every protective device and feeders included in the contract. The first upstream overcurrent device outside the contract shall be used as a fixed reference. The studies shall include as a minimum the following components:

1. Executive Summary: A synopsis of key findings and recommendations.

2. One Line Diagram: A model for the entire electrical system which forms the basis for the study.

3. Short Circuit Analysis: Calculate available fault current for each piece of electrical distribution equipment in the station and a table to compare fault level with equipment ratings.

4. Protective Device Coordination Study: Model each protective device and its recommended set points.

5. Settings Table: A list of recommended settings for circuit breakers and relays.

6. Arc Flash Incident Energy Analysis: Used to generate arc flash warning labels showing nominal system voltage, and arc flash boundaries, as well as available incident energy and/or PPE category.

7. Input Data Used in Analysis: A reference to the data on which the study is based.

C. The short circuit study shall be performed with the aid of a digital computer program, and shall be in accordance with:

1.	ANSI/IEEE 141	Recommended Practice for Electrical Power Distribution for Industrial Plants
2.	ANSI/IEEE 242	Recommended Practice for Protection, and Coordination of Industrial, and Commercial Power Systems
3.	ANSI/IEEE C 37.010	Application Guide for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis

4. ANSI/IEEE C 37.13 Low-Voltage AC Power Circuit Breakers Used in Enclosures

D. A protective device evaluation study shall be performed to determine the adequacy of circuit breakers, molded case switches, and fuses. Any problem areas or inadequacies in the equipment due to prospective short-circuit currents shall be promptly brought to the ENGINEER's attention. Do not utilize series rated circuit breakers to meet short circuit requirements for this project. Devices shall be fully rated to withstand available fault currents.

E. As a minimum, the time/current coordination curves for the power distribution system shall include the following on 5-cycle log-log graph paper:

1. Time/current curves for each protective relay, circuit breaker, or fuse showing graphically that the settings will provide protection and selectivity within industry standards. Each curve shall be identified, and tap and time dial settings shall be specified. Provide individual curves for each feeder unless identical to others.

2. Time/current curves for each device shall be positioned to provide the maximum selectivity to minimize system disturbances during fault clearing. Where selectivity cannot be achieved, the ENGINEER shall be notified as to the cause. Recommendations shall be included for alternate methods that would improve selectivity.

3. Time/current curves and points for cable and equipment damage.

4. Circuit interrupting device operating and interrupting times.

5. Indicate maximum fault values on the graph.

6. Sketch of bus and breaker arrangement.

7. Magnetizing inrush points of transformers.

8. Thermal limits of dry type and liquid insulated transformers. (ANSI damage curve).

9. Every restriction of the ANSI and National Electrical Code shall be followed, and proper coordination intervals and separation of characteristics curves shall be maintained.

F. Submit coordination settings, curves, calculations for Engineer approval. The Report shall be submitted and approved prior to final approval of the distribution equipment Shop Drawings and release of equipment for manufacture. Approval from the ENGINEER shall be obtained to ensure that equipment withstand and interruption ratings will be adequate. The Report shall be approved by the ENGINEER prior to releasing distribution equipment for manufacture.

G. The Report shall be performed and stamped by a registered Louisiana licensed professional electrical engineer.

H. Arc Flash Study: An arc flash study shall be performed with the aid of a digital computer program to determine the "Arc Flash Protection Boundary" and "Personal Protective Equipment" (PPE) level for all applicable electrical equipment in the power distribution system. The arc flash study shall be performed in conjunction with short circuit calculations and protective device coordination. The arc flash study shall be in accordance with the latest version of:

NFPA 70E	Standard for Electrical Safety Requirements for Employee Workplaces
IEEE 1584	IEEE guide for performing Arc Flash Hazard Calculations
OSHA (29 CFR PART 1910)	Occupational Safety and Health Standards for General Industry
ANSI Z535.4	Product Safety Signs and Labels

The recommended values for the "Arc Flash Protection Boundary" and PPE levels, based on the arc flash study results, shall be tabulated in the report. The digital computer program shall provide the "Arc Flash Protection Boundary" and PPE values in a format that can be directly printed on to labels. The CONTRACTOR shall provide and install these labels on the Contractor furnished equipment in accordance with Section 16010 – Electrical Work - General.

The Utility company typically furnishes 2 sets of fault data:

1. Based on infinite bus and lowest acceptable transformer impedance.

2. Based on infinite bus and highest acceptable transformer impedance.

Equipment fault protection shall be based on item 1 above. Arc flash energy shall be calculated using both item 1 and 2 above. The higher value of arc flash energy shall be used for electrical worker protection.

I. Report:

The results of the power system studies shall be summarized in a final Report. Eight bound copies of the Report shall be submitted. Manufacturer shall provide a six copies of entire study in both hard copy and on electronic copy. Submit short circuit and coordination software program for engineer approval prior to commencing study. Program used shall be in common use by consulting electrical engineers. The Report shall include Single-line

diagram, Impedance diagram, Tabulation of all protective devices identified on the single line diagram, Time/current coordination curves, specific recommendations, if any. The final report shall also include a soft copy of the report database, all associated electronic files used in the report generation, and all files generated by the Report program.

J. The Protective Device Study shall be approved by the Engineer prior to the release to manufacturing of MCC-1 and the StandBy power system Genset.

2.19 MOTOR CONTROL CENTER LABELING

A. All labels shall include manufacturer name, voltage, current, AIC rating etc. – i.e. all data relevant to the manufactured equipment.

B. The manufacturer shall provide markings and labels as required by NEC Article 110, in particular items 110.21 Marking; Item 110.22 Identification and disconnecting means; 110.24 Available Fault current.

C. The manufacturer shall provide and install Arc Flash Hazard labels per study item 2.18 this specification.

PART 3 EXECUTION

3.1 FACTORY TESTING

A. The motor control centers shall have been tested in a high-power laboratory to prove adequate mechanical and electrical capabilities.

B. All factory tests required by the latest ANSI, NEMA and UL standards shall be performed.

C. A certified test report of all standard production tests shall be available to the ENGINEER upon request.

D. Factory tests as outlined above may be witnessed by the owner's representative.

1. The manufacturer shall notify the owner two (2) weeks prior to the date the tests are to be performed.

2. The manufacturer shall include the cost of transportation and lodging for up to three (3) owner's representatives. The cost of meals and incidental expenses shall be the owner's responsibility.

E. All capacitors shall be tested in compliance with NEMA, ANSI, UL and CSA requirements for capacitance, dissipation factor, terminal-to-terminal and terminal-to-case dielectric strength and terminal-to-case dielectric strength.

3.2 FIELD QUALITY CONTROL

A. Provide the services of a qualified factory-trained manufacturer's representative to assist the CONTRACTOR in installation and startup of the equipment specified under this section. The manufacturer's representative shall provide technical direction and assistance to the CONTRACTOR in general assembly of the equipment, connections and adjustments, and testing of the assembly and components contained therein.

B. The following minimum work shall be performed by the CONTRACTOR under the technical direction of the manufacturer's service representative:

1. Rig the MCC assembly into final location and install on level surface.
2. Check all removable cells and starter units for easy removal and insertion.
3. Perform insulation tests on each phase and verify low-resistance ground connection on ground bus.
4. Connect all power wiring and control wiring and verify basic operation of each starter from control power source.
5. Torque all bolted connections made in the field and verify all factory bolted connections.
6. Calibrate any solid-state metering or control relays for their intended purpose and make written notations of adjustments on record drawings. Perform startup of any solid-state starters and adjustable frequency drives.

C. The CONTRACTOR shall provide three (3) copies of the manufacturer's field startup report.

3.3 MANUFACTURER'S CERTIFICATION

A. A qualified factory-trained manufacturer's representative shall certify in writing that the equipment has been installed, adjusted and tested in accordance with the manufacturer's recommendations. Equipment shall be inspected prior to the generation of any reports.

B. The CONTRACTOR shall provide three (3) copies of the manufacturer's representative's certification.

3.4 TRAINING

A. The CONTRACTOR shall provide a training session for up to six (6) owner's representatives for 1 – 4 hour normal workdays at the jobsite or other office location chosen by the owner.

B. The training session shall be conducted by a manufacturer's qualified representative.

C. The training program shall consist of the following:

1. Review of the MCC one-line drawings and schedules
2. Review of the factory record shop drawings and placement of the various cells.
3. Review of each type of starter cell, components within, control, and power wiring.
4. Review contactor coil replacement and contact replacement procedures.
5. Discuss the maintenance timetable and procedures to be followed in an ongoing maintenance program.
6. Provide three-ring binders to participants complete with copies of drawings and other course material covered.

3.5 EXAMINATION

A. Installing CONTRACTOR to fully inspect shipments for damage and report damage to manufacturer and file claim upon shipper, if necessary.

B. Overload relay heater ratings must be properly sized and coordinated for each motor starter unit.

C. Installing CONTRACTOR to verify NEC clearances as dictated on the contract drawings prior to installation. Verify UL labeling of the assembly prior to installation.

3.6 INSTALLATION

A. CONTRACTOR to follow the installation instructions supplied by the manufacturer.

B. Control wiring shall be as shown on the contract drawings except as modified by the approval and submittal process. Interface all local and remote devices into the control wiring and operational systems for each load.

3.7 FIELD ADJUSTMENTS

A. Follow the manufacturer's instructions and the contract documents concerning any short-circuit device settings, heater selection, timing relays, or startup of components.

3.8 FIELD TESTING

A. Follow the minimum requirements as stipulated in the NETA testing procedure for this type of motor control center assembly.

B. Check motor nameplates for correct phase and voltage. Check bearings for proper lubrication.

C. Check the ampere rating of thermal overloads for motors and submit a typed record to the Engineer of same, including MCC cubicle location and load designation, motor service factor, horsepower, full load current and starting code letter. If inconsistencies are found, new thermal elements shall be supplied and installed.

D. Check rotation of motors prior to energization. Disconnect driven equipment if damage could occur due to wrong rotation. If it rotates in the wrong direction, correct it.

E. Check interlocking, control and instrument wiring for each system and/or part of a system to prove that the system will function properly as indicated by schematic and wiring diagrams.

F. Verify all terminations at transformers, equipment, panels and enclosures by producing a 1 2 3 rotation on a phase sequenced motor when connected to "A", "B" and "C" phases.

G. Testing shall be scheduled and coordinated with the Engineer at least two weeks in advance. Provide qualified test personnel, instruments and test equipment.

H. Make the above tests and checks prior to energizing electrical equipment. Submit test reports upon completion in accordance with Section 01300.

I. Test and calibrate all protective relays, circuit breakers, having an adjustable setting.

J. Test and document all soft start settings.

K. Generate a Field Report on tests performed, test values experienced, etc., and make available to Owner.

L. Provide services of MCC manufacturer's field engineer, to perform start up services with Pump Control Panel System Supplier. The representative from the MCC manufacturer and the pump control panel System Supplier shall be on site at the same time to perform start up services. The MCC manufacturer's representative shall remain on site for as long as it takes to perform complete start up services for a fully functioning system.

3.9 PAYMENT

Payment for the work under this section will be made under:

Item	Description	Unit Price
NS-13	VFD Drive	Lump Sum

END OF SECTION 16482

SECTION 16485

LOCAL CONTROL STATIONS AND MISCELLANEOUS ELECTRICAL DEVICES

PART 1: GENERAL

1.1 THE REQUIREMENT

The CONTRACTOR shall provide complete local control stations as indicated herein or in other Sections of the Specifications

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

Local control panels shall comply with the requirements of NEC, NEMA, and UL.

1.3 CONTRACTOR SUBMITTALS

Furnish Shop Drawings in accordance with Sections 01300 - Contractor Submittals and 16010 - Electrical Work, General.

A. Ladder diagrams and written descriptions explaining ladder diagram operation and system operation.

B. Include catalog cuts of all control equipment including enclosures, overcurrent devices, relays, pilot devices, terminations, and wire troughs.

PART 2: PRODUCTS

2.1 GENERAL

A. All items shall be furnished by the Contractor.

B. The CONTRACTOR shall provide the stations to satisfy the functional requirements in the relevant mechanical equipment and Instrumentation & Control specifications and the Electrical Elementary Schematics. Each station shall be fabricated with UL labeled components. Stations not specifically indicated as being WORK of other Sections shall be provided under this Section. All stations shall be wired under this Section.

C. The controls shall be 120 V maximum. Where the electrical power supply is 240 V, single phase or 480 V, 3 phase, the station shall be provided with a fused control power transformer. Control conductors shall be provided in accordance with Section 16120.

D. Each station shall be provided with identified terminal strips for the connection of external conductors. The CONTRACTOR shall provide sufficient terminal blocks to connect 25 percent additional conductors for future use. Termination points shall be identified in accordance with Shop Drawings. The stations shall be the source of power for all 120 VAC solenoid valves interconnected with the stations. All equipment

associated with the stations shall be ready for service after connection of conductors to equipment, controls, and stations.

E. Wiring to door-mounted devices shall be extra flexible and anchored to doors using wire anchors cemented in place. Exposed terminals of door-mounted devices shall be guarded to prevent accidental personnel contact with energized terminals.

F. Enclosures

1. In HVAC conditioned finished rooms, enclosures shall be NEMA 12 steel enclosures painted with ANSI 61 exterior and white interior.

2. In all other non-hazardous areas, enclosures shall be NEMA 4X 316 stainless steel (prior to modifications) with brushed finish. Where possible, penetrations shall be made in such a manner to maintain the NEMA 4X rating. If this is not possible, the penetrations shall be made in such a manner to minimize entry of foreign materials into the enclosure.

3. In hazardous areas, enclosures shall be cast aluminum NEMA 7 and shall be UL listed for use in hazardous or classified locations. Where allowable per NEC, enclosure may be NEMA 4X stainless steel with hermetically sealed contacts.

4. Enclosures shall be freestanding, pedestal-mounted, or equipment skid-mounted, as indicated. Internal control components shall be mounted on a removable mounting pan. Mounting pan shall be finished white.

5. Outdoor mounted enclosures shall be provided with thermostatically-controlled heaters.

6. Provide breather/drain fittings mounted to bottom of enclosure for draining condensation.

7. Provide breather/drain fittings at all low points in conduit runs.

G. Identification of panel-mounted devices, conductors, and electrical components shall be in accordance with Section 16055.

H. Panel-mounted devices shall be mounted a minimum of 3-feet above finished floor elevation, and above flood level for equipment mounted at grade.

2.2 STATION COMPONENTS

A. The Contractor shall furnish and install pushbuttons stations, selector switch stations, and pilot light stations, etc, that are remote from the motor control centers and not furnished as part of another system.

B. Pushbuttons, selector switches, and pilot lights shall be the heavy-duty, oil-tight type, sized to 30 mm, with NEMA enclosures, of the type as required in these specifications, or approved equal. Miniature style devices are not acceptable. Devices shall be as manufactured by Allen Bradley, Eaton, or approved equal. Devices shall be rated for

intended application, e.g. the amp contact rating shall be suitable for repeated use at it's intended load rating.

1. Lens colors shall be red for "stopped," "closed," or "off; green for "run,"; "open," or "on"; and amber for alarm.
2. Pilot lights shall be low voltage, LED, push-to-test type.
3. Devices located in "wet" locations shall be NEMA4X 316ss or NEMA 7. Provide hazardous location type pilot devices in classified locations.
4. All device contacts shall be hermetically sealed type, and fully rated for the application, as manufactured by AB or approved equal.

C. Relays shall be 3 PDT with 10 amp contacts, plug-in type utilizing rectangular blades and provided with sockets for screw-type termination and hold-down clips. Relays shall be as manufactured by Square D, Potter Brumfield, or equal.

D. Elapsed time meters shall be non-resettable type, read to a maximum of 99999.9 hours and shall be as manufactured by G.E., Eaton Electrical, or equal.

E. Starters:
The Contractor shall furnish and install all combination full-voltage magnetic starters with circuit breaker that are not furnished as part of another system. The motor starters shall match existing MCC starters. Each motor starter shall have three overcurrent heaters, a 120 volt control transformer, and an enclosure of the type required by these Specifications.

F. Magnetic starters shall be:
1. NEMA rated. IEC or dual NEMA/IEC rated type are not acceptable.
2. FVNR type unless indicated otherwise.
3. Combination starters with magnetic only instantaneous trip circuit breakers such as Eaton Electrical "MCP," SqD" or equal.
4. Control transformers shall be provided with primary and secondary fuses, 120 V maximum control voltage.

G. Manual Starters:

Manual starters shall be suitable for the voltage and number of phase shown on the Drawings and shall be non-reversing, reversing or two speed type as shown on the Drawings. NEMA sizes shall be as required for the horsepowers shown on the Drawings. Manual starters shall have motor overload protection in each phase. Enclosures shall NEMA 4X 316 stainless steel enclosures, where indicated on the drawings and corrosion resistant compression molded fiberglass reinforced polyester in sodium hypochlorite chemical feed room. Manual motor starters shall be as manufactured by the Square D Co. or equal.

H. Terminal strips shall be provided for all panels and shall be the flanged fork or ring lug type suitable for No. 12 AWG stranded wire minimum. Provide 25 percent spare terminals in each panel.

I. Current-to-current converter/isolators shall be 4 - 20 mA input, 4 - 20 mA output for operation from 120 V power, and shall be by Moore, A.G.M., or equal.

J. Process alarm relays shall have a 4 - 20 mA input and 2 independent SPST contact outputs as manufactured by A.G.M., or equal. Power input shall be 120 V.

K. Digital indicators shall have 4 - 20 mA input and shall display the signal in process units. Zero to 100 percent as a displayed signal shall only be acceptable to indicate speed. Indicators shall be as manufactured by Newport, Red Lion, or equal, for operation from 120 V. Provide splash-proof covers in NEMA 4X panels, and viewing windows in NEMA 7 panels.

L. Time delay relays shall be combination on delay and off delay (selectable) with adjustable timing ranges. Provide socket with screw terminal connections and retaining strap. Time delay relays shall be Square D JCK70 or similar by ATC.

2.3 MISCELLANEOUS CONTROLS

C. Provide all miscellaneous controls panels not listed elsewhere in Division 16 as shown on the drawings.

B. Panels shall be NEMA 4X 316ss with hinged door, and backplane.

2.4 POWER DISTRIBUTION BLOCKS

A. Provide insulated power distribution terminal blocks at all distribution Junction Boxes as called for in the drawings. .

B. The insulated power distribution block shall be tin plated copper, 600VAC, ampere rating equivalent to 75 degreeC copper wire NEC table 310-16, 1 or 2 conductor in, multiple conductor out as per drawings, number of poles as shown on the drawings, polycarbonate clear safety cover, end barrier, Ferraz Shawmut catalog 68000 or approved equal. Mount power distribution blocks on JB backplane. All wiring shall be neatly bundled, strapped, tied down inside the JB, All circuits shall be ID and tagged.

C. All power distribution terminal blocks shall have 25% spare capacity (minimum 3 spare taps per phase of equal amperage to largest distribution tap) to add additional loads.

D. The power distribution terminal blocks shall be mounted in appropriately rated enclosure for the area. The enclosure shall have bolt on cover, back plane for mounting power distribution terminal blocks, and "Danger 480Volts Electrical" sign on cover.

2.5 CONTROL TERMINAL BLOCKS

A. Terminal blocks shall be 600 volt, channel mounted, tin plated, with tubular screw and pressure plate, 30amp, 600VAC rating.

B. Provide terminal blocks as required by function, i.e. finger safe blocks, fuse blocks, pill apart blocks, ground, etc.

B. Terminal blocks shall be Bulletin 1492 as manufactured by the Allen-Bradley Co., Square D or equal.

2.6 UNINTERRUPTIBLE POWER SUPPLY

A. UPS: Provide UPS systems where shown on the drawings.

1. All UPS systems shall be rated at a minimum of 150% of their connected loads. The UPS system shall carry its rated output (at 100% load factor) for a minimum of 30 minutes, in the absence of input power. The UPS system shall support all equipment to insure that the entire control system stays on-line in the event of total loss of plant power. Provide a power analysis of all connected loads (with allowance for future) and run a UPS sizing calculation. Submit to Engineer for approval. UPS size shall be the greater of size shown on the drawings or as calculated.
2. Provide an alarm and fault contact output on the UPS. Wire alarm and fault contact to the PLCs. Provide audible alarm for UPS alarm or fault.
3. Provide UPS indicators for battery charge, surge suppression protection, and operating status.
4. Provide software to communicate with the UPS to run diagnostics on UPS. Load software on portable laptop and on main system computer.
5. UPS shall have voltage regulation to prevent unnecessary switching to battery for minor voltage variations. Input voltage range shall be minimum (82-144) VAC. The UPS shall have a Trim and Boost feature and a voltage sensitivity adjustment.
6. The UPS shall not be sensitive to input voltage distortion. Provide an adjustment to change this sensitivity.
7. UPS shall be suitable for loads served as shown on the drawings. Transfer of power shall be seamless between normal power and UPS power. Loads shall not be interrupted during transfer process.
8. Provide a network interface card on the UPS. Wire the network interface card to the closest switch and display all UPS diagnostic data on the main system HMI.
9. UPS shall be double conversion design such that there is zero transfer time when switching between battery and on-line power.
10. UPS shall have a 3 year warranty.
11. UPS Shall be Eaton, Minuteman or approved equal.

2.7 POWER SUPPLIES

Power Supplies: Power supplies shall be Sola with noise filters. Provide auxiliary form C contact for alarm. Wire to PLC input.

2.8 SPARE PARTS

Provide a minimum of 10 percent spare lamps (minimum 2) and one spare lens for each color pilot lamp in each panel.

PART 3: EXECUTION

3.1 INSTALLATION

A. Stations shall be installed in accordance with in Section 16010 and in accordance with the manufacturer's recommendations.

B. Stations shall be protected at the site from loss, damage, and the effects of weather. Stations shall be stored in an indoor, dry location. Heating shall be provided in areas subject to corrosion and humidity.

C. Station interiors and exteriors shall be cleaned, and coatings shall be touched up to match original finish upon completion of the WORK.

D. Conduit, conductors, and terminations shall be installed in accordance with Section 16010.

E. Mounting Stands

Field mounted disconnects, pushbutton control stations, etc, shall be mounted on steel stands, or hot dipped galvanized after fabrication 4"channel @ 7.25# with ½" plate welded to the bottom of the channel for bolting to a flat surface. Where clearance requirements for stands may not be maintained, the Engineer may direct equipment to be wall-mounted adjacent to the drive. The distance from the drive motor to the control station shall not exceed three feet, unless shown otherwise on the drawings.

3.2 FIELD TESTING

Each station shall be tested again for functional operation in the field after the connection of external conductors and prior to equipment startup.

3.3 PAYMENT

Payment for the work under this section will be made under:

Item	Description	Unit Price
NS-13	VFD Drive	Lump Sum

END OF SECTION 16485

SECTION 16496

LOW VOLTAGE AUTOMATIC TRANSFER SWITCH (ATS -1)

PART 1 GENERAL

1.01 SCOPE

A. Furnish and install automatic delayed transition transfer switch (DTTS) with number of poles, amperage, voltage, and withstand current ratings as shown on the plans. Each DTTS system shall consist of a delayed transition transfer switch. All DTTS and control modules shall be the product of the same manufacturer. The transfer switch shall be located as shown on the Drawings.

B. The DTTS shall transfer the load in delayed transition (break-before-make) mode. Transfer is accomplished with a user-defined interruption period in both directions adjustable from 1 second to 5 minutes in at least 15 increments.

C. The transfer switch manufacturer shall coordinate with the generator manufacturer as specified under Section 16426, Emergency Generator Set Modifications, such that the generator, and transfer switch shall operate as an integrated system.

1.02 CODES AND STANDARDS

The automatic delayed transition transfer & bypass-isolation switches and accessories shall conform to the requirements of:

A. UL 1008 - Standard for Transfer Switch Equipment

B. IEC 947-6-1 Low-voltage Switchgear and Controlgear; Multifunction equipment; Automatic Transfer Switching Equipment

C. NFPA 70 - National Electrical Code

D. NFPA 99 - Essential Electrical Systems for Health Care Facilities

E. NFPA 110 - Emergency and Standby Power Systems

F. IEEE Standard 446 - IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications

G. NEMA Standard ICS10-1993 (formerly ICS2-447) - AC Automatic Transfer Switches

H. UL 508 Industrial Control Equipment

1.03 RELATED SECTIONS

A. Section 16426 – Standby Power System Genset

B. Section 16429 – Load Bank
C. Section 16482 – Motor Control Centers
D. Section 16671 – SPD
E. Section 16950 – Electrical Tests
F. The Standby Power System Genset and the Automatic Transfer Switch (ATS-1) manufacturers provide documentation that demonstrate start signal compatibility between the specific models of Generator and ATS per code requirements of NEC 2017 and TIA 17-17

1.04 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Provide catalog sheets showing voltage, switch size, ratings and size of switching and overcurrent protective devices, operating logic, short circuit ratings, dimensions, and enclosure details.

G. Shop Drawings: Provide drawings for all switches.

1.05 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Submittals for information.

B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.06 SUBMITTALS FOR CLOSEOUT

A. Section 01700 - Contract Closeout: : 01720 – Project Record Documernts: 01730 - Operation and Maintenance Data: Procedures for submittals.

B. Operation Data: Instructions for operating equipment under emergency conditions.

C. Maintenance Data: Routine preventative maintenance and lubrication schedule. List special tools, maintenance materials, and replacement parts.

1.08 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience, and with service facilities within 100 miles of Project.

C. Supplier Qualifications: Authorized distributor of specified manufacturer with minimum

five years documented experience.

D. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.09 ACCEPTABLE MANUFACTURERS
Automatic delayed transition transfer switches shall be ASCO Series 7000 or transfer switches of equal rating by Cummins, Eaton.

PART 2 PRODUCTS

2.01 RATINGS
The transfer switches shall be 480VAC automatic delayed transition transfer switch (DTTS) with number of poles, amperage, voltage, and withstand current ratings as shown on the plans. Minimum transfer switch frame size shall be 600amps. All transfer switches shall be rated at 50KA WCR, and 35KA WCR, at 18 Hertz short time duration.

2.02 MECHANICALLY HELD TRANSFER SWITCH

A. The transfer switch unit shall be electrically operated and mechanically held. The electrical operator shall be a solenoid mechanism, momentarily energized. The transfer switch unit shall include both electrical and mechanical interlocks to prevent both sets of main contacts from being closed at the same time. Main operators which include overcurrent disconnect devices OR do not include electrical and mechanical interlocks will not be accepted.

B. All transfer switch sizes shall use only one type of main operator for ease of maintenance and commonality of parts.

C. The switch shall be positively locked and unaffected by momentary outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized for maximum reliability and operating life.

D. All main contacts shall be silver composition. Switches rated 600 amperes and above shall have segmented, blow-on construction for high withstand and close-on capability and be protected by separate arcing contacts.

E. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. Switches rated 600 amps and higher shall have front removable and replaceable contacts. All stationary and moveable contacts shall be replaceable without removing power conductors and/or bus bars.

F. Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof, which are not intended for continuous duty, repetitive switching or transfer between two active power sources are not acceptable.

H. Where neutral conductors are to be solidly connected as shown on the plans, a neutral conductor plate with fully rated AL-CU pressure connectors shall be provided.

2.03 MICROPROCESSOR CONTROLLER

A. The controller's sensing and logic shall be provided by a single built-in microprocessor for maximum reliability, minimum maintenance, and the ability to communicate serially through an optional serial communication module.

B. A single controller shall provide twelve selectable nominal voltages for maximum application flexibility and minimal spare part requirements. Voltage sensing shall be true RMS type and shall be accurate to ± 1% of nominal voltage. Frequency sensing shall be accurate to ± 0.2%. The panel shall be capable of operating over a temperature range of -20 to +60 degrees C and storage from -55 to +85 degrees C.

C. The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance. Sensing and control logic shall be provided on multi-layer printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers. The panel shall be enclosed with a protective cover and be mounted separately from the transfer switch unit for safety and ease of maintenance. The protective cover shall include a built-in pocket for storage of the operator's manuals.

D. All customer connections shall be wired to a common terminal block to simplify field-wiring connections.

E. The controller shall meet or exceed the requirements for Electromagnetic Compatibility (EMC) as follows:

1.	EN 55011:1991	Emission standard - Group 1, Class A
2.	EN 50082-2:1995	Generic immunity standard, from which:
3.	EN 61000-4-2:1995	Electrostatic discharge (ESD) immunity
4.	ENV 50140:1993	Radiated Electro-Magnetic field immunity
5.	EN 61000-4-4:1995	Electrical fast transient (EFT) immunity
6.	EN 61000-4-5:1995	Surge transient immunity
7.	EN 61000-4-6:1996	Conducted Radio-Frequency field immunity

8. IEEE472 (ANSI C37.90A) Ring Wave Test.

2.04 ENCLOSURE

A. The DTTS shall be mounted in MCC-1.

B. All standard and optional door-mounted switches and pilot lights shall be 16-mm industrial grade type or equivalent for easy viewing & replacement. Door controls shall be provided on a separate removable plate, which can be supplied loose for open type units.

2.05 CONTROLLER DISPLAY AND KEYPAD

A. A four line, 20 character LCD display and keypad shall be an integral part of the controller for viewing all available data and setting desired operational parameters. Operational parameters shall also be available for viewing and limited control through the serial communications input port. The following parameters shall only be adjustable via DIP switches on the controller:

1. Nominal line voltage and frequency
2. Single or three phase sensing
3. Operating parameter protection
4. Transfer operating mode configuration
   (Open transition, Closed transition or Delayed transition)

All instructions and controller settings shall be easily accessible, readable and accomplished without the use of codes, calculations, or instruction manuals.

2.06 VOLTAGE, FREQUENCY AND PHASE ROTATION SENSING

A. Voltage and frequency on both the normal and emergency sources (as noted below) shall be continuously monitored, with the following pickup, dropout and trip setting capabilities (values shown as % of nominal unless otherwise specified):

Parameter	Sources	Dropout / Trip	Pickup / Reset
Undervoltage	N&E,3ϕ	70 to 98%	85 to 100%
Overvoltage	N&E,3ϕ	102 to 115%	2% below trip
Underfrequency	N&E	85 to 98%	90 to 100%
Overfrequency	N&E	102 to 110%	2% below trip
Voltage unbalance	N&E	5 to 20%	1% below dropout

B. Repetitive accuracy of all settings shall be within ± 0.5% over an operating temperature range of -20°C to 60°C.

C. Voltage and frequency settings shall be field adjustable in 1% increments either locally with the display and keypad or remotely via serial communications port access.

D. The controller shall be capable (when activated by the keypad or through the serial port) of sensing the phase rotation of both the normal and emergency sources. The source shall be considered unacceptable if the phase rotation is not the preferred rotation selected (ABC or CBA).

E. Source status screens shall be provided for both normal and emergency to provide digital readout of voltage on all three phases, frequency and phase rotation.

2.07 TIME DELAYS

A. An adjustable time delay of 0 to 6 seconds shall be provided to override momentary normal source outages and delay all transfer and engine starting signals. Capability shall be provided to extend this time delay to 60 minutes by providing an external 24 VDC power supply.

B. A time delay shall be provided on transfer to emergency, adjustable from 0 to 60 minutes, for

controlled timing of transfer of loads to emergency.

C. An adjustable time delay of 0 to 6 seconds to override momentary emergency source outage to delay all retransfer signals during initial loading of engine generator set.

D. Two time delay modes (which are independently adjustable) shall be provided on re-transfer to normal. One time delay shall be for actual normal power failures and the other for the test mode function. The time delays shall be adjustable from 0 to 60 minutes. Time delay shall be automatically bypassed if the emergency source fails and the normal source is acceptable.

E. A time delay shall be provided on shut down of engine generator for cool down, adjustable from 0 to 60 minutes.

F. A time delay activated output signal shall also be provided to drive an external relay(s) for selective load disconnect control. The controller shall have the ability to activate an adjustable 0 to 5 minute time delay in any of the following modes:

1. Prior to transfer only.
2. Prior to and after transfer.
3. Normal to emergency only.
4. Emergency to normal only.
5. Normal to emergency and emergency to normal.
6. All transfer conditions or only when both sources are available.

G. A pre transfer countdown timer to indicate return from Emergency to Normal – (0 -60 seconds). This signal shall interface with the Pump Control Panel and shall indicate that the ATS is about to return to Normal power. The Pump Control Panel shall use this signal to shut down the pumps in an orderly manner prior to transfer and restart them after return to Normal Power.

H. A relay contact for "Load Bank Dump" signal to signal the load bank controller to dump load in event the ATS is called to go to Emergency position.

H. The controller shall also include the following built-in time delays for Delayed Transition & Bypass-Isolation operation:

1. 0 to 5 minute time delay for the load disconnect position for delayed transition operation.

I. All time delays shall be adjustable in 1 second increments, except the extended parallel time, which shall be adjustable in .01 second increments.

J. All time delays shall be adjustable by using the LCD display and keypad or with a remote device connected to the serial communications port. The time delay value displayed on the LCD or remote device shall be the remaining time until the next event occurs.

2.08 ADDITIONAL FEATURES

A. A three position momentary-type test switch shall be provided for the test / automatic / reset modes. The test position will simulate a normal source failure. The reset position shall bypass the time delays on either transfer to emergency or retransfer to normal. Switches which require utilizing the keypad and display function or have no manual time delay bypass means are not acceptable.

B. A SPDT contact, rated 5 amps at 30 VDC, shall be provided for a low-voltage engine start signal. The start signal shall prevent dry cranking of the engine by requiring the generator set to reach proper output, and run for the duration of the cool down setting, regardless of whether the normal source restores before the load is transferred.

C. Auxiliary contacts, rated 10 amps, 250 VAC shall be provided consisting of one contact, closed when the DTTS is connected to the normal source and one contact closed, when the DTTS is connected to the emergency source.

D. LED indicating lights (16 mm industrial grade, type 12) shall be provided; one to indicate when the DTTS is connected to the normal source (green) and one to indicate when the DTTS is connected to the emergency source (red).

E. LED indicating lights (16 mm industrial grade, type 12) shall be provided and energized by controller outputs. The lights shall provide true source availability of the normal and emergency sources, as determined by the voltage sensing trip and reset settings for each source.

G. The following features shall be built-in to the controller, but capable of being activated through keypad programming or the serial port only when required by the user:

1. Provide the ability to select "commit/no commit to transfer" to determine whether the load should be transferred to the emergency generator if the normal source restores before the generator is ready to accept the load.

2. Terminals shall be provided for a remote contact which opens to signal the DTTS to transfer to emergency and for remote contacts which open to inhibit transfer to emergency and/or retransfer to normal. Both of these inhibit signals can be activated through the keypad or serial port.

3. The controller shall be capable of accepting a normally open contact that will allow the transfer switch to function in a non-automatic mode using an external control device.

4. Engine Exerciser - The controller shall provide an internal engine exerciser. The engine exerciser shall allow the user to program up to seven different exercise routines. For each routine, the user shall be able to:

   a. Enable or disable the routine.

   b. Enable or disable transfer of the load during routine.

   c. Set the start time, .
      - time of day
      - day of week
      - week of month (1st, 2nd, 3rd, 4th, alternate or every)

d. Set the duration of the run.

At the end of the specified duration the switch shall transfer the load back to normal and run the generator for the specified cool down period. A 10-year life battery that supplies power to the real time clock in the event of a power loss will maintain all time and date information.

5. System Status - The controller LCD display shall include a "System Status" screen which shall be readily accessible from any point in the menu by depressing the "ESC" key a maximum of two times. This screen shall display a clear description of the active operating sequence and switch position. For example,

Normal Failed
Load on Normal
TD Normal to Emerg
2min15s

Controllers that require multiple screens to determine system status or display "coded" system status messages, which must be explained by references in the operator's manual, are not permissible.

6. Self Diagnostics - The controller shall contain a diagnostic screen for the purpose of detecting system errors. This screen shall provide information on the status input signals to the controller which may be preventing load transfer commands from being completed.

7. Data Logging – The controller shall have the ability to log data and to maintain the last 99 events, even in the event of total power loss. The following events shall be time and date stamped and maintained in a non-volatile memory:

a. Event Logging

1. Date and time and reason for transfer normal to emergency.
2. Date and time and reason for transfer emergency to normal.
3. Date and time and reason for engine start.
4. Date and time engine stopped.
5. Date and time emergency source available.
6. Date and time emergency source not available.

b. Statistical Data

1. Total number of transfers.
2. Total number of transfers due to source failure.
3. Total number of days controller is energized.
4. Total number of hours both normal and emergency sources are

H. Provide all contacts to interface with the control scheme as shown on the drawings, including the countdown timer (emergency return to normal) output contact.

2.09 Withstand and Closing Ratings

A. The DTTS shall be rated to close on and withstand the available RMS symmetrical short circuit current at the DTTS terminals with the type of overcurrent protection shown on the

plans.

B. The DTTS shall be UL listed in accordance with UL 1008 and be labeled in accordance with that standard's 1½ and 3 cycle, long-time ratings. DTTSs which are not tested and labeled with 1½ and 3 cycle (any breaker) ratings and have series, or specific breaker ratings only, are not acceptable.

2.10 TESTS AND CERTIFICATION

A. The complete DTTS shall be factory tested to ensure proper operation of the individual components and correct overall sequence of operation and to ensure that the operating transfer time, voltage, frequency and time delay settings are in compliance with the specification requirements.

B. Upon request, the manufacturer shall provide a notarized letter certifying compliance with all of the requirements of this specification including compliance with the above codes and standards, and withstand and closing ratings. The certification shall identify, by serial number(s), the equipment involved. No exceptions to the specifications, other than those stipulated at the time of the submittal, shall be included in the certification.

C. The DTTS manufacturer shall be certified to ISO 9001 International Quality Standard and the manufacturer shall have third party certification verifying quality assurance in design/development, production, installation and servicing in accordance with ISO 9001.

2.11 SERVICE REPRESENTATION

A. The DTTS manufacturer shall maintain a national service organization of company-employed personnel located throughout the contiguous United States. The service center's personnel must be factory trained and must be on call 24 hours a day, 365 days a year.

B. The manufacturer shall maintain records of each switch, by serial number, for a minimum of 20 years.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of existing conditions prior to beginning work.

B. Verify that surface is suitable for transfer switch installation.

3.02 PREPARATION

A. Provide housekeeping pads under the provisions of Section 03300.

3.03 INSTALLATION

A. Section 01400 - Quality Control: Manufacturer's instructions.

B. Provide engraved plastic nameplates under the provisions of Section 16055.

3.04 FIELD QUALITY CONTROL

A. Section 01640 - Starting of Systems, Field inspection, testing, adjusting.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.22.3.

D. Include the following visual and mechanical inspections and electrical tests, performed in accordance NETA ATS.

1. Visual and Mechanical
   a. Inspect for physical damage
   b. Compare nameplate info and connections to drawings and specifications.
   c. Check for proper anchorage and required clearances
   d. Check tightness of all control and power connections
   e. Perform manual transfer operations
   f. Check contact alignment
   g. Confirm proper lubrication
   h. Check to insure positive interlock between normal and alternate sources.
   i. Ensure manual transfer warnings are attached and visible
   j. Check all covers, barriers, and doors are secure.
   k. Clean entire assembly using approved methods and materials.

2. Electrical Tests:
   a. Insulation resistance tests, phase to phase, phase to ground with switch in both source positions.
   b. Contact resistance tests across all main and by pass contacts
   c. Verify settings and operation of control devices in accordance with the specifications
   d. Calibrate and test all relays and timers including voltage and frequency sensing relays, in-phase monitor (synchronism check), and all timing circuits.
   e. Perform automatic transfer tests
      1) Simulate normal loss of power
      2) Return to normal power
      3) Simulate loss of emergency power
      4) Simulate all forms of single phase conditions
   f. Monitor and verify correct operation and timing of the following simulations
      1) Normal voltage sensing relays
      2) Time delay upon transfer
      3) Alternate voltage sensing relays
      4) Automatic transfer operation
      5) Interlocks and limit switch function
      6) Time delay and retransfer upon normal power restoration

3. Follow Up Verification: Upon completion of acceptance checks and tests, Contractor shall show by demonstration in service that circuits and devices are in good operating condition and properly performing their intended function.

3.05 MANUFACTURER'S FIELD SERVICES

A. Section 01640 - Starting of Systems: Prepare and start systems.

B. Check out transfer switch connections and operations and place in service.

C. Coordinate all transfer switch settings (time delays etc) with the existing plant operations and with new equipment installed under this contract such that all systems are time coordinated and the overall plant electrical system operates as a coordinated system. The Generator system supplier shall be responsible for coordination settings on all transfer switches to insure a plant wide coordinated system.

D. Provide complete documentation (hard copy and software copy in MS Word format) listing all final calibrations and set up parameters.

3.06 DEMONSTRATION AND INSTRUCTIONS

A. See Division 1 - Contract Closeout: .

B. Demonstrate operation of transfer switch in bypass, normal, and emergency modes.

C. Performance Acceptance Test: Complete Performance Acceptance Test to include all operations, related interlocks, communications, data transfer, etc. to ensure a complete functional system. Coordinate test with other interrelated components. Engineer shall be given 5 working days advance notice of the date and times of checking.

3.07 MANUFACTURER'S CERTIFICATION

A. A qualified factory-trained manufacturer's representative shall certify in writing that the equipment has been installed, adjusted, and tested in accordance with the manufacturer's recommendations.

B. The Contractor shall provide six (6) copies of the manufacturer's representative's certification before final payment is made.

3.08 TRAINING

A. Onsite Operator Training
The manufacturer shall conduct training course for plant operating staff. The training period shall consist of 2 non-consecutive periods of 2 hours each of normal working time and shall start after the system is functionally completed but prior to final acceptance. The course instructions shall cover pertinent points involved in operating, starting, stopping, servicing the equipment, as well as all major elements of the operation and

maintenance manuals. The training program shall consist of the instruction on the operation of the transfer switches, all system components, and all ancillary equipment. Provide 6 training manuals for operator training.

B. On-Site Maintenance Training:
The switchgear manufacturer shall furnish a qualified representative to supervise the installation of the switchgear, assist in the performance of the onsite tests, and instruct personnel as to the operational and maintenance features of the equipment. Maintenance instruction shall consist of 2 non-consecutive periods of 2 hours each of normal working time and shall start after the system is functionally completed but prior to final acceptance. The training program shall consist of the instruction on the operation of the assembly, transfer switches, major components within the assembly, all ancillary equipment. Provide 4 manuals for maintenance training.

3.09 PAYMENT

Payment for the work under this section will be made under:

Item	**Description**	**Unit Price**
NS-15	ATS	Lump Sum

END OF SECTION 16496

SECTION 16500

LIGHTING

PART 1: GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall provide lighting fixtures, and accessories for all lighting systems, complete and operable, in accordance with the Contract Documents.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of these specifications, all work hereunder shall conform to the applicable requirements of the referenced portions of the following documents, to the extent that the requirements therein are not in conflict with the provisions of this Section.

National Electric Code, Underwriters Laboratories, Standards of the Certified Ballast Manufacturer's Association

ANSI C82.1	Specifications for Fluorescent Lamp Ballasts
ANSI C84.4	Specifications for High Intensity Discharge Lamp Ballasts (Multiple Supply Type)

1.03 RELATED SECTIONS

A. Section 16501 – LED Area Lighting

1.04 CONTRACTOR SUBMITTALS

A. The CONTRACTOR shall submit the following in accordance with the requirements of Section 01300 – Contractor Submittals.

1. Shop drawings and catalog data.
2. Catalog literature for each fixture.
    a. Materials of construction, type of diffusers, hardware, gasketing, reflector and chassis, finish, and ballast.
    b. Photometric data, including coefficient of utilization, average brightness, candle power distribution curve, and lumen output chart.
3. Pole mounted fixtures, including complete data on the pole material, finish, handholes, anchoring, and fixture attachment. Support method shall be submitted for interior fixtures weighing more than 50 pounds.
4. Ballast catalog data indicating lamp wattage, input watts, sound rating, power factor, and type of ballast. Data for outdoor ballast shall be include low temperature starting characteristics.
5. Photocell data submittal shall indicate switching capacity, the means of adjusting the lighting pickup level, and enclosure.

B. Substitutions for specified fixtures shall be based upon quality of construction, light distribution, appearance, and maintenance.

1.05 QUALITY ASSURANCE

A. Exterior lighting system operation shall be demonstrated during the hours of darkness to indicate that fixtures are properly focused, photo cell operation is correct, and that fixture switching functions as intended. Similar requirements shall apply to interior lighting. Through demonstration, the CONTRACTOR shall also verify that panel schedules properly indicate the lighting outlets connected to each circuit.

B. Lighting demonstration shall occur within 2 weeks prior to project acceptance.

C. Lighting fixtures shall be stored in their original cartons from the manufacturers until the time of installation. Fixtures poles shall be stored on blocks above grade until the time of installation.

1.06 CLEANUP

A. Fixture lenses, diffusers, and reflectors shall be cleaned just prior to the time specified for the system demonstrations.

B. Fixture trim, including poles and support brackets, where finish has been damaged, shall be refinished.

PART 2: PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers shown on the drawings.

B. Other manufacturer's equipment will be considered acceptable providing the equipment meets, or exceeds specification requirements, has the capacity and performance requirements, fits the space available to the satisfaction of the Engineer, conforms in every respect with the applicable regulatory agencies and for lighting fixtures is also similar in appearance, construction and photometrics (photometric information shall be based on independent laboratory reports). Contractor shall submit for approval large scale drawings of proposed layouts and arrangements and samples of lighting fixtures when requested.

The listed prior approvals are not given with respect to any specific model, series, catalog number, etc. Suppliers are cautioned that before their equipment is actually approved, it will be incumbent upon them to demonstrate to the Engineer that it is in fact equal to the requirements specified and conforms fully to all specification requirements.

2.02 FIXTURES – GENERAL

A. All fixtures shall be pre wired with leads of 18 AWG, minimum, for connection to building circuits.

2.03 EXTERIOR FIXTURES

A. Exterior fixtures in combination with their mounting pole and bracket shall be capable of withstanding 150 MPH winds without damage. Exterior fixtures shall have corrosion resistant hardware and hinged doors or lens retainer. Fixtures specified to be furnished with integral photo electrical control shall be of the fixture manufacturer's standard design.

2.04 INTERIOR FIXTURES

A. General: Provide lighting fixtures, of sizes, types and ratings indicated; complete with, but not necessarily limited to, housings, lamps, lamp holders, reflectors, ballasts, starters and wiring. All ballasts shall be low noise, high power factor, low radio interference type and shall be provided with an automatic thermal cutout device.

B. Fluorescent Lamp Ballasts: Provide fluorescent lamp ballasts, capable of operating lamp types indicated; with high power factor, A sound rating, and low-noise features; and with internal thermal protection; Ballasts shall be completely electronic type with minimum ballast factor of 95% and less than 10% total harmonic distortion (THD) Electronic ballasts shall meet FCC Rules/Regulations Part 18, 15J for ENI/RFI Emissions, and shall meet 1988 Federal Efficiency Standard (Law 100-357) where applicable. Ballasts shall be manufactured by Advance, Universal, Valmont, or approved equal.

C. High Intensity Discharge Lamp Ballasts: Provide HID lamp ballasts, of ratings, types and makes as recommended by lamp manufacturer, which properly matches lamps to power line by providing appropriate voltages and impedances for which lamps are designed. Ballasts shall limit inrush current to an amount less than operating current.

D. Ballasts for HID lamps shall be high power factor, constant wattage or constant wattage autotransformer, low noise level, and shall be furnished by the manufacturer of each type of particular lighting fixture specified.

E. Emergency Fluorescent Power Packs (Battery backup ballasts) shall be manufactured to provide a minimum of 1100 lumens per fixture for 1 1/2 hours operation during the emergency mode.

F. All fixtures located in classified locations will be enclosed, gasketed, filtered, and listed for the classified location. Comply with additional fixture requirements contained by Lighting Fixture Schedule shown on drawings.

G. Catalogue numbers scheduled for lighting fixtures may indicate fixture compatibility with certain types of ceiling construction. The Electrical Contractor shall determine exact type of ceiling actually to be furnished in each area and shall obtain fixtures to suit. Additionally, ceiling space requirements shall be verified and fixtures compatible for operation within the confines present shall be used. This would include any special mounting due to temperature, space limiting or above ceiling access requirement factors. Provide for heat resisting shielding or spacers and access panels as required. Submit any deviation to the Architect for review.

H. Any fixture specifically to be furnished by others, shall unless noted otherwise, be

roughed-in, installed, connected and lamped by the Electrical Contractor. Do not perform any work on such fixtures unless any damage noted is called to the attention of the Engineer.

I. Fluorescent fixtures with multiple lamps shall have lamp sockets arranged so that lamps are equally spaced to produce uniform lamp appearance. Fixtures to be installed in damp or wet locations shall be labeled by Underwriters Laboratory for that purpose.

J. Fixtures shall be finished (painted or other finish as specified) after fabrication.

K. Where the lamp manufacturer indicates possible hazardous conditions caused by lamp breakage, fixtures shall contain protective lenses and/or screens to contain parts of broken lamps.

2.05 STARTER CIRCUIT/QUARTZ OPTIONS

A. Selected number of H.I.D. fixtures will be furnished with quartz auxiliary lamp.

2.06 LAMPS

A. Lamps shall be first line General Electric, Sylvania, or equal.

B. Fluorescent lamps shall be cool/white unless otherwise indicated. Incandescent lamps shall be frosted unless a specified fixture fighting control system requires clear globe lamps. High pressure sodium lamps shall be "color corrected." Unless otherwise indicated in the Contract Documents, lamps shall be suitable for operation in any burning position.

2.07 PHOTO ELECTRIC CELLS

A. Photoelectric cells for control of multiple fixtures shall be self contained, weatherproof type and shall be provided with time delay features.

B. Photoelectric cells for control of multiple fixtures shall be self contained, weatherproof type and shall be provided with time delay features.

2.08 LIGHT FIXTURE CONTROL RELAYS

A. Relays for light fixtures control shall be mechanically held. Such relays shall be base mounted, single purpose units, i.e., not attachments to a multi purpose solenoid operator.

B. If not indicated otherwise, coil voltage shall be 115 volts ac with contacts rated at 20 amps. Relays shall be ASCO Series 166, Zenith Series MSC, or equal.

PART 3: EXECUTION

3.01 LIGHTING FIXTURES

A. Lighting fixtures shall be furnished complete at each outlet in accordance with the Fixture Schedule.

B. Lighting fixtures shall be installed plumb and square with building and wall intersections. Pendant mounted fixtures which are mounted from sloping ceilings shall be suspended by

ball hangers. Fixtures installed in machinery rooms shall be located after machines have been installed. In all cases, fixture locations shall be coordinated with work of other trades to prevent obstruction of light from the fixtures. Fixtures shall be installed in accordance with the architectural reflected ceiling Drawings. Unless otherwise indicated, fixtures shall be centered on ceiling tiles. Fixtures weighing more than 25 pounds shall be supported independently of the fixture outlet box.

C. Recessed fixtures shall be installed light tight to the ceiling and shall be provided with auxiliary safety supports attached directly to the building structure. Said safety supports shall consist of #12 AWG soft drawn galvanized wire or #10 Aluminum wire.

3.02 FIXTURE POLES

A. Fixture poles shall be set on anchor bolts and secured with double nuts on each bolt. After fixture has been leveled and plumbed, the fixture base shall be dry-packed with grout. All anchor bolts, and hardware shall be stainless steel. All poles with proposed fixtures mounted on pole, shall be rated for 150mph wind.

3.03 PAYMENT

Payment for the work under this section will be made under:

Item	**Description**	**Unit Price**
NS-17	Lighting	Lump Sum

END OF SECTION

SECTION 16501

LED AREA LIGHTING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. LED Area Lighting.

B. Related Sections:

1. Section 16500.

2. This section is a Division 16 Electrical section, and is part of each Division 16 section making reference to lighting.

1.02 REFERENCES

A. American National Standards Institute (ANSI):

1. ANSI C62.41.1-2002 - IEEE Guide on the Surge Environment in Low-Voltage (1000V and less) AC Power Circuits.

2. ANSI C62.41.2-2002 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000W and less) AC Power Circuits.

3. ANSI C82.SSL1 - SSL Drivers (in ANSI development).

B. Underwriters Laboratory (UL):

1. UL 1598 - Standard for Safety of Luminaires.

2. UL 1598A - Standard of Safety of Luminaires for Installation on Marine Vessels.

C. Canadian Standards Association (CSA):

1. CSA 22.2.

D. Institute of Electrical and Electronics Engineers (IEEE):

1. ANSI/IEEE C2 - National Electrical Safety Code.

2. C62.41.1-2002 - IEEE Guide on the Surge Environment in Low-Voltage (1000V and less) AC Power Circuits.

3. C62.41.2-2002 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000W and less) AC Power Circuits.
4. C62.45-2002 - IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits.

E. International Electrotechnical Commission (IEC):

1. IEC 60929 Annex E Low Voltage Control of Luminaires.
2. IEC 60529 – Degrees of Protection provided by enclosures (IPCode).
3. IEC 62471:2008 Photobiological Safety of Lamps and Luminaires.
4. IEC 61000-3-2 Harmonics Standards.
5. IEC 61000-4-5 Surge Testing.

F. International Organization for Standardizations (ISO):

1. ISO 9001-2008 Quality Management System.

G. National Electrical Manufacturers Association (NEMA):

1. NEMA Standards Publication 250-2003 "Enclosures for Electrical Equipment".

H. International Illuminating Engineers Society of North America (IESNA):

1. LM-79-08 - IESNA Approved Method for the Electrical and Photometric Measurements of Solid-Sate Lighting Products
2. LM-80-08 - IESNA Approved Method for Measuring Lumen Maintenance of LED Light Sources.
3. TM-21 "Projecting Long Term Lumen Maintenance of LED Light Sources".

I. Occupational Safety and Health Administration (OSHA):

1. OSHA Hazard Communication Standards 29 CFR 1910.1200

J. International Dark Skies Association (IDA):

1. IDA Fixture Seal of Approval.

K. National Fire Protection Association (NFPA):

1. NFPA 70 - National Electrical Code.

1.03 DESCRIPTION

A. Light Emitting Diode (LED) Luminaire for Lighting:

1. LED Area Lighting.

1.04 SUBMITTALS

A. Submit under provisions of Section 13300.

B. Specification Conformance Document. Indicate where the submitted:

1. Meets the specification exactly as stated.

2. Meets the specification via another means and indicate the specific methodology used with drawings and product photography.

C. LED Product Data: For each type of lighting luminaire, arranged in order of luminaire designation. Include data on features, accessories, finishes, and the following:

1. Physical description of luminaire including dimensions.

2. Driver including driver efficiency, catalog code and input watts.

3. Luminaire photometric reports per IES LM-79, including laboratory name, report number, date, luminaire catalog number, luminaire, and light source specifications.

4. Initial lumen output of luminaire and ambient temperature and drive current at which the lumens are rated.

5. Luminaire (also known as fixture) efficacy.

6. CCT of light source.

7. CRI of light source.

1.05 QUALITY ASSURANCE

A. Manufacturer: Experience in manufacturing solid state luminaires for heavy duty industrial plants.

B. Manufacturer's Quality system: Registered to ISO 9001:2008.

C. Luminaire tested to the IESNA LM-79.

D. Luminaire incorporates LEDs evaluated to IESNA LM-80.

E. Furnish an in-situ temperature test indicating maximum LED temperature does not exceed component ratings.

F. Luminaire is evaluated to TM-21 indicating projected lumen maintenance.

1.06 REGULATORY REQUIREMENTS

A. Luminaire is listed by UL1598A.

1.07 DELIVERY, STORAGE AND HANDLING

A. Equipment shall be handled and stored in accordance with manufacturer's instructions.

1.08 OPERATION AND MAINTENANCE MANUALS

A. Equipment operation and maintenance manuals shall be provided with each luminaire shipped, and shall include instruction leaflets and instruction bulletins.

1.09 PROJECT CONDITIONS

A. Do not install equipment unless the following conditions are maintained:

1. Ambient Temperature -40°C to 65°C (-40°F to +149°F).

1.10 WARRANTY

A. Provide a written manufacturer's five year full performance fixture warranty covering defective material or workmanship.

PART 2 PRODUCTS

2.01 GENERAL

A. Manufacturers shown on the drawings.

B. Other manufacturer's equipment will be considered acceptable providing the equipment meets, or exceeds specification requirements, has the capacity and performance requirements, fits the space available to the satisfaction of the Engineer, conforms in every respect with the applicable regulatory agencies and for lighting fixtures is also similar in appearance, construction and photometrics (photometric information shall be based on independent laboratory reports). Contractor shall submit for approval scale drawings of proposed layouts, arrangements and lighting levels.

Suppliers are cautioned that before their equipment is approved, it will be incumbent upon them to demonstrate to the Engineer that it is in fact equal to the requirements specified and conforms fully to all specification requirements.

2.02 LUMINAIRE REQUIREMENTS

A. The luminaire shall have a ten year operational life while operating between -45°C and +65°C with a rated L70 of 100,000 at 25°C ambient per TM-21 calculations.

B. UL1598A listed.

C. The luminaire shall have an initial luminaire efficacy up to 145 lumens per watt (lm/W).

D. Metalized reflector based optics for precise light control and no lumen degradation.

E. Optical Pattern: Wide throw.

F. Actively prevents overheating and degraded LED life when deployed in ambient conditions that exceed +65˚C.

G. Housing:

1. Die Cast Copper-Free Aluminum Unibody Housing & Heat Sink.

2. Color: Polyester/Epoxy powder coat gray (RAL 7040) for superior corrosion resistance.

3. Ingress Protection: IP66.

4. NEMA Rated: 4x.

H. Connection/Cabling:

1. 10-foot (3.5 m) STOOW three-conductor power cord.

I. Lens: Polycarbonate.

J. The luminaire shall contain no hazardous chemicals and emit no UV or IR.

K. The luminaire shall be IDA Dark Sky Compliant Certified.

L. Electromagnetic interference:

1. Shall have a total harmonic distortion (THD) of ≤ 15% at full input power and across specified voltage range.

2. Shall be IEC 61000-3-2 compliant.

3. Shall comply with FCC 47 CFR part 15 non-consumer radio frequency interference / electromagnetic interference standards.

M. The luminaire shall be inaudible in a 25 dBA ambient.

N. The luminaire shall be manufactured in a facility that employs ESD reduction practices in compliance with ANSI/ESD S20.20.

O. The luminaire shall have country appropriate governing mark and certification.

P. The luminaire shall be fully assembled and electrically tested before shipment from factory.

2.03 POWER-SUPPLY UNIT (DRIVER) REQUIREMENTS

A. Drivers shall have a starting temperature -40° C.

B. Universal voltage input: 120 to 277V AC, 50/60 Hz.

C. Drivers shall have a PF of: ≥ 0.90.

D. Transient protection: 1kV line to neutral, 2kV mains to ground.

E. Fusing: Internal, none required.

F. 20kA/40kV surge protection

2.04 LIGHT SOURCE REQUIREMENTS

A. LED sources shall meet the following requirements:

1. Correlated Color Temperature (CCT): 4,000K cool white, nominal and target CCT.

2. CRI ≥ 70.

3. LED sources shall have no visible change in light output with a variation of +/- 10% line voltage input.

4. Tested and evaluated by an independent US DOE approved SSL testing laboratory to IESNA LM-79 and have been tested according to LM-80.

2.05 SOURCE QUALITY CONTROL

A. Perform function test on 100% - ALL units manufactured.

B. Perform factory burn-in on 100% - All units manufactured.

C. Perform submersion test on 100% - All units manufactured.

PART 3 EXECUTION

3.01 INSTALLATION

A. Disconnect all power sources prior to installation.

B. Install equipment in accordance with manufacturer's recommended installation procedures.

C. Provide complete installation of system in accordance with contract documents.

3.02 MEASUREMENT AND PAYMENT

A. Measurement for payment for the work under this section shall be at NO DIRECT PAY and shall be included with the related work bid items.

END OF SECTION

SECTION 16670

LIGHTNING PROTECTION SYSTEMS

PART 1: GENERAL

1.01 SUMMARY

A. Scope: Provide complete lightning protection systems for the following structures at the Reserve Relief Homewood Pump Station.

1. MCC-1, Generator, pumps, and associated equipment on the pump station structure.
2. Pump Station – structure.

B. The extent of lightning protection work required in this Section is indicated on the drawings, and in the requirements of this Section, and Section 16010, "Electrical Basic Requirements."

C. System Design: The work covered by this section of the specifications consists of furnishing all labor, materials, and items of service required for a complete functional and unobtrusive lightning protection system as approved by the Engineer, and in strict accordance with this section of the specifications and the applicable contract drawings.

D. The Specialty Subcontractor shall visit the site prior to bidding and investigate the existing site conditions including the existing pump station structure. The Specialty Subcontractor shall include in his bid all costs associated with providing lightning protection for this structure. See Item 3.04, Miscellaneous.

1.02 QUALITY ASSURANCE

A. Manufacturer: All components of the lightning protection system shall be UL listed and the product of a manufacturer regularly engaged in the production of lightning protection equipment.

B. Specialty Subcontractor: Lightning protection systems shall be installed by a specialist with at least 3 years of successful installation experience on projects with lightning protection work similar to that required for this Contract.

1. Specialty subcontractor shall be a member of the Lightning Protection Institute (LPI). Specialty subcontractor shall maintain at all times a regular force of certified LPI personnel on his payroll. LPI installers certificate together the Masters installer certificate shall be submitted to the Engineer for approval prior to commencement of work. The system installation shall be made under the supervision of an LPI Certified Master Installer.

C. Lightning Protection Institute (LPI): Conform to the following LPI standards:

1. 175 Lightning Protection Installation Standard.

D. Conform to the requirements of the National Fire Protection Association (NFPA) 780, "Lightning Protection Code."

E. Underwriters Laboratories, Inc. (UL): Conform to the following UL standards:

1. 96A Installation Requirements for Lightning Protection Systems.

F. The lightning protection system shall conform to the requirements and standards for lightning protection systems of the LPI, UL, and NFPA. Upon completion, an application shall be made to the Underwriters Laboratories, Inc. for inspection and certification and shall be delivered to the owner ensuring that the concealed components have also been monitored during job progress.

1.03 SUBMITTALS

A. Division 1: Conform to the requirements of Division 1, Section 01340, "Submittals."

B. Certification: Provide certification for the lightning protection system as follows:

1. The Contractor shall provide a certification, signed by an officer of the corporation, that the lightning protection systems shall be installed in strict compliance with the Contract documents, the drawings and the reference standards included herein.

2. The specialty subcontractor shall certify that materials, products, and installation procedures will conform strictly with the referenced standards and this Section.

C. Shop Drawings: Submit complete design drawings showing the type, size, and locations of all grounding down conductors, through roof/through wall assemblies, roof conductors, and air terminals shall be submitted to the architect and engineer for approval.

1. Draw on sheet sizes the same as the Contract Drawings.

2. Draw to a scale of not less than 1/8 inch to one foot.

3. Provide details of mounting, isolating, anchoring, and routing the lightning protection system through the proposed construction work.

PART 2: PRODUCTS

2.01 STANDARD

A. The system to be furnished under this specification shall be the standard product of manufacturers regularly engaged in the production of lightning protection equipment and shall be the manufacturer's latest approved design. The equipment shall be UL listed and properly UL labeled.

B. All equipment shall be new and of a design and construction to suit the application where

it is used in accordance with accepted industry standards and LPI, UL, and NFPA code requirements.

C.

Qualified Manufacturers:

(1) Advanced Lightning Technology – Texas
(2) East Coast Lightning Equipment – Connecticut
(3) Thompson Lightning Protection - Minnesota

2.02 LIGHTNING PROTECTION EQUIPMENT

A. All materials shall be copper and bronze and of the size, weight, and construction to suit the application and used in accordance with LPI, UL, and NFPA code requirements. Class I sized components may be utilized on roof levels 75 feet and below in height. Class II sized components are required for roof levels over 75 feet in height. Bolt type connectors and splicers shall be utilized on Class I and Class II structures. Pressure squeeze clamps are not acceptable. All mounting hardware shall be stainless steel to prevent corrosion.

2.03 GROUND LOOP:

A. Install a copper ground loop around the perimeter of the building utilizing main size conductor. Ground loop shall be installed at least 2' from structure and 30" below grade. Connect each downlead to the ground loop.

2.04 ALUMINUM COMPONENTS

A. Aluminum materials may not be used except on roofs that utilize aluminum, galvalume or galvanized metal roofing components. On aluminum, galvalume or galvanized metal roofs or where aluminum, galvalume or galvanized metal parapet caps exist, the entire roof lightning protection equipment shall utilize aluminum components to insure compatibility. However, the down leads and grounding are to utilize copper with the bimetal transition occurring at the through roof assembly with an approved bimetal through roof assembly.

2.05 LIGHTNING ARRESTERS

A. Lightning protection sub contractor shall coordinate with Electrical Contractor to install a surge arrester at the main electrical service entrance as required by Underwriters Laboratories UL96A lightning protection codes and in order to obtain the UL Master Label certification. It shall be the responsibility of the electrical contractor to install or verify that a surge arrester is installed on the main electrical service.

2.06 DISSIMILAR METALS

A. General: No combination of materials shall be used that form an electrolytic couple of such a nature that corrosion is accelerated in the presence of moisture. If dissimilar materials are used, provide waterproof seals so that moisture is permanently excluded from the junction of such metals.

2.07 AIR TERMINALS (STRIKE TERMINATION DEVICES)

A. Requirements: Strike termination devices shall be provided to place the entire structure under a zone of protection as defined by the standards.

B. Provide air terminals of ½ inch diameter nickel tipped solid copper at locations indicated on the drawings.

1. Air terminals shall tapered to a point, and project 10 inches above object to be protected.
2. Air terminals shall be located within 2 feet of exposed corners and roof edges.
3. The ground wire shall be fastened by threaded bolts to a bronze connector with a male threaded stud on which the female threaded air terminal shaft shall be mounted.
4. Terminal shall be securely attached to the building.

2.08 CONDUCTORS

A. General: Provide conductors of 98 percent electrical grade copper.

1. The weight of copper conductors shall not be less than 375 pounds per thousand feet.
2. The size of any wire in the cable shall not be less than No. 14 MS gauge.
3. Copper tube or solid section conductors of copper shall weigh not less than 187.5 pounds per thousand feet with a tube wall not less than No. 20 MS gauge.
4. The thickness and width of copper ribbon conductor or strip shall be not less than No. 16 gauge nor less than 1 inch in width.

B. Conductor Protection: If mechanical hazard is involved, the conductor size shall be increased to compensate for potential damage or suitable protection shall be provided. Protection may be wood molding or tubing specifically designed to protect the conductor or other nonmagnetic material.

C. Cable conductors shall provide a two- way path from strike termination devices horizontally and downward to connections with the ground system. Cable conductors shall be free of excessive splices and sharp bends. No bend of a conductor shall form a final included angle of less than 90 degrees nor have a radius bend less than 8 inches.

D. Cable down conductors may be concealed within the building construction by permission of the Engineer or enclosed within pvc conduit from roof to grade. Down conductors shall be spaced at intervals averaging not more than 100 feet around the protected perimeter of the structure. In no case shall the structure have fewer than 2 down conductors.

2.09 GROUND RODS

A. General: Provide ground rods not less than ¾ inch in diameter by 10 feet long.

1. Rods shall be copperclad steel, solid copper or stainless steel.
2. Provide solid bronze 4 inch long ground rod clamps for connecting conductors to the ground rod.

PART 3: EXECUTION

3.01 INSTALLATION

A. Installation shall conform to the requirements of NFPA 70, "National Electrical Code," Article 250, NFPA 78, and UL 96. The work shall be accomplished by personnel skilled in this type of work to satisfy UL 96A.

B. The installation shall be accomplished by an experienced installation company that is UL listed, a member of the Lightning Protection Institute and an employer of Certified Master Installers of lightning protection systems. A Certified Master Installer shall directly supervise the work. All equipment shall be installed in a neat, workmanlike manner. The system shall consist of a complete conductor network at the roof and include air terminals, connectors, splicers, bonds, copper down leads, ground connections, grounding electrodes, ground loop conductor. Copper down lead conductors shall be utilized even when aluminum is required on the roof. Down lead conductors in conduit shall not be brought directly through the roof. Through roof assemblies with solid brass or stainless steel rods shall be utilized for this purpose. Structural steel may be utilized in the installation as outlined by UL, NFPA, and LPI.

C. Electrically interconnect lightning system to form shortest distance to ground. Do not use nonconducting parts of the structure as part of the building's lightning protection system.

3.02 COORDINATION

A. The lightning protection installer will work with other trades to insure a correct, neat and unobtrusive installation. The roofing contractor will be responsible for sealing and flashing all lightning protection roof penetrations as per the roof manufacturer's recommendations. However, the lightning protection contractor will be required to coordinate locations of through roofs and submit details of through roof penetrations as required. The lightning protection contractor shall use a compatible adhesive to adhere lightning protection components to the roof when required. The lightning protection contractor shall furnish and install the adhesive and obtain an approval of the compatible adhesive from the roof manufacturer/contractor prior to the installation. Should the roofing contractor/manufacturer require any special walk pads, membrane patches, pavers, etc. under the components of the lightning protection system, it shall be the responsibility of the roofing contractor to furnish and install such items. The lightning protection installer shall be responsible for marking the roof with all conductor and/or pad locations.

B. It shall be the responsibility of the lightning protection installer to assure a sound bond to the main water service and to assure interconnection with other ground systems.

3.03 COMPLETION

A. The Lightning protection system shall be inspected by the Engineer to determine conformance with this specification. No part of the system shall be concealed until inspected by the Engineer.

B. Upon completion of the installation, the lightning protection installer shall secure and deliver to the owner the LPI Master Certification. The system will not be accepted without the certification.

3.04 MISCELLANEOUS

A. This specification recognizes that UL will not Master Label structures or additions that are attached to a structure which does not fully comply with current UL96A lightning protection standards. Therefore, all attached structures shall be reviewed for compliance. The attached structure(s) not fully complying because of damaged systems, missing systems or improperly installed systems shall be fully protected and/or repaired in order to obtain all required inspections and certifications for the Owner.

B. Provide as built drawings and O&M manuals.

3.05 TESTING

A. General: Upon completion of the lightning protection work, test the resistance to ground. Resistance to ground shall not exceed 5 ohms.

1. Should ground resistance exceed 5 ohms, drill 1 inch diameter holes approximately 2 feet distance from the ground rod by 10 feet deep minimum and fill each hole with a mixture of 90 percent magnesium and 10 percent copper sulfate and then soak with water. Retest the system.

3.06 PAYMENT

A. Measurement for payment for the work under this section shall be at NO DIRECT PAY and shall be included with the related work bid items.

END OF SECTION 16670

SECTION 16671

SURGE PROTECTIVE DEVICES (SPD)

PART 1: GENERAL

1.01 SCOPE

A. The Contractor shall furnish and install the Surge Protective Devices (SPD) having the electrical characteristics, ratings and modifications as specified herein and as shown on the contract drawings.

1.02 RELATED SECTIONS

A. Section 16426 – Stand By Power System Genset

B. Section 16470 – Panelboards

C. Section 16482 - Motor Control Centers

1.03 REFERENCES

A. The SPD units and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of the following:

1. UL Listed under UL 1449 4th edition and UL 1283

2. CSA certified per CSA 22.2

B. The UL 1449 suppression voltage ratings (SVR) and CSA label shall be permanently affixed to the SPD unit.

1.04 SUBMITTALS

A. The following information shall be submitted to the Engineer:

1. Provide verification that the SPD device complies with the required UL 1449 and UL 1283 SVR.

2. Provide actual let through voltage test data in the form of oscillograph results for both the ANSI/IEEE C62.41 Category C3 (combination wave) and B3 (ringwave) tested in accordance with ANSI/IEEE C62.45.

3. Provide spectrum analysis of each unit based on MIL-STD-220A test procedures between 50 kHz and 200 kHz verifying the device's noise attenuation exceeds 50 dB at 100 kHz.

4. For retrofit mounting applications, electrical/mechanical drawings showing unit dimensions, weights, installation instruction details, and wiring configuration.

5. Provide test report from a recognized independent testing laboratory verifying the suppressor components can survive published surge current rating on both a per mode and per phase basis using the IEEE C62.41, 8 x 20 microsecond current wave. Note that test data on individual module is not accepted.

B. Submit ten (10) copies of the above information.

1.05 SUBMITTALS – FOR INFORMATION

A. When requested by the Engineer the following product information shall be submitted.

1. Descriptive bulletins.

2. Product sheets.

1.06 SUBMITTALS – FOR CLOSEOUT

A. The following information shall be submitted for

1. Final as built drawings and information for items listed in section 1.04.

1.07 QUALIFICATIONS

A. For the equipment specified herein, the manufacturer shall be ISO 9000, 9001 or 9002 certified.

B. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

1.08 REGULATORY REQUIREMENTS

A. SPD units shall be Underwriters Laboratories listed.

1.09 DELIVERY, STORAGE AND HANDLING

A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.10 FIELD MEASUREMENTS

1.11 OPERATION AND MAINTENANCE MANUALS

A. Ten (10) copies of the equipment operation and maintenance manuals shall be provided.

B. Operation and maintenance manuals shall include the following information:

1. Instruction books and/or leaflets

2. Recommended renewal parts list

3. Drawings and information required by section 1.06

1.12 EXTRA PRODUCTS

PART 2: PRODUCTS

2.01 MANUFACTURERS

A. Eaton

B. Square D

C. Polyphaser

2.02 TRANSIENT VOLTAGE SURGE SUPPRESSION – GENERAL

A. Transient Voltage Surge Suppression

B. Electric requirements

1. Unit Operating Voltage – Refer to drawings for operating voltage and unit configuration.

2. Maximum Continuous Operating Voltage (MCOV) – The MCOV shall be greater than 115% of the nominal system operating voltage.

3. Protection Modes – For a wye configured system, the device must have directly connected suppression elements between line-neutral (L-N), line-ground (L-G), and neutral-ground (N-G). For a delta configured system, the device must have suppression elements between line to line (L-L) and line to ground (L-G).

4. UL 1449 SVR – The maximum UL 1449 SVR for the device must not exceed the following:

Models	208Y/120	480Y/277	600Y/347
L-N:L-G:N-G	400V	800V	1200V
L-L	800V	1500V	2000V

5. ANSI/IEEE Cat C3 Let Through Voltage – The let through voltage based on IEEE C62.41 and C62.45 recommended procedures for Category C3 surges (20kV, 10 kA) shall be less than:

Models	208Y/120	480Y/277	600Y/347
L-N	470V	900V	1300V

6. ANSI/IEEE Cat. B3 Let Through Voltage – Let through voltage based on IEEE C62-.41 and C62.45 recommended procedures for the ANSI/IEEE Cat. B3 ringwave (6 kV, 5000 amps) shall be less than:

Models	208Y/120	480Y/277	600Y/347

L-N	150V	200V	300V

C. SPD Design

1. Balanced Suppression Platform – The surge current shall be equally distributed to all MOV components to ensure equal stressing and maximum performance. The surge suppression platform must provide equal impedance paths to each matched MOV. Designs incorporating SPD modules which do not provide a balanced impedance path to each MOV shall not be acceptable.

2. Electrical Noise Filter – Each unit shall include a high-performance EMI/RFI noise rejection filter. Noise attenuation for electric line noise shall be 55 dB at 100 kHz using the MIL-STD-220A insertion loss test method. The unit shall be complimentary listed to UL 1283. Products not able to demonstrate noise attenuation of 55 dB @ 100 kHz shall be rejected.

3. Internal Connections – No plug-in component modules or printed circuit boards shall be used as surge current conductors. All internal components shall be hardwired with connections utilizing low impedance conductors and compression fittings.

4. Safety and Diagnostic Monitoring – Each unit shall be equipped with 200 kAIC internal fuses. Each unit shall provide the following three levels of monitoring:

   a. Continuous monitoring of fusing system.

   b. Internal infrared sensor system for monitoring individual MOV's (including neutral to ground). The system must be capable of identifying open circuit failures not monitored by conventional fusing systems.

   c. Thermal detection circuit shall monitor for overheating in all modes due to thermal runaway. A green/red solid-state indicator light shall be provided on each phase. The absence of a green light and the presence of a red light, shall indicate which phase(s) have been damaged. Fault detection will activate a flashing trouble light. Units which can not detect open-circuit damage, thermal conditions and over current will not be accepted.

5. Warranty – The manufacturer shall provide a full five (5) year warranty from the date of shipment against any SPD part failure when installed in compliance with manufacturer's written instructions and any applicable national or local electric code.

6. The unit must be equipped with transient event counter and audible alarm.

7. Remote Status Monitor – The SPD device must include form C dry contacts (one NO, one NC) for remote annunciation of unit status. The remote alarm shall change state if any of the three monitoring systems described detect fault conditions.

8. Each suppression unit shall incorporate an integral test feature which operational integrity of the unit's monitoring system.

2.03 SYSTEM APPLICATION

A. The SPD applications covered under this section include distribution and branch panel locations, bus plugs, motor control centers (MCC), switchgear, and switchboard assemblies. The branch panel located SPD shall be tested and demonstrate they are suitable for ANSI/IEEE C62.41 Category C1 environments.

B. Surge Current Capacity – The minimum total surge current 8 x 20 microsecond waveform that the device is capable of withstanding shall be as shown in the following table:

Application	Min, Surge Current Per Phase	Min. Surge Current Per Mode*
Service Entrance (Switchboards Switchgear, MCC Main Entrance)	250 kA	125 kA
Distribution Panelboards	160 kA	80 kA
High Exposure Roof Top Locations	160 kA	80 kA
Branch Locations (Panelboards, MCC's, Busway)	160 kA	80 kA

*L-G, L-N and N-G (WYE system);
L-L, L-G (Delta system)

C. Panelboard and Bus Plug Requirements

1. The SPD application covered under this section include distribution, branch panel and bus plug locations. The SPD units shall be tested to demonstrate suitability for ANSI/IEEE C62.41 Category C1 environments.

2. Withstand – Each unit must be capable of surviving more than 10,000 category C1 transients without failure or degradation of UL 1449 Suppression Voltage Rating.

3. Panelboards rated 240 Vac or less shall have short-circuit ratings as shown on the drawings or as herein scheduled, but not less than 10,000 amperes RMS symmetrical.

4. Panelboards 480 VAC shall have short-circuit ratings as shown on the drawings or as herein scheduled, but not less than 14,000 amperes RMS symmetrical.

5. Panelboards shall be labeled with a UL short circuit withstand rating. When series ratings are applied with integral or remote upstream devices, a label shall be provided. Series ratings shall cover all trip ratings or installed frames. It shall state the condition of the UL series rating including:

   a. Size and type of upstream device

b. Branch devices that can be used

c. UL series short-circuit rating

6. Branch panels shall be UL labeled as "suitable for non-linear loads."

7. Distribution and panel suppressors shall be installed inside the panelboards or bus plugs at the manufacturer's factory.

8. A direct bus bar connection shall be used to mount the SPD component to the panelboard bus bar or the bus plug disconnect to reduce the impedance of the shunt path.

9. The SPD panelboard shall be constructed using a direct bus bar connection (cable connection between bus bar and SPD device is not acceptable). SPD units that use a wire connection do not meet the intent of this specification.

10. Suppression shall be included and mounted within the panelboard and bus plug by the manufacturer of the panelboard or bus way.

D. Retrofit Installation (externally mounted suppressor)

1. Maximum conductor lead length between breaker and suppressor shall not exceed 14 inches. Comply with manufacturer's recommended installation and wiring practices.

E. Switchgear, Switchboard and MCC Requirements

1. The SPD application covered under this section is for switchboard locations. The service entrance SPD shall be tested and suitable for ANSI/IEEE C62.41 Category C3 environments.

2. Service entrance suppressor shall be installed by assembly manufacturer.

3. Withstand. Each unit must be capable of surviving more than 10,000 ANSI/IEEE C62.41 Category C3 transients without failure or degradation of UL 1449 Suppression Voltage Rating.

4. Service entrance suppressors shall be installed in the assembly.

5. Locate suppressor on load side of main disconnect device, as close as possible to the phase conductors and ground/neutral bar.

6. Provide a 30-amp disconnect. The disconnect shall be directly integrated to the suppressor and assembly bus using bolted bus bar connections.

7. The suppressor and integral disconnect shall be installed to the switchboard using a direct bus bar connection (no cable connection between bus bar and SPD device). SPD units that use a wire connection do not meet the intent of this specification.

8. All monitoring diagnostics features such as indicator lights, trouble alarms and surge counter if specified) shall be mounted on the front of the switchboard.

F. Instrument Suppressors on 120V ac Power Supply Connections

1. Occurrences: Tested and rated for a minimum of 50 occurrences of IEEE Category B3/C1 test waveform.
   a. First-Stage Clamping Voltage: 350 volts or less.
   b. Second-Stage Clamping Voltage: 210 volts or less.
   c. Continuous Operation: Power supplies for one four-wire transmitter or receiver: 5 amps minimum at 130V ac. All other applications: 30 amps minimum at 130V ac.
   d. Compliance: UL 1449 listed, 2nd edition.
   e. Protection: All modes.
   f. Response Time: Less than 1 nanosecond.
2. Suppressors on Analog Signal Lines:
   a. Test Waveform: Linear 8 microsecond rise in current form 0 amps to a peak current valve followed by an exponential decay of current reaching one half the peak valve in 20 microseconds.
   b. Surge Rating: Tested and rated for 50 occurrences of 2,000-amp peak test waveform.
   c. dc Clamping Voltage: 20 to 40 percent above operating voltage for circuit.
   d. dc Clamping Voltage Tolerance: Less then plus or minus 10 percent.
   e. Maximum Loop Resistance: 18 ohms per conductor.
3. Physical Characteristics:
   a. Mounted in Enclosures: Encapsulated in flame retardant epoxy.
   b. For Analog Signals Lines: Joslyn Total Protection Solutions Com Trac SLP .
   c. For 120V ac Lines: Joslyn Total Protection Solutions LoadTrac LTE, 30 amp rating
   d. Field Mounted at Two-Wire Instruments: Encapsulated in stainless steel pipe nipples. Joslyn Total Protection Solutions Com Trac SCP
   e. Field Mounted at Four-Wire Instruments: With 120V ac outlet, ac circuit breaker, and surge suppressor on signal lines, all in NEMA 4X 304 stainless steel with door, 12 inches by 12 inches by 8 inches deep.
   f. Installation and Grounding of Suppressors: per manufacturer's instructions. Grounding equipment, installation of grounding equipment, and terminations for field mounted devices are provided under Division 16, ELECTRICAL.

G. Telephone Entrance:
1. Protect all incoming cabling.
2. Protection shall be rated 2kA per pair
3. Suitable for dial up, T1/E1, HDSL, CDSL, ISDN

4. UL listed 497A as secondary telephone protector.
5. Provide in minimum blocs of 25 pair
6. Joslyn Total Protection Solutions Com Trac MDP .

H. Data:

1. Suitable for use on Cat5 UTP, Cat5 STP, Cat6,
2. Min rating 10/110BASE-T
3. All modes protection, L-L, L-G
4. Polyphaser IX-2M (for outdoors -- weatherized unit), NX2-60 (indoors). Modify catalog for system voltages.

2.04 ACCESSORIES

A. Push to test feature to verify operational integrity.

B. Form C dry contacts one NO, one NC for remote status monitoring.

C. Provide audible alarm and surge counter.

2.05 ENCLOSURES

A. All enclosed equipment shall have minimum NEMA 12 gasketed, general purpose enclosures indoors, unless otherwise noted. Provide enclosures suitable for locations as indicated on the drawings and as described below:

1. NEMA 12 gasketed, surface or flush-mounted general purpose enclosure primarily intended for indoor air conditioned building use.
2. NEMA 12 dust-tight enclosures intended for indoor use primarily to provide protection against circulating dust, falling dirt and dripping non-corrosive liquids (Panelboards Only).
3. NEMA 4X 316ss, watertight stainless steel intended for indoor or outdoor use primarily to provide protection against windblown dust and rain, splashing rain, hose-directed water, and damage from external ice formation. (Side Mounted Units Only).
4. NEMA 7 Ex Pf in classified areas.

PART 3: EXECUTION

3.01 EXAMINATION

3.02 FACTORY TESTING

A. Standard factory tests shall be performed on the equipment under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.

3.03 INSTALLATION

A. The Contractors shall install all equipment per the manufacturer's recommendations and the contract drawings.

B. The Electrical Contractor shall furnish power and analog surge suppressors at the instrument ends as specified in specification section 16671. The Electrical Contractor shall coordinate the requirement wit the System Supplier.

3.04 MANUFACTURER'S CERTIFICATION

A. A qualified factory-trained manufacturer's representative shall certify in writing that the equipment has been installed, adjusted, and tested in accordance with the manufacturer's recommendations.

B. The Contractor shall provide six (6) copies of the manufacturer's representative's certification before final payment is made.

3.05 TRAINING

A. Onsite Operator & Maintenance Training

The manufacturer shall conduct training course for operating staff as designated by the Engineer. The training period shall consist of 1 period of 2 hours of normal working time and shall start after the system is functionally completed but prior to final acceptance. The course instructions shall cover pertinent points involved with the equipment, including servicing the equipment, as well as all major elements of the operation and maintenance manuals. Provide 10 training manuals for operator training.

B. The Electrical Contractor shall furnish power and analog surge suppressors at the instrument ends as specified in section 16671. The Electrical Contractor shall coordinate requirements with the System Supplier in Section 16904.

3.06 MEASUREMENT AND PAYMENT

A. Measurement for payment for the work under this section shall be at NO DIRECT PAY and shall be included with the related work bid items.

END OF SECTION 16671

SECTION 16904

PUMP CONTROL PANEL (PCP)

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. General: **The CONTRACTOR shall furnish, install, and place into service a pump control panel (PCP) to control the entire pump station.** The PCP shall interface with the pump station power equipment (MCC-1, ATS-1, G-1). The PCP shall control the motor starters, instrumentation and appurtenances for control of the lift station pumps. The PCP shall interface with the 480V automatic transfer scheme (ATS-1). This includes Utility Power and generator power. The PCP shall incorporate into it's control system, coordination of pump starting, stopping etc. with the ATS switching of power sources. The CONTRACTOR shall also furnish and install a new data radio and antenna as part of the PCP. The system shall communicate with the existing Parish's Supervisory Control and Data Acquisition (SCADA) System at the Parish Emergency Operations Center.

B. System Supplier: Due to the critical nature of the system, the complete Pump Control Panel shall be furnished by a single supplier.

One Responsible Supplier (System Supplier): The system described herein, including PLCs, supporting hardware, software, communication enclosures, UPS, process instruments, and other ancillaries, etc. shall be furnished by a single supplier designated as the System Supplier. The System Supplier shall be regularly engaged in the business of system integration for municipal pump stations, and be familiar with all aspects of fully automated process control systems. The responsibility for performance to the specification in its entirety shall not be split up amongst individual suppliers of components comprising the system, but must be assumed solely by the supplier of the system. The System Supplier shall furnish the Owner with program implementation and customization. In addition, the System Supplier shall furnish schematics, wiring diagrams for the system components, interconnection schematics, loop drawings, and field point to point wiring diagrams showing all connections to each individual piece of equipment within the system. The PLC/Operator Interface software manufacturer and hardware component manufacturer shall have printed literature and brochures describing the standard series specified (not one of a kind fabrication).

1. **The System Supplier shall also be responsible for coordinating the submittal drawing packages for Contractor supplied equipment. The System Supplier shall integrate all the Contractor equipment submittal drawing packages into a unified control, monitoring and communication system for this project.** This includes the following specification sections:

16426	Stand By Power System Genset
16429	Load Bank
16470	Panelboards
16482	Motor Control Centers
16485	Local Control Stations & Miscellaneous Electrical Devices

16496 Automatic Transfer Switch
16950 Electrical Tests

In addition, the System Supplier shall review all other PLC/HMI related contractor submittals for Engineer approval, within the various sections of Division 16 as called for above, and affix a statement under the System Supplier letterhead, that the submittal has been reviewed for all PLC/HMI coordination, content, etc. and that the System Supplier takes "No Exceptions" to the submittal as submitted by the Contractor. Engineer will not review submittals unless such an approval is attached.

2. The System Supplier shall also be responsible for supplying and integrating into a unified control, monitoring and communication system all the electrical components for this project. This includes the following specification sections:

   16904 Pump Control Panel

3. The System Supplier shall perform a complete factory test on the Pump Control Panel with PLC and all internal components.

4. The System Supplier shall be responsible for Pump Control Panel startup services and the coordination and integration of the System Supplier start up services with the services of the other related manufacturer's field start up engineers, such that all systems are integrated and fully functional. This includes all the equipment listed in item 1.01.B.1 above. The field service engineers for the equipment listed in 1.01.B.1 above, and the pump control panel System Supplier shall be on site at the same time to perform start up services. The field services start up engineers, shall remain on site for as long as it takes to perform complete start up services for a fully functioning system.

5. The OWNER at his option, may witness the pump control panel factory test. The Owner shall be notified at least 3 weeks in advance of any factory testing to allow travel arrangements.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Electrical work specified hereunder shall conform to the requirements of this Section and the applicable requirements of all Electrical Sections.

1.03 REFERENCE SPECIFICATION, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of these Specifications, all work specified herein shall conform to or exceed the applicable requirements of the referenced documents to the extent that the requirements therein are not in conflict with the provisions of this Section; provided, that where such documents have been adopted as a code or ordinance by the public agency having jurisdiction, such code or ordinance shall take precedence.

1.04 CONTRACTOR SUBMITTALS

A. General: All submittals shall be made in accordance with the applicable general requirements of the Specification Section entitled "Submittals" and additional submittal requirements as called out in Section 16010.

B. Shop Drawings: The CONTRACTOR shall submit to the ENGINEER shop drawings of all equipment before fabrication in accordance with provisions of the Contract Documents. Should an error be found in a shop drawing during installation or start up of equipment, the correction, including any field changes found necessary, shall be noted on the drawing and submitted finally as part of the "Record Drawings" prior to acceptance of the WORK. All shop drawings shall be checked by the CONTRACTOR before submittal for review by the ENGINEER. These drawings and data shall be submitted as a complete package at one time (except allowed early submittals on major equipment and long lead delivery items) and shall include:

1. Complete systems diagrams: Drawings shall shown definitive wiring interconnections diagrams for each site. These diagrams shall show and identify each component of each system and shall show which components require a nominal 117-volt, 60-Hertz power source. These diagrams shall be prepared in accordance with ANSI/ISA S5.4.

2. Data sheets shall be included for each component together with a technical product brochure or bulletin. These data sheets shall show the following: The component name as used on project drawings and in these Specifications, manufacturer's model number or other identifying product designation, the project tag number, the project system of which it is a part, the project site to which it applies, input and output characteristics, functional and operational descriptions sufficient to show conformance to the specification requirements, requirements for electric power, specifications for ambient operating conditions, and details on materials of construction.

3. The arrangement of construction drawings for the control panel enclosures shall show dimensions, identification of all components, preparation and finish data, name plates, and the like.

4. Installation, mounting, and anchoring details shall be shown for all components and assemblies to be field mounted, including access requirements, conduit connections, or entry details.

5. In addition to the above requirements, provide the following:
   a. Bills of Material
   b. Elevation and Base Plan drawings
   c. Wiring diagrams
   d. Catalog cut-sheets
   e. Pump Control Panel heat calculations
   f. Certified Factory Test results
   g. Spare parts list
   h. 10-year Warranty for Programmable Pump Controller and printed circuit boards.

i. 10-year warranty for Reactive Air™ Level Monitoring System compressor.
j. 1-year warranty for all electrical components, from date of pump station acceptance.
k. Certification that all printed circuit boards have conformal coating.
l. Certification the Programmable Pump Controller and all printed circuit boards have passed a 5-day burn-in test. Testing requirements are as noted in the PPC hardware specification.
m. System Supplier CSIA Certified Member certification

1.05 QUALITY ASSURANCE

A. Installation Supervision: The pump control panel System Supplier shall furnish services and technical information as necessary to ensure that the equipment furnished by him is installed in a proper and satisfactory manner. These services shall include, but not be limited to, providing the installing contractor with information and direction prior to the commencement of the installation work, answering of all questions regarding the installation and hookup, and a complete check of the completed installation to ensure that it is in conformance with the requirements of the equipment and the Contract Documents.

B. Calibration: The pump control panel System Supplier shall furnish the services of a trained technician to perform a complete system calibration. Those components having adjustable features shall be set for the specific conditions and applications, and within the specified limits of accuracy. Defective elements which cannot achieve proper calibration or accuracy, either individually or within the system or subsystem, shall be replaced. A complete record of the calibration checks and adjustments shall be made and delivered to the ENGINEER & Owner upon completion of the system calibration.

C. Testing: Systems shall be exercised through operational test in the presence of the ENGINEER in order to demonstrate achievement for the specified performance. Attention is directed to all applicable equipment testing and system startup sections for additional requirements relating to testing.

1.06 INTERFACE TO EXISTING SCADA SYSTEM

A. General: The pump controller shall be designed for direct communications with the existing Parish SCADA System. Signal data, setpoints, etc. shall be stored in standardized registers for access by the SCADA system central software. System Supplier shall coordinate details with Jefferson Parish Central Station Scada operations prior to programming the pump controller. All modifications to the central software to incorporate the Chaz Pizani DPS site will be performed by the Parish.

B. Radios: At Chaz Pizani DPS, the pump control panel manufacturer shall provide a radio system with all components in the pump control panel. The Contractor shall provide new conduit and cabling between the radio and proposed new antenna location.

PART 2 -- PRODUCTS

2.01 GENERAL

A. General Requirements
Furnish and install all equipment as shown on drawings.

B. Enclosure
Provide a U.L. 508 listed, weatherproof NEMA 3RX stainless steel Pump Control Panel. The Pump Control Panel shall be 90" in height and shall include a custom sunshade that shall hang over the front of the enclosure a minimum of 42" for added protection from the weather. Along with exterior doors, the Pump Control Panel enclosure shall be furnished with hinged interior dead-front doors. All enclosure material shall be constructed of 14-gauge, 304 stainless steel and shall be painted "White", per Parish standards. Doors shall be equipped with 316-stainless steel polished handles with 3-point roller bearing latches and hasps for owner padlocks. Doors shall be hinged on the same side and shall open to greater than 90 degrees. All doors (exterior and interior) shall also be furnished with 316 stainless steel metal doorstops for use in windy conditions. All dead-front latches shall be 1/4 turn adjustable with 1/8" thick latching dog and knurled knob. All interior mounting hardware shall be stainless steel. Interior color including front and back of all hinged dead front doors, separation barriers and mounting backpans shall be white. The painting process shall include five stages of metal preparation using dip tanks as follows: 1) Alkaline cleaner, 2) Clear water rinse, 3) Iron phosphate application, 4) Clear water rinse, and 5) Inhibitive rinse to seal phosphated surfaces. Finish shall be polyester dry powder, electrostatically applied and baked on at 400 degrees Fahrenheit for a minimum of 15 minutes.

The Pump Control Panel shall be housed within the MCC-1 enclosure as shown on the drawings. MCC-1 enclosure shall contain the station main circuit breaker, automatic transfer switch, motor starters and motor control, power distribution, Programmable Pump Controller (PPC)/telemetry components and level controls. The enclosure shall be compartmentalized such that the Programmable Pump Controller/telemetry section shall be isolated from the power sections. The compartments containing the Programmable Pump Controller/telemetry components shall be separated from the power sections by barriers behind the inner dead front doors. All openings shall be sealed to prevent entrance of insects and rodents.

The MCC-1 enclosure shall be free standing suitable for anchoring to a house keeping pad.

C. Internal Construction
The main circuit breaker, automatic transfer switch, motor circuit breakers, motor controls, and all power wiring shall be located behind an interior dead front door. Interlocks and circuit breaker operation shall be possible without opening the dead front door. The PPC Operator Interface Unit, elapsed time meters, indicating devices and H.O.A. switches, shall be mounted on the inside dead front door. Breaker cutouts for breaker toggle protrusion shall be supplied, to eliminate exposure to hazardous potentials. A physical lockout device shall be supplied on each motor circuit breaker. The control panel shall be thermostatically controlled by heating and cooling systems - without the use of an air conditioner - to maintain suitable climate conditions within the control panel. Lightning/surge protection and PFR power fail relay shall be furnished to protect

the panel equipment from lightning, loss of power or utility power surges. Provide GFCI receptacle, intrusion switch and LED light with door activated switch in each panel section. All bussing and wire shall be copper. All wire shall be stranded with locking spade pressure connectors and labeled with clip-on permanent plastic wire markers. All circuit breakers and dead-front mounted devices (lights and switches) shall be equipped with custom engraved phenolic nameplates.

D. Miscellaneous Items: Miscellaneous items such as cables, connectors, etc. are not necessarily shown or specified. All such items needed to provide a complete and operable system shall be furnished under the requirements of the Contract.

2.02 PROGRAMMABLE PUMP CONTROLLERS (PPC)

A. General Requirements
The Programmable Pump Controller shall have all the characteristics and features listed herein. All sites shall be similar in nature, (operator interface, configuration and options, back pan layout, etc., except for I/O count), so all RTUs can be interchangeable with one another. The use of any third party hardware or software add-on products to meet this specification is not acceptable. For maintenance purposes, to be compatible with the installed base of Parish controllers, the controller shall be an L3000™ Programmable Pump Controller from TESCO Controls, Inc.

B. Manufacturer
The Programmable Pump Controller shall be procured from a manufacturer that has at least 40 years experience manufacturing its own Programmable Pump Controllers designed specifically for the water and waste water industry. The manufacturer shall not have discontinued any line of Programmable Pump Controllers manufactured. The PPC itself and support for the controller shall be available directly from the manufacturer. Programming services shall be available direct from the manufacturer as a normal practice.

C. Warranty
The manufacturer shall provide a factory-standard 10-year warranty with the unit. The replacement controller shall be available within 24 hours, installed and running at the station, without requiring that the original unit first be removed and returned to the factory.

D. Support
The manufacturer shall provide 24/7/365 support for questions related to any aspect of the controller, including general use, application-specific issues, programming, and use of the programming software. This support shall be available directly from the manufacturer at no extra charge with the purchase of a controller. The manufacturer must also support a Spare In The Air Program™, which will expedite parts or a new controller unit by the next day.

E. Construction
The Programmable Controller should be constructed using a card cage architecture incorporating a 96 pin 3U DIN VME standard backplane interconnection. The printed circuit cards shall be designed to slide into the card rack and interconnect with the VME

backplane. A high density I/O card with a mix of I/O types as well as an I/O card for each individual I/O type shall be available. The system shall operate with a minimum of 2 cards and shall be easily expandable to 20 cards. All field wiring to the I/O cards shall be done at externally mounted terminal blocks with ribbon cable interconnects to the relative I/O card.

1) Operating Conditions
The Programmable Controller shall operate correctly under an ambient temperature range of -40 to +185 degrees F without requiring forced air or other special cooling measures. Coatings on connectors, component leads, and other materials used in the construction of the Programmable Pump Controller shall be substantially resistant to atmospheres containing significant amounts of Hydrogen Sulfide gas and Chlorine gas.

2) Other
The Programmable Pump Controller shall have a low-power shut-down mode suitable for use in solar or other sites where power consumption is critical. The Programmable Pump Controller shall be provided with a complete operations and maintenance manual. At minimum, each Programmable Pump Controller shall be subjected by the manufacturer to a 5 day burn-in procedure at 165 degrees F.

F. Card Architecture

1) Processor Card
The Programmable Pump Controller shall be microcontroller-based, using a microcontroller that, at minimum, supports the following:
a. 1GHz clock rate
b. 512Mbytes RAM
c. 64Gbytes secure digital Flash
e. Watchdog timer
f. 4 configurable timers with interrupt capability
g. 3 serial ports with separate baudrate generators
h. 1 10/100Mbs Ethernet port
i. 4 USB 2.0 ports
j. 1 HDMI Video port
k. Write-protect enable/disable

The Programmable Pump Controller shall use a real-time, preemptive, multitasking operating system, contained in Flash memory. The Flash memory shall also contain all firmware that is not specific to a particular job or application, such as operator interface and communications firmware.

2) Input/Output Characteristics
The Programmable Pump Controller shall provide built-in digital filtering of analog inputs. The filter constants shall be adjustable from the keyboard and through the communications ports.

G. Field Wiring Terminal Blocks

The terminal blocks shall support the following listed characteristics:

- pull-apart two piece wiring blocks for fast and easy wiring/re-wiring
- separate wiring blocks for each I/O type and each wire point fully labeled
- versatile internal or external analog power source

- digital outputs have LED "ON" indicators and socketed 10A relays
- entire terminal block shall snap on/off standard track mount
- onboard passive circuit protection to protect programmable controller shall be available with a built-in isolated current loop power supply, powered from the 12V DC main power. The current loop power supply shall be capable of producing at least 24V DC and 161 mA.
- three levels of lightning/surge protection

H. Power Supply

The Programmable Pump Controller shall be powered by a 12V/5V DC power supply, with an allowed operating range of at least +/- 10%. A 12V battery backup of the 12V DC shall be available such that the 5V DC is also maintained by the 12V battery.

I. Operator Interface Unit

The Programmable Pump Controller shall be available with an operator interface that is an integral part of the unit. The same operator interface shall be remotely mountable.

1) Keyboard

The Programmable Pump Controller shall be provided with a full 32 keyboard with keys for direct access to functions. The keyboard construction shall be sealed membrane type, using a stainless steel backing plate, and shall be impervious to wash-down environments and atmospheres containing Hydrogen Sulfide and Chlorine gases. The keys shall provide tactile feedback. The keyboard shall provide a menu-based operator interface, allowing the operator to perform at least these functions, without process interruption:

a) Examine and change setpoints
b) Examine analog input and output registers
c) Examine and change timers and counters
d) Examine and change analog input filter constants
e) Calibrate analog inputs and outputs
f) Force digital outputs on and off
g) Override analog inputs and outputs
h) Examine control program

2) LED Character Display

The Programmable Pump Controller shall be provided with an alphanumeric LED display capable of displaying at least 8 characters at a time using at least 15 segments per character. The LED character display shall be used for showing the values of registers, inputs, outputs and other data.

3) LED Annunciators

The Programmable Pump Controller shall be provided with at least 380 individual LED's arranged in columns, which shall be usable to display the on/off state of digital inputs and outputs (physical or internal). The LED's shall also be usable for bar graph displays.

4) Mode LED's

The Programmable Pump Controller shall be equipped with at least the following

mode display LED's:

- SBY - lighted when in standby mode
- CMD - lighted when in command mode
- RUN - lighted when in run mode
- MEM - lighted when write-protected memory is open
- CAL - lighted when in calibration mode
- XMT - lighted when a message is being transmitted via a communications port
- RCV - lighted when a message is received via a communications port
- ERR - lighted when a an error condition is detected by the controller

The XMT/RCV LED's shall be configurable to selectively show activity on any combination of the communications ports.

5) Bar Graph Displays
The Programmable Pump Controller shall have the ability to display at least 4 bar graphs on the LED annunciators. The bar graphs shall be individually configurable. If the value being monitored by the bar graph should go beyond the defined endpoints (under range or over range), the LED at that end of the bar graph shall flash to indicate the condition.

6) Color Touch Screen OIT
The PPC shall have the ability to communicate Modbus to other OIT's through the Ethernet port.

7) HDMI Touch Screen
The PPC shall have the ability to interface to a HDMI OIT using the HDMI port. Where a HDMI Touch Screen is provided, it shall be rated at least with a NEMA 3 rating or better.

8) Operating Modes
The Programmable Pump Controller shall have two basic modes of operation as described below:

a) RUN:
- Actively controlling, running application-specific control program
- Sensing input signals
- Generating outputs under program control
- Peer-to-peer message initiation is enabled
- Polling is enabled

b) STANDBY:
- Not actively controlling
- Continues to sense input signals
- Analog outputs held at current level or set to zero
- Digital outputs go to off state

- Initiation of peer-to-peer messages is disabled
- Polling is disabled

J. Programming

1) Language

The Programmable Pump Controller shall be programmable using the ability to execute a higher-level BASIC-like programming language which is native to the controller. The Programmable Pump Controller must also support IEC 61131-3 for additional programming languages.

2) Registers

The Programmable Pump Controller shall have at least the following preformatted register types arranged in a global system database, with the quantity of each register type selectable to at least the numbers given:

a) Setpoint (for storing constants, at least 1000)
b) Analog input (physical or internal, at least 1000 total)
c) Analog output (physical or internal, at least 1000 total)
d) Digital input (physical or internal, at least 1000 total)
e) Digital output (physical, at least 128)
f) Index (for indirection and general purpose use, at least 1000)
g) Timer/counter (at least 1000 total)
h) Seconds timer (times in seconds with 10 mS or better resolution, up to 497 days)
i) Hours timer (times in hours with 2 second or better resolution, up to 272 years)
j) HMS timer (hours, minutes, seconds format, with 0.5 second or better resolution, up to 68 years)
k) Event counter (integer value register supporting increment/decrement, range 0 - 4,294,967,295)

The Programmable Pump Controller shall support a pulse counting frequency of at least 1 kHz on a single input.

3) PID Function

The Programmable Pump Controller shall provide built-in PID (Proportional/Integral/Derivative) control without requiring any procedural programming or subroutine writing. The Programmable Pump Controller shall support the ability to simultaneously execute at least 16 independent PID control loops.

K. Configuration

The Programmable Pump Controller shall be configurable via a configuration table, which shall be changeable both by downloading through a communication port and through the full and limited keyboards. The configuration table shall allow the operator to change virtually all significant operating parameters of the system.

L. Web Server

The Programmable Pump Controller shall include an integrated web server for secured remote customized visualization of process data including a web server disable feature if not desired. The web server must be able to store all types of documentation and values,

and all information must be available using a web browser. The web server must have colorful well designed screens that clearly show data in real time. The web server must also be able to email alarm notifications to operators and facilities.

M. Communications

The Programmable Pump Controller shall have the ability to simultaneously support at least 3 serial communication ports 1 Ethernet/IEEE 802.3 RJ45 port. Any of these serial ports shall be usable for both communications of telemetry data and control program/configuration upload/download and support baud rates of 230,400 bps or higher. The ports shall be configurable to support the following media:

- Full handshake RS-232 (at least 3 ports must be configurable this way)

In addition to the three (3) RS-232 serial ports, the Programmable Pump Controller shall have one (1) Ethernet port, for a total of four (4) communications channels. All four (4) communications channels shall have the capabilities of independent operation. Each channel shall have the following capabilities:

- Poll/Response
- Quiescent (Unsolicited)
- Master Polling
- Message Store and Forward
- Automatic Port Escalation with Recovery
- Message Retries
- Communication Statistics and Diagnostics

The Programmable Pump Controller design shall incorporate Ethernet design using 100BASE-T interface and TCP/IP industry standard network protocol with the following features:

- Redundant hot-standby Ethernet (Primary Network and Secondary Fail Over Communications)
- Standard 100BaseT Interface (100Mbps data transmission, over twisted-pair cable with RJ45 connectors)
- Complies to IEEE 802.3 Specifications (Local Area Networks or Wide Area Networks)
- Separate LED Line Status Indicators (Each port to confirm Frame Transmit, Receive, Link, Collision, and Interference)
- Individual IP Configuration (Multi Network Configurations)
- Built-in PING Response (Test connectivity and verification of IP Address)
- Multi Protocol Support (Modbus TCP/Modbus Serial, Data Express, Data Express Plus)
- Telemetry Message Routing (Communicate across all channels, i.e. RS232 to Ethernet and Ethernet to RS232)

The Programmable Pump Controller must also have USB ports to support uploading/downloading of programs, external USB Drives and the ability to configure ports for additional communications channels.

1) Protocols
The Programmable Pump Controller shall implement the Ethernet/IEEE 802.3 protocol. When the PPC wishes to transmit, it will check for activity on the LAN. When the LAN becomes silent for a specified period, the PPC will begin transmission. During transmission, the PPC will continually check for a collision on the LAN. If a collision is detected, the Programmable Controller will cease transmission. The Programmable Pump Controller will then wait a random period of time before attempting to transmit again.

The Programmable Pump Controller shall support serial communications using at least 3 different protocols. The de facto standard ModBus protocol shall be supported. These protocols shall be able to coexist simultaneously on the same port. The Programmable Pump Controller shall support poll/response, polling master, quiescent, report-by-exception and message routing communications, as described in the following sections. Any of these communications modes shall be usable alone or simultaneously in any combination.

2) Polled Slave Communications
The Programmable Pump Controller shall respond as a slave unit in response to polling messages from a master SCADA system or other unit. In this mode the Programmable Pump Controller shall only respond to requests for data and not initiate messages on its own.

3) Polling Master Communications
The Programmable Pump Controller shall initiate polls as a master unit and wait for the response from the slave device.

4) Quiescent Communications
Using quiescent (peer-to-peer) communications, the Programmable Pump Controller shall provide the ability to initiate messages transmitting register values under operator definable conditions.

5) Report by Exception Communications
The Programmable Pump Controller shall support a means of report-by-exception communications, where only those registers of interest that have changed since the last reporting are transmitted.

6) Message Routing
The Programmable Pump Controller shall provide the ability to route received messages that are destined for another unit. The routed message can be received and sent in any combination of communication ports and physical media.

7) Failure Recovery
The Programmable Pump Controller shall have the ability to switch to alternate communications paths in the event of failure of the primary path. There shall be no practical limit on the number of different paths that the Programmable Controller may try in order to deliver the information.

8) Redundant Message Elimination
The Programmable Pump Controller shall automatically provide redundant

message elimination when peer-to-peer and polled communications are used in combination.

9) Other
The Programmable Pump Controller shall provide a means on enabling/disabling quiescent/polling master message initiation from the keyboard.

N. Engineering Unit Representation
The Programmable Pump Controller shall have the capability to represent all analog input and analog output values directly in engineering units. Engineering units are defined to be "real world" IEEE 754 standard floating point numbers corresponding to physical measurements, such as level, pressure, depth and flow. Telemetry communications shall use engineering unit representation in all messages.

O. Calibration and Multipoint Calibration
A simple menu-driven procedure shall be provided that allows the operator to calibrate an analog input or output to an engineering unit measurement scale. This procedure shall be usable from both the full and minimal keyboards. The calibration information shall be uploadable and downloadable via a communication port.

P. Single and Multi-Point Test Override
The Programmable Pump Controller shall provide the ability to override I/O and register values for test and other purposes. When in override, the operator shall be able to control the register (set any value or on/off state) independent of the control program or physical input. The value seen by the control program shall be the override value. The operator shall also be able to release all override points at once. When any register is in override, there shall be a visible indication to the operator, regardless of what mode the Programmable Pump Controller is in.

Q. Alarms
The Programmable Pump Controller shall provide alarm flags to be used to indicate application-specific alarm conditions. The Programmable Pump Controller shall provide a common alarm digital output, that can be configured to be any digital output and can be displayed anywhere on the LED annunciators.

R. Fault Tolerance and Reliability Features

1) Event Logging
The Programmable Pump Controller shall provide a mechanism that reports and logs unusual events and items of interest. The Programmable Pump Controller shall also support viewing of the RAM event log data by transmission via the serial port.

2) Fault Relay
The Programmable Pump Controller shall contain a normally closed fault relay that under normal operation shall be energized by the Programmable Controller to indicate a non-fault state. The fault relay shall go to a fault condition (non-energized) under the following circumstances:

- 12 V DC power failure
- Memory error or other internal operating error

3) Power Up Self Test
The Programmable Pump Controller shall perform a brief self test upon application of power, including:
- ROM checksum
- RAM write-protection circuit check
- Write-protected RAM CRC check

4) On Going Self Test
During normal operation (run or standby modes) the Programmable Controller shall run an ongoing self test process. The frequency with which the ongoing self test performs these checks shall be configurable by the operator.

5) Diagnostic Functions
The Programmable Pump Controller shall have the capability to perform self-test diagnostic functions under operator control to verify the integrity of the RAM and ROM inside the unit.

6) Activity Monitoring
The Programmable Pump Controller shall provide a mechanism for selectively viewing activity of certain integral subsystems. Text messages indicating activity shall be directable under operator control to the LED or a communication port.

7) Power Fail/Brownout Detector
The Programmable Pump Controller shall have an integral hardware device that detects a brownout or imminent power fail condition. Upon detection of the 12V DC power supply voltage dropping below an adjustable threshold, this device shall generate an immediate interrupt signal to the microcontroller.

8) Watchdog Timer
The Programmable Pump Controller shall contain a hardware watchdog timer circuit that will reset the microcontroller within 1 second of detecting a firmware failure.

9) Security
The Programmable Pump Controller shall be capable of being configured to require password entry before access to functions that would change the control characteristics or basic operating mode (run/standby) of the Programmable Pump Controller. Multiple passwords shall be supported, with at least 100 allowed. If the operator does not operate the keyboard within a selectable time period, the Programmable Pump Controller shall log him out automatically. The Programmable Controller shall also support uploading and downloading of password configuration information via the communications ports.

10) Data Archiving
The Programmable Pump Controller shall provide a means of archiving I/O and register values into storage arrays. The Programmable Pump Controller shall also provide direct read access through any communications port to the contents

of each data archive. Each sample shall consist of a date and time stamp and the register value. The Programmable Pump Controller shall also provide functions available through the communications port that allow an external SCADA or other system to reset specific archives and obtain other necessary information about the data archives in use.

11) Remote Control

The Programmable Pump Controller shall have the ability to remotely control other controllers of the same make using any of the communication ports. The operator shall be able to perform at least the following functions on the remote unit by using the local keyboard:

- Examine and change setpoints
- Examine analog input and output registers
- Examine and change timers and counters
- Force digital outputs on and off
- Override analog inputs and outputs
- Change operating mode between Run and Standby

S. Programming Software

1) General

A free copy of the necessary programming software shall be provided with each Programmable Pump Controller purchased. The software shall be produced, provided and supported directly by the Programmable Pump Controller manufacturer. No third party tools are acceptable.

2) QuickLoad Software

A fast and easy to use software program shall be available free of charge to Upload and Download from a laptop computer to the controller all calibration points, setpoints and control programming. A complete user's manual shall be provided which describes the use of all programming software. The latest version of TESCO's WinBench™ programming software shall be used.

3) OPC Communications Server Software

OPC (OLE for Process Control) communications server program shall be available to poll the programmable controller and serve real-time data values to any OPC compliant client, such as spreadsheets, databases and SCADA systems. This software shall operate on a computer and shall poll the controller through any maintenance port to gather real-time data of any type and number. Also, the program shall operate remotely to poll for any real-time data in the controller. The program shall have the ability to operate in a multipoint controller environment, up to 100 controllers, with full hardware handshaking to the communications media. The program shall have the ability to display all telemetry message transactions for the communications port and shall utilize protocol disciplines such as retries, comm. failures and automatic comm. recovery methods.

The program shall have the ability to display all telemetry message transactions for the communications port and shall utilize protocol disciplines such as retries, comm. failures and automatic comm. recovery methods.

T. Pump Controller I/O Configuration
Provide all the I/O required to implement the control scheme specified and as shown on the drawings.

Analog inputs: As a minimum, 12 analog inputs shall be provided. All inputs are 4-20 mADC.

Analog outputs: As a minimum, 4 (4-20)mA outputs shall be furnished for future use.

Digital Inputs: As a minimum, 64 digital inputs shall be provided.

Digital Outputs: As a minimum, 16 outputs shall be furnished.

2.03 BATTERY BACKUP

A. Battery back up system shall correctly sized to power the Controller, radio and I/O system for a minimum of 8 hours. Batteries shall be sealed gel cell type lead acid.

2.04 ELECTRICAL COMPONENTS

A. General: Provide all components for a complete system as shown on the drawings.

B. Push Buttons and Selector Switches: Provide as required to implement the control scheme. Switches shall be oil-tight, heavy duty, as manufactured by Allen-Bradley 800H, or equal.

C. Indicating Lamps: Provide as required to implement the control scheme. Lamps shall be oil-tight, LED, heavy duty, full voltage, press-to-test type as manufactured by Allen-Bradley, or equal.

D. Elapsed Time Meters: An elapsed run time meter shall be furnished for each pump motor. Meters shall be six digits, non-resettable, recording in hours and tenths.

E. Duplex Outlet: A GFCI service outlet shall be furnish with each control panel. The outlet shall be rated 20 amp at 125 VAC, Hubbell industrial type, extra heavy duty. The outlet shall be fed thru a 20 amp circuit breaker. A separate 20 amp circuit breaker shall provide power to the pump control circuit.

F. Terminal and Distribution Blocks: Distribution blocks shall be furnished and installed as required for "fan-out" of power and other 120V sources within the enclosure. Power distribution blocks shall be insulated type, tin plated copper, 600V, ampere rated equivalent to 75 degree C copper wire, per 2014 NEC conductor table 310.15.(B).(16) Terminal blocks shall be rated 600V at a minimum of 30 amperes and sized for the conductors served. They shall be screw terminal type capable of terminating 10 to 26 gauge wire. Terminal bridge bars shall be provided when it is necessary to bridge multiple like terminals together. Terminals and accessories shall be Phoenix Contact "Clipline" or equal by Allen Bradley or Weidemueller.

G. Circuit Breakers: All 120 volt breakers shall be rated 10,000 minimum amperes interrupting capacity. Where required, provide breakers with AIC rating to match panel AIC rating such that system is fully AIC rated. Circuit breakers shall be of the indicating type, providing ON, OFF and TRIPPED positions of the operating handle. Circuit breakers shall be quick-make, quick-break, with a thermal-magnetic action. Circuit breakers shall be the bolted on type. The use of tandem or dual provide breakers in a normal single- pole space to provide the number of poles or spaces specified is not acceptable. All multiple-pole circuit breakers shall be designed so that an overload on one pole automatically causes all poles to open. Circuit breakers shall meet the requirements of UL and NEMA AB l. All circuit breakers shall be heavy duty molded case circuit breakers conforming to Federal specification W-C-375B and shall be UL listed. Provide higher rated amperes interrupting capacity breakers as required to meet the 50KAIC nameplate overall equipment rating, as shown on the drawings.

H. Control Power Transformer: Transformer shall be furnished where required, with primary and secondary fusing. Transformer shall be encapsulated with electrical grade epoxy and silica sand to completely seal the core and coils from moisture and contaminants. Transformer shall be designed for quiet operation, 180 deg. C insulation system standard with 115 deg. C temperature rise. Transformer shall be made in U.S.A. and meet or exceed all applicable NEMA, ANSI, OSHA, UL and CSA requirements.

I. Relays, Control : Control relays shall be rated, 10 amp contacts, 300V, 1 million operations, minimum two form-C contacts, octal plug in base, neon energized lamp, Relays shall be Idec RR, P&B or equal.

Time delay relays shall be solid state relays with a timer adjustable over the range 1 to 60 seconds unless other ranges are indicated or required. Provide 10 amp contacts, LED energized indicator lamp, plug-in base. Time delay relays shall be Idec RTE, P&B or equal.

J. Relays Power Fail: The power fail relay shall continuously monitor the three phases for power loss, low voltage, phase loss, phase reversal and have automatic reset. The power fail monitor shall have a drop-out voltage adjustment and a failure indicating LED. Provide Diversified Electronics SLA series or equal.

K. Panel Light Fixtures: Provide LED light with door activated switch in each panel section.

L. Interface Relays to Opti Level Floats, and motor High Temperature

1. Interface relays shall be provided for back up level detection and for Low Low Level cut-out, Low Level, High Level as shown on the drawings. The unit shall utilize low current (120 micro amps maximum) and low voltage (12 volts d-c maximum).

2. Pump high temperature relays shall be provided for drainage pumps. Relays shall be rated 10Amp, 120VAC, plug in base, 2 form C contacts, with LED relay energized indicator lamp. Hardwire 1 contact as permissive in the motor control circuit. Wire 1 contact into the PLC input circuit. Provide a control panel

indicating light showing motor high temperature trip.

2.05 MOTOR CONTROL

A. Provide control circuits for each motor as shown on the drawings and to interface with the MCC equipment supplied under Section 16482. Coordinate with the MCC manufacturer's circuitry to provide an integrated power and control system for each motor. Make any necessary adjustments to wiring, controls, and other affected material or equipment to accommodate the motors actually installed, at no additional cost to the Owner.

B. The starters and control switches for each motor shall be mounted in the Motor Control Centers MCC-1. Each motor control system shall be equipped with a hand-off-auto control switch, indicating lights, elapsed time meter, motor starter and 3 phase pump current monitoring.

C. Control switches and indicating lights shall be U.L. listed oil-tight devices rated heavy duty. Provide Allen Bradley or equal.

D. Current Transmitters: Current transmitters shall be two-wire donut type devices with the following features: isolated 4-20 mADC output, current overload protection, supply reversal protection. Accuracy shall be $\pm$1% of full scale. Transmitter range shall be at least 150 percent of motor FLA. but not more than 250 percent.

2.06 INTRUSION

A. Intrusion/Unauthorized Entry Alarms: Door Entry Switches shall be magnetic type suitable for use on steel doors, UL rated. Switches shall be heavy duty industrial type, triple biased alarm switch, magnetic field tamper output, hidden pry tamper SPST alarm switch output, indoor/outdoor use, lead type 3' flexible stainless steel armor, powder coat aluminum housing, UL listed, Potter type PL-HSC1.

2.07 REACTIVE AIR LEVEL MEASUREMENT SYSTEMS (LT-1, LT-2)

A. General: A reactive air level measurement system shall be furnished to monitor the liquid level in the wet well. The system shall consist of a reactive bell mounted near the bottom of the wet well with tubing back to the control panel for connection to the level transmitter, and an air compressor and solenoid valve for periodic purging of the bell. The reactive air control shall also provide a means of manually actuating the purging cycle when immediate purging and cleaning is necessary. The level signal shall be used for monitoring and control of the lift station as described in the execution portion of this specification section. Alternative systems for monitoring will be considered if submitted prior to bid.

B. Reactive Bell: The reactive bell shall be inserted in 4 inch PVC 80 stilling well pipe. The reactive bell shall be constructed of 2" diameter 316stainless steel by 24"long, and capped at one end. The tubing shall be 1/4 inch polyflo. The mounting brackets and hardware shall be 316 SS. A quick disconnect shall be installed in each airline in the control panel to allow the air tubes to be cleaned.

C. Air Compressor: Two air compressors shall be furnished with each system. The

compressors shall operate in an alternating sequence. Each compressor shall be oil-less, rotary type. A backflow preventing check valve shall be furnished on each compressor.

D. Solenoid Valve: A three-way solenoid valve shall be furnished to allow high pressure purging while protecting low pressure components. The solenoid valve shall have a brass body with 1/4 inch tube connections, as manufactured by ASCO or equal. A manual purge button on the dead front panel shall also be provided.

E. The system shall be mounted in a 316ss NEMA 4X enclosure, mounted outdoors, as shown on the plans. The enclosure shall have adequate interior space for cooling the compressors in 100 degF outdoor temperature. The unit shall be remotely controlled from the pump control panel. Provide a 316ss sunshade over the enclosure.

2.08 FLOAT SWITCHES - BACKUP

A. Back up Level Control system: Provide level control system back up Optical Float as shown on the drawings, with stainless steel mounting hardware. Back up control system shall operate if the programmable controller or primary level control systems are inoperable. Back up control system shall be hard wired on a separate dedicated circuit.

B. The float switches shall be an optical design. The float switch shall use a plastic fiber optic cable to transmit a beam of light from an LED in a remote transceiver to the float. Inside the float, the beam shall make or break depending on the tilt of the float. The transceiver shall detect the presence or absence of light, and shall activate an output relay in the transceiver. The activation of the output relay shall correspond to the activation of the float. The float switch shall have the following features:

1. The float switch shall be mercury and lead free device, made with environmentally friendly materials.
2. The float fiber optic cable shall be manufactured with a plastic fiber material that shall be tested to maintain over 15 million flexes.
3. The float shall be a two-toned float color to easily locate the position of the float via the white dome top.
4. The float shall be tested to withstand pressure up to 300 feet of water without failure or deformation due to the unique shape of the float.
5. The float cable jacket can be cut with a standard stripper or a stripper supplied by the float manufacturer. The fiber optic cable can be cut with a traditional razor or cutter supplied by the float manufacturer. The float cable shall then be capable of insertion into a fiber transceiver module.
6. Float chatter shall be prevented by an eclipser built into the float assembly. The eclipser shall break the light in the float, and shall be smoothed by a dampening fluid that slows its movement. The eclipser shall eliminate chattering, even in turbulent areas.
7. The float shall be an inherently safe device. The float shall; be suitable for installation in hazardous locations, including a Class 1 Division 1 hazardous

location.

8. The float shall be a Narrow Angle Float. The float shall include sufficient length of cable to run from the wet well to the PCP. The float shall include an External Weight, manufactured from 316 stainless steel that can be attached directly to the float cable.
9. Operating Temperature – (32 – 130) degree F.

C. The floats shall be Opti-Float Liquid Level Detector as manufactured by Cox Research or prior approved equal.

D.

TAG	SERVICE
LSLL, LSL, LSH	Float Switch

E. OPTICAL FLOAT SWITCH TRANSCEIVERS:

1. Provide an optical float switch transceivers as shown on the drawings.

2. The transceivers shall be designed to work in conjunction with the optical floats. The transceiver system shall consist of Fiber Transceivers, Power Supply, Circuit Breaker, Terminal Strips (corrosion resistant, tin plated), padlockable enclosure, all pre-wired, 120VAC Input.

3. The transceivers shall have the following features and contain the required electronics to process the float switch signals:
   a. Optical- float fiber dual transceivers. Provide the transceiver quantity required for the number of floats shown on plans.
   Operating Voltage: 12 VDC ± 10%
   Power Consumption: 1.2 VA max
   Output: Relay SPDT 3 amp @ 240VAC, each channel
   Ambient operating temperature: -15 to +130F (-25 to +55C)
   Storage temperature: -15 to +155F (-25 to +70C)
   UL Listed
   The output relay shall be capable of 1 million switching operations of the starter coil as shown on the plans. If required, provide interposing relays to accomplish this task.

   b. The Optical-Float Power Supply
   120/240VAC-12VDC, 10 Watt
   Class 2 DIN Rail Mounted
   UL Listed

   c. Accessories:
      i. Optical Float Heavy Duty Cable Cutter
      ii. Optical Float, Optical Cable Stripper

   d. The Transceivers, floats, shall be as manufactured by Cox Research or prior approved equal.

2.09 TEMPERATURE INDICATING TRANSMITTER, (TIT-1: MCC-1) :

A. TIT-1 shall indicate the MCC interior temperature and provide a (4-20)mA signal to the Scada PLC. This shall alarm in event of high MCC temperature. TIT-1 shall indicate the room temperature and provide a (4-20)mA signal to the Scada PLC. This shall alarm in event of high room temperature. Provide unit with temperature sensor (t/c or RTD), NEMA 12 enclosure, 3 ½ digit display, (4-20)mA output, relay output, programmable set point, 120VAC or 24VDC power. Locate unit to measure a hot spot within the MCC.

2.10 RADIOS

A. General: The radio shall be furnished/installed in the pump control panel and connected to the pump controller communications output port. The existing Jefferson Parish SCADA radio system operates on 4 adjacent 12.5 KHz channel splits in the 928-952 MHz band. The central station transceivers operate through antennas at the EOC tower. The radios shall meet all of FCC part 94 out-of-band emission requirements and shall be capable of transmitting data at 9600 baud, operating half duplex. The radio shall also be capable of communicating with the Jefferson Parish VTSCADA system via a cellular connection.

B. Frequency Plan: Jefferson Parish has FCC licenses to operate four point-to-multipoint radio systems on 12.5 KHz channels in the Power Radio Service on the frequencies shown below:

Master Transmitter East Bank Sewerage 952.45625 MHz
Master Transmitter West Bank Sewerage 952.46875 MHz
Master Transmitter Drainage 952.48125 MHz
Master Transmitter Water 952.49375 MHz
Remote Transmitters East Bank Sewerage 928.45625 MHz
Remote Transmitters West Bank Sewerage 928.46875 MHz
Remote Transmitters Drainage 928.48125 MHz

C. The R.F. equipment furnished under these specifications shall meet or exceed all current FCC requirements for point-to- multipoint radio systems and shall also meet or exceed the following minimum specifications. The R.F. equipment shall be capable of operation on the above listed adjacent 12.5 KHz channels without degradation

D. The R.F. transmitters shall be directly frequency modulated by a built-in digital modem from the digital data stream furnished by the Pump Controller. The R.F. receivers shall provide a digital data stream to the Pump Controller.

Power Output (at duplex output) +39.0
Dbm Frequency Stability 1.5 PPM
Modulation Deviation +3.0 KHz
Duty Cycle Continuous

E. Receivers:

Receiver Sensitivity (10 to -6 BERT) -106

Dbm Frequency Stability 1.5 PPM
Modulation Acceptance +3.0 KHz

The radio assembly for each site shall consist of a nonprotected transmitter, receiver, power supply and digital modem capable of operating in the 928 to 952 MHz band. Each assembly shall be capable of transmitting and receiving digital data at a rate of 9600 Baud over a 12.5 KHz FCC assigned channel. These units shall also meet the following requirements:

1. Each R.F. assembly shall be capable of operation at full performance specifications between -30 and +60 degrees centigrade with a relative humidity of 95% measured at +40 degrees centigrade.
2. Each R.F. assembly shall operate from a D.C. power system furnished and installed as a part of the overall installation. Battery tapping of 24 volt power systems to obtain 12 volts will not be permitted.
3. Each R.F. assembly shall be enclosed in a sturdy metal housing suitable for mounting on the back plate of the Pump Controller enclosure with stainless steel hardware in such a manner as to permit easy removal of the radio assembly for service and/or replacement

F. Antenna systems shall be furnished and installed in accordance with the following specifications and as shown on the drawings. The antennas for all sites shall be heavy duty yagi type meeting the following minimum specifications:

Frequency Range 928 to 960 MHz
Forward Gain 10Dbd
Front-to-Back Ratio 20Db
VSWR Vertical
Impedance 50 Ohms
Horizontal Beamwidth 60 Degrees (half power point)
Input Power 50 Watts
Wind Rating 150 MPH Survival (no ice)
Lighting Protection Direct Ground
Input Connector Type "N", Female

Mounting brackets shall be steel and shall be hot-dip galvanized after fabrication. All mounting hardware shall be stainless steel. Antennas at sites with wooden support poles shall be installed so that the 2" aluminum mast at the top of the pole extends over the top of the antenna by a minimum of 6".

Antenna mast and pole shall be furnished by the Contractor.

G. Transmission lines shall be Andrew Corporation Heliax Type LDF4-50A 1/2" diameter foam dielectric coaxial cable or approved equal. The coaxial cable shall be encased in a black polyethylene outer jacket. Connection shall be Type "N" male. If the length of cable required is not listed on the contract documents then 100' of coaxial cable is required with each antenna furnished

H. Cellular Connection: The radio system shall be capable of communicating with the Jefferson Parish VTSCADA system via a cellular connection. The Contractor shall be

responsible for providing the radio system with a one year cellular plan and include setup of the private network that will segregate SCADA data from public interest

I. Radio: Radio equipment shall be GE MDS Orbit LN series. The approved radio devices are listed below.

MXNCL9CN4G1N1S2FASUNN Orbit MCR LN9 Licensed Narrowband + 4G LTE North America Verizon with GPS, 1 Ethernet 2 Serial

Contractor shall coordinate the details of the radio system to be provided with Jefferson Parish prior to purchase.

2.11 RAIN GAUGE

1. Rain Gauge shall be tipping bucket type and meets the specifications of the World Meteorological Organization (WMO). The design shall use a proven tipping bucket mechanism for rainfall measurement. The bucket geometry and material shall be specially selected for maximum water release, thereby reducing contamination and errors. Catchment area shall be 200 cm2 and measurement resolution of 0.1 mm shall meet the recommendations of the WMO.
2. Leveling screws and bullseye level shall be built in for precise adjustment in the field. Measured precipitation shall be discharged through a collection tube for verification of total rainfall.
3. To discourage birds from perching on the funnel rim, accessory bird wire assembly shall be attached to the gauge.
4. Housing shall be marine grade stainless steel housing.
5. Catchment Area: 200 cm2
   Resolution: 0.1 mm per tip
   Accuracy: 2% up to 25 mm/hr 3% up to 50 mm/hr
   Output: Magnetic reed switch (N.O.), rating 24VAC/DC 500mA
   Operating Temperature: -20°C to +50°C
   Mounting: Clamp for 1" (1.34" dia.) iron pipe or 3 bolts on 160mm dia. circle
   Leveling adjustment, thermostatic control for heater, intake screen

2.12 SPARE PARTS

The pump control panel manufacturer shall furnish a complete set of recommended spare parts necessary for the first five (5) years of operation, which shall include at least the following:

1 - relay for each type required, mounted in the pump control panel
1 - spare 20A circuit breaker mounted in the pump control panel
1 – spare set of normally open contacts on each motor starter
1 – contactor coil and 1 set of power contacts for each starter size used
1 - programmable pump controller (per project). Spare controller shall be programmed with the project final accepted program.

Loose spare parts shall be properly bound and labeled for easy identifications without opening the packaging and suitability protected for long storage.

2.13 PUMP CONTROL PANEL FUNCTIONAL REQUIREMENTS

1. The pump control panel manufacturer shall provide the following:
   a. Front of panel mounted pilot lights (LEDs) for all the I/O provided on the project; front of panel data display of all measured analog values. The legend for the LEDs, analog values, shall be as shown on the drawings.
   b. Provide Operating/Alarm/Shutdown indications. The indications shall be different such that the Operator can distinguish between functions.
   c. Pump Control:
      1. Start and stop of the drainage station pumps shall be controlled by the level in the intake basin. There shall be an individually adjustable start and stop set point for each pump. The pump sequence shall be automatically altered with alternation on pump stop. If a pump fails to start, the next pump in sequence is started. High and low wet well alarms, transducer out of range alarms, and pump high and low motor currents shall be furnished. The set points for all controllers purchased under this contract shall utilize standard Jefferson Parish numbering system. The numbering system shall be furnished to the Contractor upon award of the contract.
      2. The pump control sequence shall be Operator adjustable.
      3. Pump run time shall be distributed equally between pumps.
      4. When pump main breaker is OFF or H/O/A is in OFF position, that pump is unavailable to the pumping sequence.
      5. Pump Alternation: Automatic mode; Hand mode allows Operator to set sequence.
      6. Back Up Controls: See drawings. Activation of high level switch, LSH indicates a PLC failure or level transmitter failure. Provide separately hard wired controls to run the pumps under this condition. Field test the system to set up time delay relays for this condition.
      7. Pump Run & Fail: When a pump is called to run either through a local hand switch or automatic pump control, and a pump run signal is not sensed within a set time period, a pump fail alarm shall be generated.
      8. The controller shall automatically purge the reactive air bell at a set interval.
      9. Station Flow: The Controller shall have an algorithm to automatically calculate station inflow based on the rate of rise in the wet well. The algorithm shall also compare inflow to effluent based upon pump status and compare original pump capacity to calculated pump effluent flow.
      10. The controller shall activate the common alarm beacon on occurrence of the station alarms.
      11. The station shall be telemetry ready to interface with existing JP SCADA system.

   d. Trash Rake Control:
      1. Provide all necessary interfaces for future Trash Rakes. There is

a Trash Rake associated with each pump intake i.e. TR#1 is associated with Pump#1. Each Trash Rake has a H/O/A switch:

a. H/O/A in Hand – control is local at the Trash Rake control panel.
b. When the Trash Rake H/O/A is in Auto position, the Trash Rake shall be controlled from the Pump Control Panel. The Pump Control Panel shall issue a start command to the Trash Rake when it issues a Pump Call command to its associated pump e.g. when Pump #1 is called, Trash Rake #1 is also called. .
c. With Trash Rake H/O/A in Auto, provide an Operator input on the Pump Control Panel to allow the Operator to run additional Trash Rakes if desired e.g. "Run Trash Rake associated with Pump and Run all Trash Rakes".

e. Generator G-1 Control:
1. Provide all necessary interfaces for automatic starting of the generator.
2. The Generators shall automatically start when Utility power has failed (ATS-1 signal), the water level is generating a Pump Call signal, and the Scada "Gen Stop" is not actuated. Coordinate with the Parish during station start up on how they wish to configure the Generator call signal.
3. Sequential Loading of Generator:
The Generator shall be loaded in three (3) steps. On Generator power up:
a. Step #1, the transformer T-2 loads shall be automatically applied.
b. Step #2: After a time delay (approx. 5 seconds after power up) the Lead pump shall be started.
c. Step#3: After a time delay (approx. 15 seconds after power up) the Lag pump shall be started.

2.14 WARRANTY

Pump Control Panel components shall carry a full one (1) year replacement warranty from date of owner acceptance. Programmable Pump Controller shall carry a ten (10) year replacement warranty.

PART 3 -- EXECUTION

3.01 INSTALLATION

A. General: The CONTRACTOR shall employ installers who are skilled and experienced in the installation and connection of all control elements, instruments, accessories and assemblies furnished. Mechanical and electrical work shall be performed as specified in the applicable sections of Divisions 15 and 16, respectively.

B. Wire Marking: Each signal and control circuit conductor connected to a give electrical

point shall be designated by a single unique number which shall be shown on all shop drawings. These numbers shall be marked on all conductors at every terminal using white numbered wire markers which shall be plastic-coated cloth, or permanently marked heatshrink plastic.

C. Mounting and Connection: The CONTRACTOR shall install and connect all field mounted components and assemblies under the criteria imposed by the equipment manufacturer and the System Supplier. The installation personnel shall be provided with a final reviewed copy of the shop drawings and data.

D. Technical Assistance: The CONTRACTOR shall provide a trained technical field representative to instruct installation personnel on any and all equipment installation requirements. Thereafter, the technical field representative shall be readily available to answer questions and supply clarification when needed by the installation personnel.

E. Final Checks: After all installation and connection work has been completed, the technical field representative shall check it all for correctness, verifying polarity of electric power and signal connections, making sure all process connections are free of leaks, and all other similar details. The technical field representative shall certify in writing to the ENGINEER that each loop and system has been checked out and that all discrepancies have been corrected by the installation personnel.

3.02 RADIO SYSTEM INSTALLATION

A. General: Installation of all radio equipment shall be performed in accordance with manufacturer's recommendations, with good and accepted radio installation practices and with these specifications. All miscellaneous installation material, tools, and test equipment shall be suitable for the tasks to be performed. All work shall be performed by qualified personnel experienced in the trade involved.

B. Radio Installation: Each radio shall be installed on the metal back-plate of its associated enclosure using stainless steel hardware. Radios shall be installed so that they may readily be removed for repair or replacement.

C. D.C. Power Wiring: All D.C. Power wiring used to connect radio equipment to the D.C. power source shall be a two-conductor cable with stranded copper AWG #14 conductors. The conductors with red insulation shall be used for the positive supply and the conductor with black insulation shall be used for the negative return (ground).

D. Grounding: The case of each radio shall be grounded to the station using a bare solid AWG #6 ground connector. Burndy Type KA, or pre-approved equal, one-hole copper grounding lugs shall be used to connect the equipment to the ground conductor. Crimp or solder type lugs will not be permitted. Brass or stainless steel bolts, nuts and washers shall be used to connect the lugs to the equipment.

E. Data and Control Wiring: Data and control wiring between radio and the Pump Controller shall conform to EIA RS-232-C specifications.

F. Connection: All connections exposed to direct weather must be made water tight. This shall be accomplished by backwrapping the connection with plastic tape. The tape will be completely covered with shrink tube that extends beyond the tape.

3.03 ENCLOSURE SIGNAL AND CONTROL CIRCUIT WIRING

A. Wiring Installation: All wires shall be run in plastic wireways except (1) field wiring, (2) wiring run between mating blocks in adjacent section, (3) wiring run from components on a swing-out panel to components on a part of the fixed structure, and (4) wiring run to panel-mounted components. Wiring run from components on a swing-out or front panel to other components on a fixed panel shall be made up in tied bundles. These bundles shall be tied with nylon ties, and shall be secured to panels at both sides of the "hinge loop" so that conductors are not strained at the terminals. All wires shall be marked as provided for above.

3.04 CALIBRATION, TESTING, AND STARTUP

A. The System Supplier shall be responsible for Pump Control Panel startup services and the coordination and integration of the System Supplier start up services with the services of the other related manufacturer's field start up engineers, such that all systems are integrated and fully functional. This includes all the equipment listed in item 1.01.B.1 above. The field service engineers for the equipment listed in 1.01.B.1 above, and the pump control panel System Supplier shall be on site at the same time to perform start up services. The field services start up engineers, shall remain on site for as long as it takes to perform complete start up services for a fully functioning system.

B. Calibration: All instruments and systems provided shall be calibrated after installation, in conformance with the component manufacturer's instructions. This shall provide that those components having adjustable features are set carefully for the specific conditions and applications of this installation, and ensure that the components and/or systems are within the specified limits of accuracy. Defective elements which cannot achieve proper calibration or accuracy, either individually or within a system shall be replaced. This calibration of work shall be accomplished by appropriately experienced technical field representatives. The CONTRACTOR shall certify in writing to the ENGINEER that, for each loop and system, all calibrations have been made and that all instruments are ready to operate. The CONTRACTOR shall provide a complete record of all calibrations, adjustments, and settings.

C. Proof of Conformance: The burden of proof of conformance to specified accuracy and performance is on the CONTRACTOR. The CONTRACTOR shall supply necessary test

equipment and technical personnel if called upon to prove accuracy and/or performance, at no separate additional cost to the OWNER, wherever reasonable doubt or evidence of malfunction or poor performance may appear.

D. Testing: All systems shall be exercised through complete operational tests in the presence of the ENGINEER in order to demonstrate achievement of the specified performance. Operational tests depend upon completion of work specified elsewhere in these Contract Documents. The scheduling of tests shall be coordinated by the CONTRACTOR among all parties involved so that the tests may proceed without delays or disruption by uncompleted work.

E. Startup: When all equipment and systems have been assessed by the CONTRACTOR to have been successfully carried through complete operational tests with not less than a minimum of simulation, and the ENGINEER concurs in this assessment, system startup can follow.

3.05 RADIO SYSTEM TESTING

A. General: At each site, after all equipment has been installed, placed in operation and optimized, the CONTRACTOR shall conduct final radio tests. Should any item of equipment fail to meet specifications, it shall be the responsibility of the Contractor at his sole expense to repair or replace any or all equipment causing said failure.

B. R.F. Equipment Testing: The following measurements shall be made, recorded and compared to normal readings on each R.F. Assembly prior to system testing to ensure that all equipment meets published specifications:

Operating Voltages
Transmitter Frequency
Transmitter Output Power (at output duplexer)
Transmitter Deviation
Receiver Local Oscillator Frequency
Receiver Sensitivity

C. R.F. System Testing: Final R.F. System testing shall be conducted with all paths in a normal unfaded condition and with paths faded 30Db.

D. Unfaded R.F. System Testing: With the paths in a normal unfaded condition, the BER shall be measured between the master radios and each RTU radio. These measurements shall be compared with the measurements recorded during preinstallation testing.

E. Faded R.F. System Testing: Path fading shall be simulated by inserting a 30 Db pad between the master radio duplexer and the transmission line. With the paths so faded the BER shall be measured in both directions between the master radios and each RTU radio. The measured BER shall be 10 to the -6 or better.

3.06 INSTRUCTION AND TRAINING

A. The System Supplier shall provide a field training program to be run at the owner's plant sites and consist of up to two non-consecutive (2) 4 hour instruction for three (3) of the

OWNER's Personnel. The program shall cover all items supplied and interfaces to other equipment, including maintenance procedures and system operation. This training program shall be held at a time chosen by the OWNER and shall be exclusive to any instructions given at the time of system start-up.

3.07 MEASUREMENT

Measurement for payment for pump control panel (PCP) will be per Each as specified herein.

3.08 PAYMENT

Payment for the work under this section will be made under:

Item	Description	Unit Price
NS-12	Pump Control Panel and SCADA	Lump Sum

END OF SECTION 16904

SECTION 16950

ELECTRICAL TESTS

PART 1: GENERAL

1.01 THE REQUIREMENT

A. This Section specifies the WORK necessary to test, commission and demonstrate that the electrical work satisfies the criteria of these Specifications and functions as required by the Contract Documents.

B. The WORK of this Section includes furnishing the labor, equipment and power required to support the testing specified in this and other Sections of Division 16 of these Specifications. Electrical testing indicated herein, shall also include functional testing of all power and controls. This scope may require the CONTRACTOR to activate circuits, shutdown circuits, and run equipment, make electrical measurements, replace blown fuses, install temporary jumpers, etc.

C. The requirements of Section 16010 – Electrical Work General, apply to the WORK of this Section.

1.02 APPLICABLE CODES, STANDARDS, AND REFERENCES

A. Applicable Publication: The publication listed in 1.2.B. forms a part of this specification to the extent of all equipment supplied under this contract. The publication is referred to in the text by the basic designation only.

B. International Electrical Testing Association – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems, 2009.

C. All inspections and tests shall be performed in accordance with applicable codes and standards including NEC, ANSI, IEEE, NFPA, NEMA, and OSHA.

1.03 QUALIFICATIONS

A. The Contractor shall provide final inspection, testing, calibration, and adjusting on the electrical distribution system as defined in this contract.

B. The Contractor shall have a calibration program with accuracy traceable every year, and in an unbroken chain, to the National Institute of Standards and Technology (N.I.S.T.).

C. The Contractor shall have a designated safety representative on the project. The safety standards shall include OSHA and NFPA 70E.

D. Testing, inspection, and calibration shall be performed by an Engineering Technician, certified by a national organization, with a minimum of 3 years experience inspecting,

testing, and calibrating electrical distribution equipment, systems, and devices. Information on the qualifications of the Certified Engineering Technician shall be submitted to the engineer for approval prior to the start of work.

E. The Contractor shall submit for approval an acceptance test procedure for each item of electrical distribution equipment to be tested on this project. Test procedures shall include the proposed system function test. No testing shall be performed until the test procedures have been approved.

F. The Contractor shall provide all materials, equipment, labor, and technical supervision to perform the inspections and tests.

1.04 INSPECTION

A. A visual inspection of the installed equipment shall be performed by the independent testing organization to verify that the distribution equipment installed and to be tested is the equipment denoted on the approved shop drawings. The inspection shall check the equipment designations, device characteristics, special installation requirements, applicable codes, and standards.

B. After completion of the visual inspection, a report shall be developed stating any discrepancies that may have been found.

1.05 TESTING, CALIBRATION, ADJUSTMENT

A. The Contractor shall perform tests on each item of distribution equipment contained in this contract in accordance with the latest edition of the InterNational Electrical Testing Association's (NETA) Acceptance Testing Specification for Electrical Power Distribution Equipment and Systems, 2017 and latest edition.

B. General: Carry out tests specified herein for individual items of materials and equipment specified in other Sections.

C. Field Acceptance Testing shall be accomplished on each item of electrical distribution equipment installed or connected to a part of this contract. Where supplied as part of this project, this shall include the following equipment:

1. Power Transformers

2. Distribution Transformers (≥75 KVA)

3. Low Voltage Circuit Breakers (≥100 AMP)

4. Low Voltage Switches (≥100 AMP)

5. Breaker trip units shall be tested and set at the values shown in the Engineer approved Short Circuit and Coordination Study.

6. Switchboards, Panelboards

7. Ground Fault Protective Systems, Protective Relays, and Associated Transformers

8. Meters and Associated Instrument Transformers (Voltmeter, Ammeter, Power Quality Meter, Electronic Power meter etc.)

9. Grounding Systems

10. Automatic Transfer Switches.

11. Emergency/Standby Systems

12. Surge Arrestors

13. MCCs

14. Reduced Voltage Soft Starters

15. Motors

D. Electrical test indicated herein shall be performed in addition to those listed elsewhere in the specifications. The following test requirements supplement test and acceptance criteria that are stated elsewhere.

1. Lighting: Switching, including remote control, if indicated. Circuitry is in accordance with panel schedules.

2. Demonstrate mechanical and/or electrical interlocking by attempting to subvert the intended sequence.

3. Activate protective and ground fault trelays by operating test features provided with relays and by primary current injection. In general, ground fault tripping should occur at a ground current equivalent to 20 percent of phase current.

4. Cable Testing: 480 volt circuits shall be tested for insulation resistance with a 1000 volt megohm meter. Testing shall be done after the 480 volt equipment is terminated. Phase to phase A B, B C, A C and phase to ground insulation resistance tests shall be performed on each cable.

5. Test ground interrupter (GFI) receptacles and circuit breakers for proper operation by methods sanctioned by the receptacle Manufacturer.

6. A functional test and check of all electrical components is required prior to performing subsystem testing and commissioning. Compartments and equipment shall be cleaned as required by other provisions of these Specifications before commencement of functional testing. Functional testing shall comprise:

   a. Visual and physical check of cables, busswork, circuit breakers, transformers, and connections associated with all new and modified equipment.

b. Circuit breakers which have adjustable time or pick up settings for ground current, instantaneous overcurrent, short time overcurrent, or long time overcurrent, shall be field adjusted by a representative of the circuit breaker Manufacturer. Time and pickup setting shall correspond to the recommendations of the Coordination Study. Setting shall be tabulated and proven (via primary current injection) for each circuit breaker.

7. Complete ground testing of all grounding electrodes prior to operating the equipment. Utilize a three point ground test.

8. Feeders powering Motor Control Centers, main switchgear, or other loads shall be tested after having been phased and tested for correct motor rotation.

9. Breaker Control shall be tested after all adjustments are made. Tests shall verify status indication, proper operation, and correct command control from local and remote devices.

E. Motors

1. At the time of motor receipt, each motor shall be visually inspected for any physical damage, and tested per the test form included herein.

2. All voltage motors shall be provided with adequate heating during storage.

3. Before energizing for machine, visually inspect for serviceability. Check manufacturer's instruction manual for correct lubrication and ventilation. Verify that proper alignment has been performed. Check name plate for electrical power requirements.

4. Test run all motor preferably uncoupled or unloaded, before placing into regular service. A check on the motor for rotation, speed, current and temperature rise to be made and results recorded. The proper color codes for phase identification to be maintained. This may require lead swaps at the motor for proper rotation. A motor phase rotation meter should be used prior to connection at motor to prevent late swaps.

5. Complete visual inspection and electrical test per NETA 2017.

F. Motor Insulation Tests

1. The Contractor to perform, or have performed by the independent testing firm, DC insulation tests of the motors as follows:

a. Delivered to the Contractor for care, storage, and/or installation.

b. Prior to energization and/or placing into service and acceptance by the Owner.

c. When damage to the insulation is suspected or known to exist.

d. After repairs or modifications to the equipment affecting the insulation.

e. Routinely as necessary to determine or evaluate the condition of the insulation, especially moisture conditions, to determine the need for drying, cleaning or other maintenance work or protection.

f. Where lightning or other surge conditions are known to have existed on the circuit.

2. Normally, and unless otherwise specifically approved by the Resident Engineer, all DC insulation testing at voltages greater than 2,500 volts on any equipment or cable is served for testing by the independent testing laboratory.

3. Insulation tests are required to be done by the Contractor or the independent testing firm at various stages of construction. The equipment that requires testing, the maximum test voltages, and the type of tests required are to be in accordance with NETA STD.ATS-2017.

4. List each motor and measured resistance as test data.

5. Maintain record of all insulation resistance values. Identify motor, date that value was taken, resistance value with temperature and relative humidity at the time of measurement, no load current and voltage. Arrange information in suitable neat tabular form and turn in to Resident Engineer.

G. Complete the following motor test forms:

1. Motor Test Report: A test report and related data sheet shall be submitted to the Engineer or each 480volt motor 3/4 hp or larger) in this project.

a. EQUIPMENT NAME AND NUMBER:

b. MOTOR MANUFACTURER:

c. MOTOR ENCLOSURE TYPE:

d. MOTOR NAMEPLATE DATA:

HP:

RPM:

FLA:

VOLTS:

S.F.:

N.E.M.A. DESIGN:

CODE:

e. RUNNING FLA: (MEASURED): A_____, B_____, C_____.

f. RUNNING VOLTS: (MEASURED): A_____, B_____, C_____.

g. MOTOR OVERLOAD HEATER INSTALLED: MODEL #/AMPS:

h. MOTOR INSULATION TEST (MEASURED PHASE-TO-GROUND):

i. TEMPERATURE OF MOTOR DURING TEST (DEG. F):

j. AMBIENT AIR TEMPERATURE (DEG. F):

k. BRANCH CIRCUIT INSTALLATION TEST (MEASURED FOR MOTORS OF 50 HP AND LARGER):

l. DATE OF TEST:

m. TESTED BY:

If any motor, either existing or proposed, is found to be running above its nameplate FLA or temperature, the Engineer shall be immediately notified.

H. Before energizing any panelboard, etc., the Contractor shall perform megohmmeter tests. The measurements shall be made on all phase busing and the data checked for conformance with typical manufacturer's data. The tests must adhere to manufacturer's testing recommendations for the proper testing methods and test voltage levels for each piece of equipment. Readings that fall below manufacturer's recommended values shall not be acceptable and the Contractor shall be required to perform any necessary remedial action before the busing is energized. A data sheet shall be submitted to the Engineer for each piece of equipment, such as panelboard etc. supplied. The test report shall include the following equipment information:

a. PANEL NAME AND NUMBER:

b. PANEL MANUFACTURER:

c. PANEL NAMEPLATE DATA:

VOLTS:

HORIZONTAL BUS AMPS:

MAIN BREAKER AMPS:

d. INSULATION TEST (MEASURED):

PHASE A-B:

PHASE B-C:

PHASE C-A:

PHASE A-G:

PHASE B-G:

PHASE C-G:

e. TEMPERATURE OF PANEL (DEG. F):

f. EQUIPMENT DISCONNECTED DURING TEST:

g. DATE OF TEST:

h. TESTED BY:

I. Where test reports show unsatisfactory results, the Engineer may require the removal of all defective or suspected materials, equipment and/or apparatus, and their replacement with new items, all at no cost to the Owner. The Contractor shall bear all cost for any retesting.

J. Subsystems shall be defined as individual components or a grouping of components. Subsystem testing shall occur after the proper operation of alarm and status contacts has been demonstrated or otherwise accepted by the ENGINEER. It is intended that the CONTRACTOR will adjust limit switches and breaker position switches to their operating points prior to testing and will set timing relays and all adjustable items as dictated by operating results.

K. After initial settings have been completed, each subsystem shall be operated in the manual mode and it shall be demonstrated that operation is in compliance with the Contract Documents. Once the manual mode of operation has been proven, automatic operation shall be demonstrated to verify such items as proper open, close interlocks of breakers, readout on HMI system, alarm annunciation, message screens, etc.

1.06 SYSTEM FUNCTION TESTS

A. Each system provided in this contract and covered by this section of specifications, shall be function tested to ensure total system operation.

B. Upon satisfactory completion of equipment acceptance tests, the system functional tests shall be performed. It is the intent of system functional tests to prove the proper interaction of all sensing, processing, and action devices to effect the designed end product or result.

C. All interlocks safety devices, fail-safe functions, and design functions shall be tested.

D. Systems shall be energized or otherwise placed in service only after completion of all system required tests and an evaluation of the test results has been completed.

1.07 CORRECTION OF DEFICIENCIES

A. Any deficiencies found shall be rectified, and work affected by such deficiencies shall be completely retested at the Contractor's expense. Final acceptance of the electrical power system is contingent upon satisfactory completion of the acceptance and system function tests.

1.08 SUBMITTALS

A. Eight bound copies of the certified test reports shall be submitted to the contractor at the completion of the project. The final report shall be signed and include the following information:

1. Summary of the project
2. Description of the equipment tested
3. Visual inspection report
4. Description of the tests
5. Test results
6. Conclusions and recommendations
7. Appendix including appropriate test forms
8. Identification of the test equipment

1.09 STATION WIDE COMMISSIONING

A. Commissioning the entire job shall not be attempted until all subsystems have been found to operate satisfactorily. Commissioning shall only be attempted as a function of normal plant operation in which plant process flows and levels are routine and equipment operates automatically in response to flow and level parameters or computer command, as applicable. Simulation of process parameters shall be considered only upon receipt of a written request by the CONTRACTOR.

B. The motor current tabulation shall reflect the values occurring during commissioning. The indications of all power data from electrical gear such as Power Quality Meters shall be recorded every 15 minutes during commissioning.

C. Project Final Acceptance: After final acceptance of the entire system, project final acceptance shall require that all the plant sub-systems shall operate as an integrated whole system without failure, for a period of 30 days.

PART 2: MEASUREMENT AND PAYMENT

A. Measurement and payment for the work under this section shall be at NO DIRECT PAY and shall be included with the related work bid items.

END OF SECTION

APPENDIX A

CN RAILROAD CROSSING PERMIT REQUIREMENTS

Southern Region

Utility Crossing/Encroachment Application Packet

Revised: 11/15/2024

Table of Contents

1. Initial Notification of Intent to Construct Utility Crossing/Encroachment
    a. Requirements and Instructions
    b. Forms
2. CN Insurance Requirements
3. Example Certificate of Insurance
4. Flagging/Cable Locate Specifications and Form

APPLICATION FOR UTILITY OCCUPANCY
REQUIREMENTS AND INSTRUCTIONS

The Applicant shall submit a completed application for utility crossing engineering review to the appropriate contact shown in the "Pipeline/Wireline Utility Occupancy Contacts" Section on the subsequent page. The application can be downloaded from Railroad's website, *then the completed packet should be emailed to CNutilities_US@cn.ca. Email submission is the only acceptable method of submittal. Once a CN File number has been assigned, EFT payment should be made referencing CN File number, no paper checks will be accepted.* Any application transmitted to Railroad that does not include all requested information or required documentation will be considered incomplete. Railroad shall notify the applicant when Railroad receives an incomplete application but under no circumstances shall Railroad review an incomplete application. Repeat: no application will be reviewed until the application is complete. Any application which remains incomplete one (1) year after the date of the first notification of an incomplete submittal from Railroad will be cancelled and a new application must be submitted, including a new application fee. All information and documentation contained in any application must meet the approval of the Railroad, in its sole discretion. Unless otherwise required by law, Railroad will respond to all applications in the order in which they are received. **Note:** In no event shall any construction related activities be scheduled or conducted on Railroad's property until Railroad has issued its final approval of the application, a written agreement outlining the legal terms of the installation has been signed and flaggers have been secured.

An application shall include the following documents:

- ☐ A cover letter which includes a project description.
- ☐ A completed and signed application form also known as Initial Notification of Intent Form.
- ☐ A map with an aerial image of the location of where work will be performed, showing the work site as well as nearby streets or other landmarks close to the work location(s).
- ☐ A certificate of insurance meeting the requirements set forth in this packet (unless lower coverage requirements are prescribed by local law and signed off by CN Legal Department).
- ☐ One (1) copy of complete stamped engineering plans which shall conform to the guidelines established by the American Railway Engineering and Maintenance of Way Association (AREMA), all applicable federal, state and local legal and professional requirements, CN standards and any additional requirements set forth in this packet. In the event of any conflict or inconsistency between the aforesaid guidelines, requirements and standards, the most stringent shall apply.
- ☐ All applications submitted should list the correct CN subsidiary throughout the application. Please refer to the attached System Map (page 32) to identify the subsidiary to refer to.
- ☐ The non-refundable application fee. Unless otherwise specified by law, the non-refundable application fee shall be $1,350.00, which is intended to cover the cost of Railroad's review of the application and all required documentation and information. The Applicant will be charged an additional fee of $200 for each review after the initial review of the completed application due to inadequate or missing information or other failure by the Applicant to meet the requirements of Railroad. This fee shall be included with any revision sent. Any revision sent without the accompanying fee will be considered incomplete and will not be reviewed.
- ☐ If the project is for maintenance to an existing utility, please include a copy of the existing agreement.

I. Pipeline/Wireline Utility Occupancy Contacts

UTILITIES

Address: CN Utilities – US
17641 South Ashland Avenue
Homewood, IL 60430

Email: CNUtilities US@cn.ca

FLAGGING AND/OR CABLE LOCATES

Address: CN Flagging - US
17641 South Ashland Avenue
Homewood, IL 60430

Email: US Flagging@cn.ca

Utility Submittal Process

-Email completed packet to CNUtilitities_US@cn.ca

-Once entered into the CN System, you will receive an email with the CN File number

-Once CN File number is received proceed to make EFT payment referencing the CN File number

-Send a snip of the EFT Confirmation of payment to CNUtilitites_US@cn.ca so it can be added to your file.

-If revisions are required, you will receive an email. Reply to that email with the requested revisions highlighted on the plans and the file saved as CN file number and the date of the revision.

-Once review is complete, you will be emailed final documents and can proceed to flagging.

APPLICATION FOR UTILITY OCCUPANCY
REQUIREMENTS AND INSTRUCTIONS

Scope

1. These specifications cover minimum requirements for utilities installed within or adjacent to railway rights-of-way. Railroad reserves the right to increase the specifications based on physical conditions or other factors specific to the installation point, including but not limited to:
    a. Track speed
    b. Traffic density
    c. Traffic sensitivity
    d. Terrain conditions
    e. Curvature and grade
    f. Bridges and other structures
    g. Pipe size, capacity and material carried
    h. Environmental risks/damages

APPLICATION FOR UTILITY OCCUPANCY
REQUIREMENTS AND INSTRUCTIONS

Engineering Plan Requirements

1. A cover page including:
   a. Include caption stating "Construction and maintenance to be in accordance with all applicable regulatory requirements and standards"
   b. Contact name, address and phone number of Utility Owner
   c. Professional Engineer's stamp, signature, and date
2. A plan view or site plan displaying:
   a. A north arrow
   b. Any tracks and railroad facilities
   c. Railroad/roadway crossings
   d. Distance from Railroad Mile Post [no decimal] plus the feet beyond the Mile Post (EX. MP 2 + 1,200 ft.).
   e. Proposed utility crossing location
   f. Location of proposed utility crossing in relation to a legal description or road allowance
   g. Public Land Survey System (PLSS) Information (sections, quarter sections, etc.)
   h. Right of way lines of railroad and labeled street or highway, if involved
   i. Warning, utility markers that are proposed for the site in accordance with this document.
   j. Indicate direction of flow and location of nearest shut off valves, if shutoff valves are required.
   k. Indicate location and distance of nearest excavation from centerline of nearest track.
   l. Location and methods of storage and disposal of excavated material. Excavated material should be stored to the back side of excavation with respect to the tracks unless this position creates an unsafe condition or a better location can be justified. All excavated material should be treated as contaminated with details provided for review unless known otherwise.
   m. Excavation protection methods shall be shown for review. All excavations must be protected at all times and fenced in with reflective material or illuminated if left unattended.
3. A profile along the proposed crossing of actual situations showing:
   a. Any tracks
   b. The existing ground surface
   c. The proposed utility
   d. *Exact* depth of burial below base of rail, roadway surface, ditch bottom, and other points of interest to the top of utility (depth measured to casing pipe, if used). Please do not use min/minimum when referring to the depth.
   e. Method of installation (i.e. boring, dry jack and bore, dry directional bore, etc.)
   f. Indicate type and details of utility protection.
4. Show a detailed spec and cross-section of the pipe including:
   a. Note and show if carrier pipe will be held clear of the casing pipe by supports. CN requires carrier & casing to be designed for cooper E-80 loading.
   b. The type, wall thickness, and maximum test pressures of carrier and casing pipes must be listed on the plans. CN requires the AREMA standard listed in *Table 1-5-1*. Minimum Wall Thickness for Steel Casing Pipe for E80 Loading also found in Section A-2 of this document.
   c. Indicate type of cathodic protection, if required for the type of construction. (See AREMA Section *5.2.3.3 Cathodic Protection* for more information)
   d. The ends of the casing shall be suitably sealed to the outside of the carrier pipe or casing vents shall be required.

e. Provide hoop stress calculation. See AREMA Sections *5.2.3 Carrier Pipe* for more information.
f. Cross sections of the utility shall be perpendicular to the center line of the railroads tracks.
g. The location of the cross sections will be at:
    i. Bore pit
    ii. Receiving pit
    iii. Intersection of utility and center line of any tracks
    iv. Any other points of interest along the utility line

5. A detail of the proposed utility marker to be used on site showing all information to be displayed as well as all dimensions and materials.
6. Drawings must be to scale and have all dimensions shown. This includes but is not limited to:
    a. Distance from each utility (encroachment) to the centerline of track, nearest road, crossing, bridge or other Railroad structures
    b. Dimension width of CN right-of-way
    c. Number of tracks proposed utility crossing will cross
    d. Angle of proposed utility crossing
    e. All existing and proposed signals and facilities with dimensions showing horizontal distance and depth to the proposed utility
7. All information regarding all seeding/surface restoration work shall be provided with the plans and conform to the local DOT specs.
8. Revised drawings shall be marked as revised (with revision date included) and state reason for revision. Each individual revision shall be called out in this manner. In addition, each page shall have a section near the title block with a list of revisions, where the revision version and date shall be marked in for any revision to that page.
9. **Professional Engineer's stamp, signature and date is required on all plans and submittals.**
10. Attachments to the plans as required in the following sections of this document may include but are not limited to:
    a. Soil Boring Logs
    b. Geotechnical Report
    c. De-Watering Plan
    d. Induction Interference Study
    e. Vibration Monitoring Plan
    f. Shoring Plan
    g. Site Safety Action Plan
    h. Emergency Action Plan
    i. An estimated construction schedule and Gantt chart with field contact name and phone number.
    j. Detailed Work Plan
    k. Settlement Monitoring Plan
    l. Construction Monitoring Plan

APPLICATION FOR UTILITY OCCUPANCY
REQUIREMENTS AND INSTRUCTIONS

Above Ground Utility Requirements

1. **General Above Ground Utility Requirements**
    a. CN's operations are not to be impaired or affected by any utility work.
        i. Flagging protection during construction will be required and may be expanded by local supervisors to include any work on, under, over, or near Railroad property.
    b. All employees of contractors not hired by CN that will work on, over, under or near CN property are required to have, at a minimum, safety certification with www.contractororientation.com or an eRailsafe badge which has the CN logo on it. The railroad representative will be responsible for verifying and documenting said certifications.
        i. Applicant must compile an Emergency Action Plan per OSHA which incorporates the proper Railroad contact information. Identify and list an adequate amount of properly trained employees to be able to enter CN property to respond to an emergency situation.
    c. On projects which have the potential to encroach or effect the operations to CN's property, it is required of the contractor to post informational documents at the jobsite for the benefit of the construction workers, CN personal, and the general public. The following required information is to be posted on a bulletin board. The bulletin board shall be weatherproof and watertight and be located in an area readily accessible to both CN and the general public.
        i. Project overview: Including a general work description, job site location address, and approximate duration of the project
        ii. Owner / Applicants Information
        iii. Contractor's Designated points of contact: Including the Safety Officer, Superintendent, and 24-hour contact number
        iv. Copies of reviewed drawings by CN
        v. Copies of the Safety Action Plan
        vi. Copies of approved permits
    d. All utilities must be a minimum of 15 ft horizontally away from any existing or planned CN signals and facilities, when practicable. Minimum distance in any direction from a vertical road crossing gate shall be no less than 4 ft.
    e. Utilities shall not be placed within a culvert, under railroad bridges, nor closer than 300 feet to any portion of any railroad bridge, building, or other structure, except in special cases and be of special design as approved by the CN Chief Engineer or the designated representative.
    f. Must not be attached to a CN pole line or pole lines licensed to others except where specifically authorized.
    g. All poles extending in height above ground equal to or greater than the distance from pole to the edge of ties on the nearest track will be anchored and guyed against tipping toward track.
        i. Guys will be guarded to a distance of 8 ft above ground line and the guards shall be orange in color.
    h. All clearances and safety provisions are subject to the National Electric Safety Code (American National Standard Institute) as well as any applicable National, State, and local codes, whichever is more restrictive.
    i. All overhead electrical utilities will require an induction interference study.
    j. During construction, the Applicant shall maintain positive drainage of Railroad property. After construction is completed, the Railroad's right-of-way shall be restored to its original condition

and to the satisfaction of the Railroad. Any fencing removed to facilitate construction shall be restored.

k. All piers or poles shall be located off of CN right-of-way.
l. Warning, utility markers shall be installed at any intersection of any utility and CN right-of-way, and on any pole on CN right-of-way.

2. Above Ground Utility Crossing Requirements

a. Utilities crossing over any railroad track must have a minimum height measured at the lowest point of the utility to the top of rail:
    i. Pipe/Pipe Bridge = 25 ft. Min
        a. Cable Supported Pipe Bridge = 50 ft.
    ii. Conveyors = 25 ft. Min
    iii. Fiber/Coaxial Cable = See Section A-3
    iv. Electric Wire = See Section A-3
b. Utilities shall be located, where practicable, to cross tracks at approximately right angles but must not cross at an angle less than 45 degrees.
    i. Any utility crossing that is less than 45 degrees will be considered a longitudinal utility and may be subject to higher requirements as required by the CN Chief Engineer or the designated representative.
c. If any new utilities are attached onto an existing structure, the existing structure must be analyzed to ensure it can withstand the new loading. If a re-design of the existing structure is required, this must be included with the plans.

3. Above Ground Longitudinal Utility Requirements

a. All longitudinal utilities shall be placed towards the outer edge of the railroad right-of-way, except in special cases and be of special design as approved by the CN Chief Engineer or the designated representative.

Underground Utility Requirements

If underground utility is greater in diameter than 10" including any casing protection, the requirements in the Section VI (immediately following this section) are required.

1. **General Underground Utilities Requirements**
   a. CN's operations are not to be impaired or affected by any utility work.
      i. Flagging protection during construction will be required and may be expanded by local supervisors to include any work on, under, over, or near Railroad property.
   b. All employees of contractors not hired by CN that will work on, over, under or near CN property are required to have, at a minimum, safety certification with www.contractororientation.com or an eRailsafe badge which has the CN logo on it. The railroad representative will be responsible for verifying and documenting said certifications.
      i. Applicant must compile an Emergency Action Plan per OSHA which incorporates the proper Railroad contact information. Identify and list an adequate amount of properly trained employees to be able to enter CN property to respond to an emergency situation.
   c. On projects which have the potential to encroach or effect the operations to CN's property, it is required of the contractor to post informational documents at the jobsite for the benefit of the construction workers, CN personal, and the general public. The following required information is to be posted on a bulletin board. The bulletin board shall be weatherproof and watertight and be located in an area readily accessible to both CN and the general public.
      i. Project overview: Including a general work description, job site location address, and approximate duration of the project
      ii. Owner / Applicants Information
      iii. Contractor's Designated points of contact: Including the Safety Officer, Superintendent, and 24-hour contact number
      iv. Copies of reviewed drawings by CN
      v. Copies of the Safety Action Plan
      vi. Copies of approved permits
   d. Jacking or boring of corrugated metal pipe, cast iron pipe or pipe with flanges, bells or couplings will not be permitted.
   e. Casing may need to be extended to accommodate any proposed projects for Railroad as required by CN Chief Engineer or the designated representative.
   f. Soils investigation and a geotechnical report may be required.
   g. All underground utilities shall have an adequate casing for protection.
   h. Utilities shall not be placed within a culvert, under railroad bridges, nor closer than 100 feet to any portion of any railroad bridge, building, or other structure, except in special cases and be of special design as approved by the CN Chief Engineer or the designated representative.
   i. Restoration and backfill compaction should conform to a 95% Proctor test suitable for the soil type at the site and commence in lifts specified by the CN Chief Engineer or the designated representative.
   j. No excavation can be closer than 25 ft. from the centerline of the nearest track.
   k. All utilities must be a minimum of 15 ft. horizontally away from any existing or planned CN signals and facilities, when practicable.

l. The zone of influence is as follows: Starting 15 feet from the centerline of nearest track at the base of rail, measured perpendicular to the track centerline, calculate a slope to the bottom of the proposed pipe at a 2H:1V slope. (See Section A-6)
   i. If a 2H: 1V slope cannot be maintained or more restrictive conditions occur, approved shoring will be required. (See Section A-7)
   ii. If shoring is required as stated above, a shoring plan designed to withstand E-80 loading shall be created, **stamped by a Professional Engineer**, and submitted to CN.
   iii. If the excavation is outside the zone of influence, then the excavation shall follow OSHA requirements.

m. A dewatering plan shall be created, **stamped by a Professional Engineer**, and submitted to CN as required by the CN Chief Engineer or the designated representative.

n. Dry Horizontal Directional Drilling (HDD) is only allowed.
   i. Mud slurry directional bore will be allowed only with the use of vents.
   ii. No wet directional drilling is allowed.

o. Vibrations Requirements
   i. If there are fiber optic cables buried within the ROW, the Contractor shall submit details on the type of equipment to be used for pile driving and estimate the vibrations that will be induced at ground level during operation.
   ii. The Contractor may be required to monitor vibrations levels during pile driving operations, for which the Contractor shall submit a procedure and the type of monitoring equipment to be used.
      - Induced vibrations shall be limited to a maximum peak particle velocity (PPV) of less than 3.5"/sec (measured in 3 mutually perpendicular directions taken at tie level / ground surface). And induced amplitude of movement shall be less than 1/128"
      - Vibrations undertaken within 150 ft. of fiber optic cables, induced vibrations shall be limited to a maximum of PPV of less than 1.5"/sec

p. During construction, the Applicant shall maintain positive drainage of Railroad property. After construction is completed, the Railroad's right-of-way shall be restored to its original condition and to the satisfaction of the Railroad. Any fencing removed to facilitate construction shall be restored.

q. Additional Resources for Underground Utilities:

http://www.undergroundfocus.com/onecalldir.php Provides links and information on state calls for cable locates
http://www.ntdpc.com/ National Telecommunications Damage Prevention Council
http://www.commongroundalliance.com Common Ground Alliance

2. Underground Utility Crossing Requirements

a. Utilities shall be located, where practicable, to cross tracks at approximately right angles but must not cross at an angle less than 45 degrees.
   i. Any utility crossing that is less than 45 degrees will be considered a longitudinal utility and may be subject to higher requirements as required by the CN Chief Engineer or the designated representative.

b. For all utility crossings the utility must be protected by a casing for the full width of CN's right-of-way or 50 ft. whichever is greater.
    i. All casing pipes shall be sloped not less than 0.3%.
    ii. Pipelines carrying commodities in a gaseous state are not required to have a steel casing as long as the top of the utility is at least 10 ft. below base of rail.
    iii. Fiber optic utilities do not need a steel casing if the depth is 15 ft. or greater below the base of rail.
c. Directional boring will be allowed at the discretion of the Railroad.
    i. If practicable, boring excavation must not exceed the outside diameter of the pipe.
        - Bore shall not be greater than 1" larger than the utility diameter. Any over-cut by the cutting head should be minimized to match the pipe being installed. Any overcut shall be no more than 2" larger than the installed pipeline. If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe (plus coating) by more than approximately 1 inch then grouting or other methods will be employed as approved by CN.
d. Minimum depth of burial below:
    i. Dry jack and Bore
        - Main Tracks Base of Rail = 6 ft.
        - Industrial Tracks Base of Rail = 6 ft.
        - Road Surface = 5 ft.
        - Ditch Bottom = 5 ft.
    ii. Uncased Utility
        - Main Tracks Base of Rail = 10 ft.
        - Industrial Tracks Base of Rail = 10 ft.
        - Road Surface = 6 ft.
        - Ditch Bottom = 6 ft.
    iii. Directional Bore
        - Main Tracks Base of Rail = 15 ft.
        - Industrial Tracks Base of Rail = 15 ft.
        - Road Surface = 6 ft.
        - Ditch Bottom = 6 ft.
e. Multiple Crossings – Refer to AREMA Standard 4.19.8 multiple installations. Each crossing should be permitted separately.
f. Any excavation must not be located on CN right-of-way or within a minimum of 50 ft. from the centerline of track, whichever is greater.
g. Warning, utility markers shall be installed at any intersection of any utility and CN right-of-way.
    i. Marker should show accurate owner, contact, and CN Agreement Number.

3. Longitudinal Underground Utility Requirements

a. Underground utilities laid longitudinally in railroad right-of-way shall be located as far as practicable from any tracks or other important structures.
b. Longitudinal lines must be a minimum of 25 ft. from the center line of track, or outside the track embankment section, whichever is greater.

c. Uncased steel carrier pipe utilities laid longitudinally on the railroad right-of-way, 25 ft. to 50 ft. from the center line of the nearest rail shall be buried not less than 6 ft. from the natural ground surface to the top of pipe. If distance is more than 50 ft. from centerline of track, minimum cover shall be 5 ft.
    i. At all locations on the right-of-way farther than 25 ft. away from the centerline of the nearest track, the minimum natural ground cover for uncased steel natural gas pipes must be 6 ft.
d. Plastic carrier pipes are not allowed for longitudinal utilities on CN right-of-way.
e. Longitudinal underground utilities must be marked by a sign approved by the CN Chief Engineer or the designated representative every 500 ft., at every road crossing, streambed, other utility crossing, and at locations of major change in direction of the line.
    i. Marker should show accurate owner, contact, and CN Agreement Number.

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Additional Requirements for Underground Utilities with Diameter of 10 Inches or Greater (Including Casing)

1. Drawings shall be **stamped, signed, and dated** by a Professional Engineer licensed in the State where the work is being performed. CN reserves the right to prohibit a certain construction methodology, at its own discretion; however, CN shall not assume any responsibility for the suitability of the accepted method. Open cut methodology shall only be considered where other installation techniques are deemed impractical and where rail traffic volumes are low. Installations using water jet methods shall not be permitted.

2. Complete Subsurface Investigation
    a. Boreholes are required at each end of the crossing and at each entry/exit pit with a maximum spacing between boreholes of 150 ft.
    b. The boreholes shall be drilled to a depth of 20 ft. below the proposed crossing depth or to 20 ft. below the maximum feasible crossing depth if the proposed crossing depth has not yet been determined.
    c. Soils samples shall be obtained at 3 ft. intervals to a depth of 15 ft. and also within the proposed utility horizon (i.e., from at least 7 ft. or one pipe/casing diameter above the proposed utility obvert to at least 7 ft. or one pipe/casing diameter below the proposed utility invert). At other depths, soil samples may be obtained at 5 ft. intervals; No boreholes will be completed between ties or tracks in double track territory.
    d. If bedrock is encountered at the proposed location, the bedrock will be cored to establish the competency and engineering characteristics of the bedrock. The bedrock shall be cored to at least 5 ft. below the invert of the proposed crossing.
    e. Soil classification testing (i.e., water content determination, Atterberg Limits testing and grain size distributions) shall be carried out on soil samples obtained from all major soil strata and on soil samples obtained from every layer that the proposed tunnel would intersect.
    f. The stabilized groundwater elevation must be established by installation of piezometer/monitoring well(s); at least one piezometer/monitoring well must be maintained in operation and checked prior to construction to confirm the groundwater elevation.

3. Submit a **stamped** Geotechnical Report prepared by a Licensed Geotechnical Engineer with experience in trenchless technology. The Report shall include:
    a. Comments and recommendations with respect to construction methodology
    b. An estimate of the expected extent and magnitude of ground movement over time
    c. Measures to be undertaken to preserve the safety of rail operations and the structural integrity of the track structure
    d. A detailed proposal for ground surface and subsurface monitoring
    e. Factual subsurface information with all field and laboratory test data
    f. A description of the site and soil stratigraphy including results of soil classification testing
    g. A plan of the proposed crossing with borehole/testing/installation locations
    h. A summary of groundwater conditions encountered during the investigation including the observed groundwater levels within the boreholes and the presence of any perched water levels at the borehole locations
    i. Anticipated settlements as well as an assessment of the anticipated settlement through configurations

j. A detailed monitoring plan to monitor any ground surface and subsurface movements during construction shall be provided. The Review and Alert (work stoppage) levels shall be provided
k. Submit a contingency plan and notification procedure to be implemented in the event of excessive/unexpected settlement or heave, and unforeseen changes in subsurface conditions, i.e. cobbles and boulders, raveling /flowing ground

4. Submit a Detailed Work Plan
    a. Details of the proposed methodology - the installation operations, methods of maintaining and adjusting line and grade, drilled/bored diameter, drill hole stabilization procedures, temporary dewatering measures and any mitigation procedures if sinkholes/settlement above the pipe occurs or excessive movement of the settlement monitors is observed.
    b. The design of the crossing - length, diameter and thickness of the casing, elevations of the crossing invert at both ends, excavation shoring details and methods of dealing with cobbles/boulders and obstructions.
    c. Provide additional details for specific installation methodologies as follows:
        i. Jack and Bore: size and location of the auger head relative to the casing, estimated jacking thrust required, method of monitoring casing elevation, thrust block design calculations, record keeping system to document casing advance and jacking pressures, bulk heading, and grouting procedures. Bore head should not extend more than 1" ahead of the casing.
        ii. HDD: slurry pressure and mitigation measures for frac-out if applicable. Vents shall be installed on each side of the track(s) to prevent frac-outs.
        iii. TBM: type of machine, methods of primary ground support, grouting between the casing, ribs and lagging (primary support) and the surrounding soil/rock

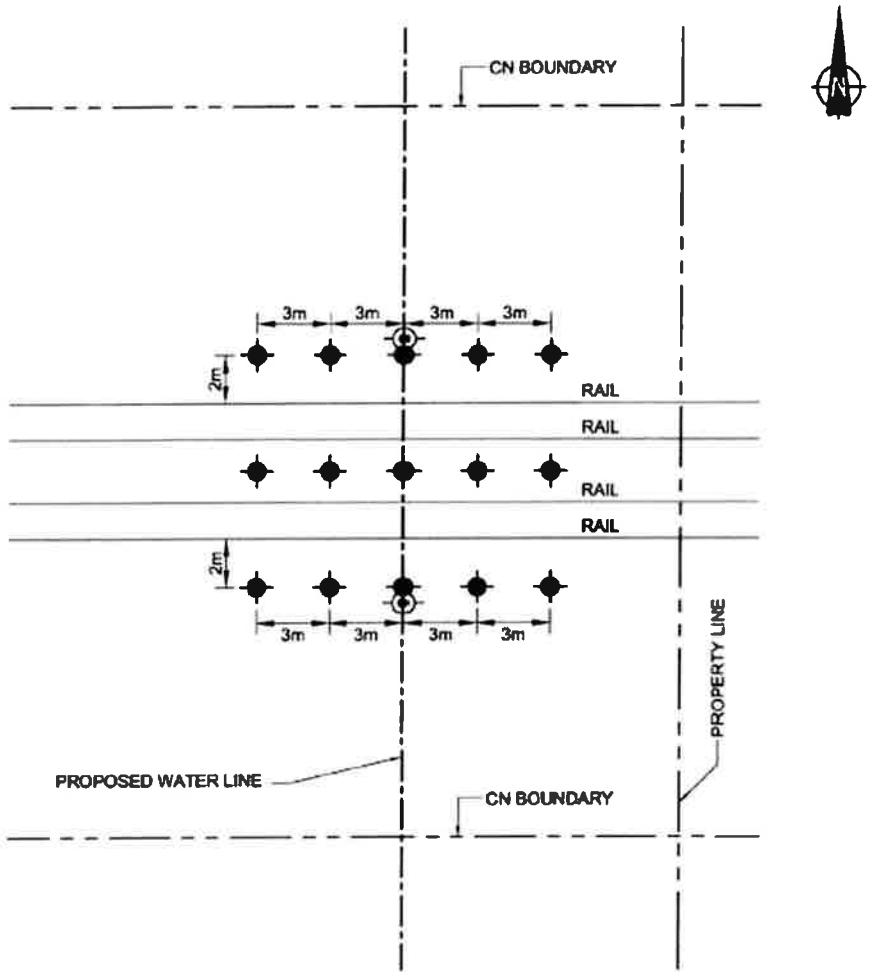
5. Submit a Settlement Monitoring Plan including:
    a. Summary of Proposed Settlement Monitoring
        i. Geographical Location
        ii. Number of Settlement Monitoring Probes
        iii. Type of Probe & installation Method
        iv. Expected Amount of Settlement (in)
        v. Frequency of Monitoring
        vi. Duration of Monitoring
    b. Site Plan:
        i. Site Plan
        ii. Identify Probe Locations and Offset Distances to Nearest Rails
        iii. Elevation of Top-of-Probes
    c. Probe Detail Drawing:
        i. Show section through Railroad Track Roadbed
        ii. Existing Ground Line
        iii. Depth of Bore
        iv. Distance to Bottom-of-Probe to Top of Casing Pipe
        v. Submit a dewatering plan.

6. Monitoring During Construction
    a. Monitoring by a qualified geotechnical personnel and report to CN daily.
    b. Installation in accordance with the Contractor's detailed work plan.
    c. Over-excavation does not occur, and the liner / casing is installed tight to the excavation.
    d. Report theoretical vs. actual volumes of spoils removed on per meter and total bases.
    e. The excavation is fully supported until the liner / pipe installation is complete.
    f. The bulkhead is installed at the end of every work shift or during any prolonged stoppage of work.
    g. Voids are fully grouted to refusal immediately after the completion of liner / pipe installation. Report theoretical vs. actual volumes of grout pumped.

7. Reporting to CN during/post Construction
    a. Progress of the contractor and pipe installation and what work was completed on that day,
    b. A summary of the daily ground surface and subsurface movements showing a comparison to a baseline reading taken before the start of construction, settlements of greater than 3/8" shall be reported to CN immediately.
    c. Any other geotechnical issues that may be of concern to CN.
    d. Log of settlement survey results showing
        i. Station
        ii. Date and Elevation of Initial Readings
        iii. Date and Elevation of Subsequent Readings
        iv. Difference in Elevation
    e. Submit ground surface and subsurface monitoring reports to CN daily, showing a comparison to baseline readings taken prior to the commencement of construction. Settlement of 3/16" is to be reported to CN immediately, and a settlement of 3/8" or greater the work is stopped until a resolution is achieved.
8. Provide, in writing, the name and phone number of the Applicant's qualified site inspector who will be on the job site on a full-time basis for the duration of construction. Update prior to work beginning if there are any changes.

NO CONSTRUCTION OR ACCESS TO CN ROW WILL COMMENCE UNTIL AN AGREEMENT HAS BEEN ENTERED INTO BETWEEN CN AND THE UTILITY OWNER

A-1. Monitoring Points Requirements



LEGEND

- DEEP SETTLEMENT MONITOR
- SURFACE SETTLEMENT MONITOR

REFERENCE

NOTE

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

Heights of Surface Rods Should Not Exceed Top of Ties

A-2. Minimum Wall Thickness for Steel Casing Pipe for E80 Loading

Table 1-5-1. Minimum Wall Thickness for Steel Casing Pipe for E80 Loading

Nominal Diameter (inches)	When coated or cathodically protected Nominal Thickness (inches)	When not coated or cathodically protected Nominal Thickness (inches)
12-3/4 and under	0.188	0.188
14	0.188	0.250
16	0.219	0.281
18	0.250	0.312
20 and 22	0.281	0.344
24	0.312	0.375
26	0.344	0.406
28	0.375	0.438
30	0.406	0.469
32	0.438	0.500
34 and 36	0.469	0.531
38	0.500	0.562
40	0.531	0.594
42	0.562	0.625
44 and 46	0.594	0.656
48	0.625	0.688
50	0.656	0.719
52	0.688	0.750
54	0.719	0.781
56 and 58	0.750	0.812
60	0.781	0.844
62	0.812	0.875
64	0.844	0.906
66 and 68	0.875	0.938
70	0.906	0.969
72	0.938	1.000

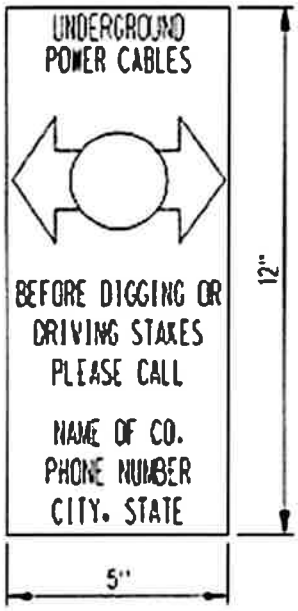
A-3. Overhead Wireline Clearance Chart

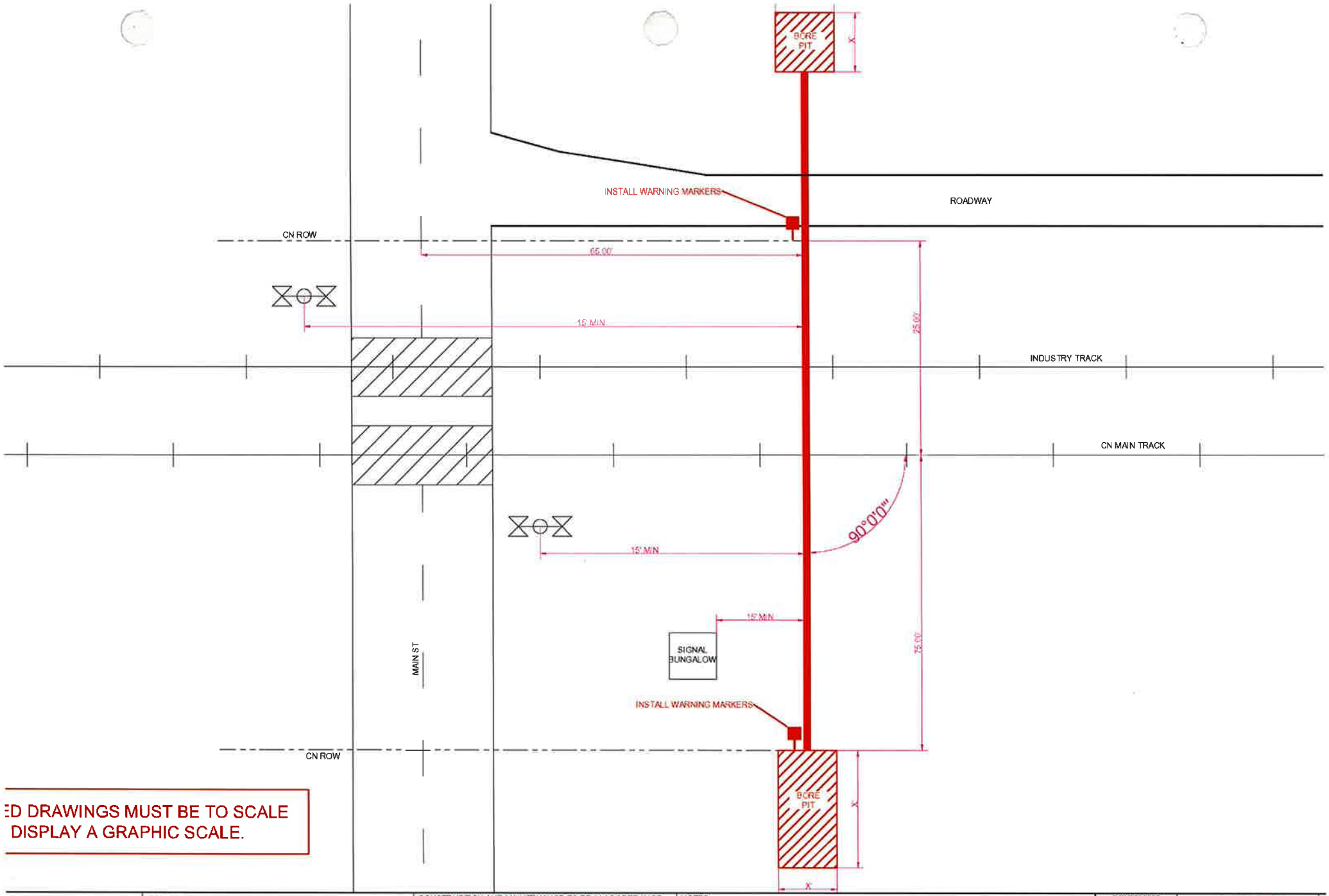
FORMULA: .5" increase for every 1,000 volts in excess of 50 KV
6" increase for every 12,000 volts in excess of 50 KV

Voltage (to ground)	Minimum Clearance Required above top Of rail	Minimum Clearance (Including Static Wires) Required above Communication and Signal Lines
0 to 750	27'0"	4'0"
8,700	28'0"	4'0"
15,000	28'0"	6'0"
50,000	30'0"	6'0"
74,000	31'0"	7'0"
98,000	32'0"	8'0"
122,000	33'0"	9'0"
146,000	34'0"	10'0"
170,000	35'0"	11'0"
194,000	36'0"	12'0"
218,000	37'0"	13'0"
242,000	38'0"	14'0"
266,000	39'0"	15'0"
290,000	40'0"	16'0"
THESE CLEARANCES ARE TO INCLUDE ALL TRACKS OPERATED AS MAIN TRACKS, SIDINGS, AND OTHER AUXILIARY TRACKAGE.		

A-4. Marking of Utilities on Railroad Right-of-Way

CABLE ROUTE MUST BE MARKED AT EDGE OF RIGHT OF WAY WHERE CABLE ENTERS OR LEAVES RAILROAD PROPERTY. IN CASES OF PARALLEL CABLE ROUTE, SIGNS AS INDICATED IN FIGURE 1 ON THIS EXHIBIT WILL BE PLACED APPROXIMATELY EVERY 200 FEET. SIGNS TO BE OF A PERMANENT VERTICAL TYPE, NOT SMALLER THAN 5 INCHES WIDE BY 12 INCHES HEIGHT. YELLOW BACKGROUND WITH BOLD BLACK LETTERING. SIGNS TO BE MOUNTED ON METAL POSTS OR AS OTHERWISE AGREED TO AT A HEIGHT OF 3 FEET ABOVE GROUND LEVEL.





ED DRAWINGS MUST BE TO SCALE
DISPLAY A GRAPHIC SCALE.

LEGEND

EXISTING
PROPOSED
ZONE OF INFLUENCE
DIMENSION
RIGHT OF WAY

CONSTRUCTION AND MAINTENANCE TO BE IN ACCORDANCE WITH ALL APPLICABLE REGULATORY REQUIREMENTS AND STANDARDS

REQUIRED NOTES

NOTES:

- SEE SHEET XX FOR PIPELINE SPECS
- SEE SHEET XX FOR DEWATERING PLAN
- SEE SHEET XX FOR SHORING PLAN
- DOT XING NUMBER (BLUE SIGN ON SIGNALS IF APPLICABLE)

REVISIONS	
DATE	BY
APPROVALS	

CN
SOUTHERN REGION

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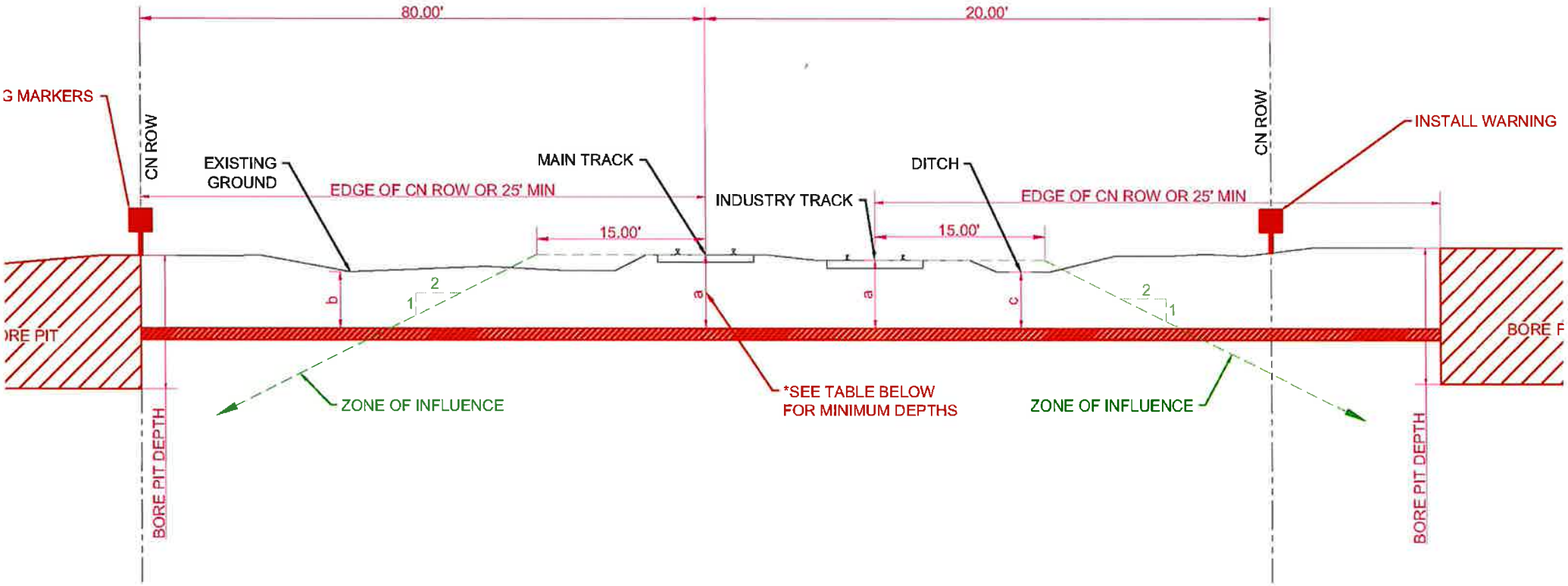

PTH	DRY JACK & BORE		DIRECTIONAL BORE
	CASED	UNCASED	
IL (a)	6'	10'	15'
JND (b)	5'	6'	6'
CH (c)	5'	6'	6'

REQUREMENTS

1. NO EXCAVATION CAN BE CLOSER THAN 25' FROM CENTEI TRACK
2. IF THE EXCAVATION IS INSIDE THE ZONE OF INFLUENCE T PLANS ARE REQUIRED AND MUST INCLUDE THE LIVE E80 PASSING TRAINS
3. THE ZONE OF INFLUENCE IS DESCRIBED AS 15' FROM CEI 2:1 SLOPE OUTWARD
4. IF EXCAVATION IS OUTSIDE OF ZONE OF INFLUENCE THE SHALL FOLLOW OSHA REQUIREMENTS

LEGEND:

EXISTING
PROPOSED
ZONE OF INFLUENCE
DIMENSION
RIGHT OF WAY

CONSTRUCTION AND MAINTENANCE TO BE IN ACCORDANCE WITH ALL APPLICABLE REGULATORY REQUIREMENTS AND STANDARDS

REQUIRED NOTES

NOTES:

- SEE SHEET XX FOR PIPELINE SPECS
- SEE SHEET XX FOR DEWATERING PLAN
- SEE SHEET XX FOR SHORING PLAN
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DATE	BY
APPROVALS	

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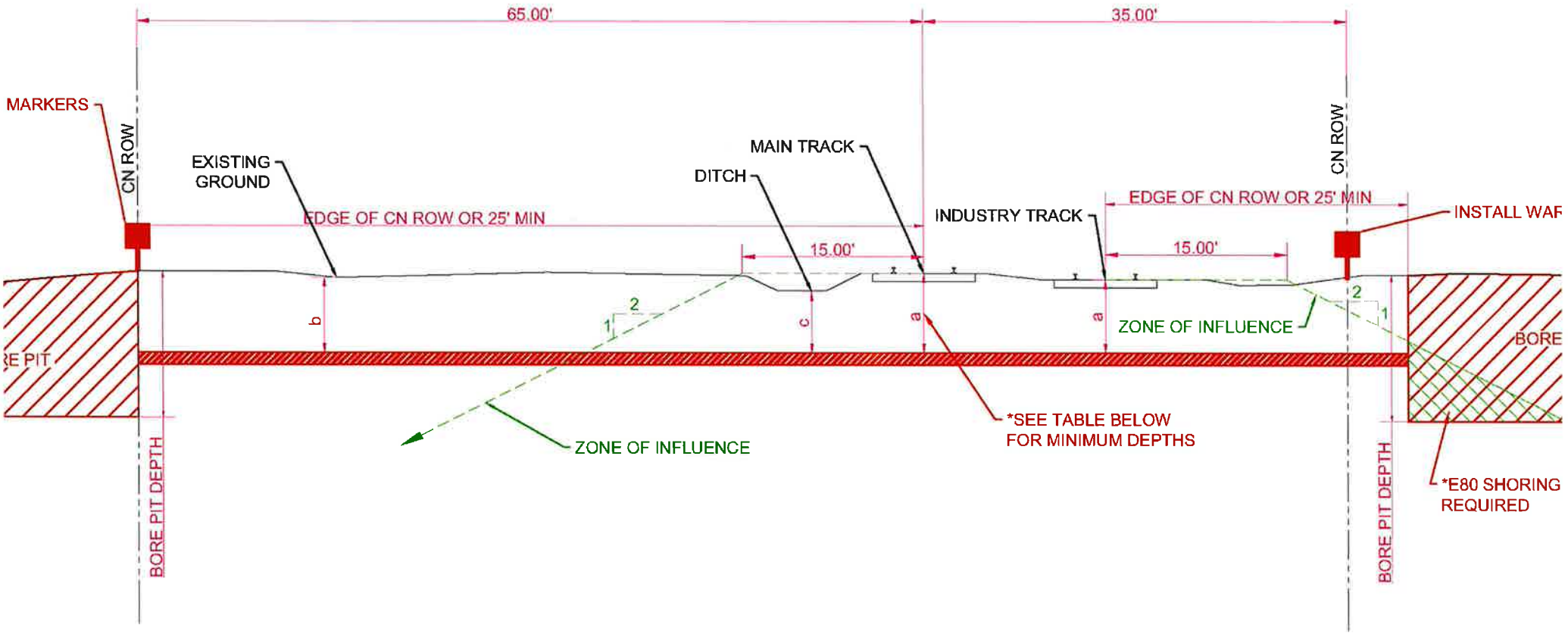

PTH	DRY JACK & BORE		DIRECTIONAL BORE
	CASED	UNCASED	
L (a)	6'	10'	15'
JND (b)	5'	6'	6'
CH (c)	5'	6'	6'

REQUREMENTS

1. NO EXCAVATION CAN BE CLOSER THAN 25' FROM CENTEI TRACK
2. IF THE EXCAVATION IS INSIDE THE ZONE OF INFLUENCE 1 PLANS ARE REQUIRED AND MUST INCLUDE THE LIVE E80 PASSING TRAINS
3. THE ZONE OF INFLUENCE IS DESCRIBED AS 15' FROM CEI 2:1 SLOPE OUTWARD
4. IF EXCAVATION IS OUTSIDE OF ZONE OF INFLUENCE THE SHALL FOLLOW OSHA REQUIREMENTS

LEGEND

EXISTING
PROPOSED
ZONE OF INFLUENCE
DIMENSION
RIGHT OF WAY

CONSTRUCTION AND MAINTENANCE TO BE IN ACCORDANCE WITH ALL APPLICABLE REGULATORY REQUIREMENTS AND STANDARDS

REQUIRED NOTES

NOTES

- SEE SHEET XX FOR PIPELINE SPECS
- SEE SHEET XX FOR DEWATERING PLAN
- SEE SHEET XX FOR SHORING PLAN
- DOT XING NUMBER (BLUE SIGN ON SIGNALS IF APPLICABLE)

REVISIONS

DATE	BY

APPROVALS

CN SOUTHERN REGION

[METHOD OF I FO

[PROPOSED UNDER

Project Type

APPLICATION FOR UTILITY OCCUPANCY

Complete this form and return it along with a non-refundable preparation fee of $1350 made out to CN.

1. **Owner/Sponsor's Information**

Company's Legal Name: _____

Street: _____

City: _____ State: _____ Zip: _____

Contact Name and Title: _____

Phone Number: _____ Owner/Sponsor's Project #: _____

Email Address: _____

2. **Consultant's Information**

Company's Legal Name: _____

Street: _____

City: _____ State: _____ Zip: _____

Contact Name and Title: _____

Phone Number: _____ Consultant's Project #: _____

Email Address: _____

Other Emails to include on correspondence: _____

3. **Location Information (Attach a Copy of a Sketch Showing Location)**

Nearest Public Road Crossing Street Name: _____

Nearest Public Road Crossing DOT #: _____ *(# on Blue Sign at Crossing, e.g. 123456L)*

Select one _____ County: _____ State: ____

Utility Location – Railroad Mile Post: _____ plus _____ ft.
(Start Railroad Mile Post [no decimal] plus the feet beyond the Mile Post)

Utility Location – Railroad Mile Post: _____ plus _____ ft.
(End Railroad Mile Post of Segment if longitudinal; if crossing please leave blank)

Please provide the coordinates for the point at which the utility will cross over or under the track(s).
If it is a longitudinal to the tracks, please provide start and end coordinates.

Latitude: _____°, Longitude: _____°

Latitude: _____°, Longitude: _____°

_____	_____	_____	_____
Name of Submitter	Signature	Telephone #	Date

APPLICATION FOR UTILITY OCCUPANCY
WIRE/FIBER/CABLE CONSTRUCTION INFORMATION

4. Type of Occupancy (check all that apply – minimum of three):

- ☐ Telephone
- ☐ Cable TV
- ☐ Coaxial
- ☐ Underground
- ☐ Overhead
- ☐ Other (please specify): _____
- ☐ Fiber Optic (# of Strands _____)
- ☐ Copper Pair (# of Wires _____)
- ☐ Electric
- ☐ Crossing
- ☐ Longitudinal

5. Wire/Cable Data

A. Number of Poles/Towers on Property
- ☐ Existing: ☐ Steel or ☐ Wood _____
- ☐ New: ☐ Steel or ☐ Wood _____

B. Number of Guys/Anchors on Property _____

C. Cross arm Overhang _____ ft.

D. Maximum Voltage _____

E. Number of Wires/Cables/Pairs/Strands (please specify # and type) _____

F. Depth of Top of Wire/Cable/Casing below base of Rail or Top of Ground _____ ft.

G. Clearance Over Railroad Company's Wires _____ ft.

H. Clearance Over Railroad Company's Tracks _____ ft.

I. Casing Length (Property Line to Property Line) _____ ft.

J. Size & Kind of Pipe or Duct _____

K. Method: How is Pipe or Duct to be installed under the track (dry bore & jack, directional, tunnel, other – specify) _____

L. Size and Type of Wire/Cable _____

M. Insulated _____

N. Bare/Open Wire _____

O. Stranded _____

P. Solid _____

Q. Angle of Crossing _____ °

R. Length of Span Crossing Tracks (unsupported length if above tracks) _____ ft.

6. Location References and Clearances of Facility (Encroachment)

A. Width of Public Road (crossing track) _____ ft.

B. Distance From Each Facility (Encroachment) to Center Line of Main Track _____ ft.

C. Distance From Each Facility (Encroachment) to Center Line of any Adjacent Track _____ ft.

D. Side Clearance from Railroad Company's Wire to Nearest Pole/Tower _____ ft.

E. Distance and Direction from Bridge Abutment, Culvert, Switch, Road Crossing, etc. _____ ft.

_____	_____	_____	_____
Name of Submitter	Signature	Telephone #	Date

APPLICATION FOR UTILITY OCCUPANCY
PIPE/CONDUIT INFORMATION

7. Type of Occupancy (check all that apply – minimum of three):

- ☐ Sewer (specify type): _____
- ☐ Steam
- ☐ Air
- ☐ Water (specify type): _____
- ☐ Underground
- ☐ Overhead
- ☐ Natural Gas
- ☐ Petroleum Products
- ☐ Chemical (specify type): _____
- ☐ Other (please specify): _____
- ☐ Crossing
- ☐ Longitudinal

8. Pipe Data

		CARRIER PIPE	CASING PIPE
A.	Inside Diameter:	_____	_____
B.	Outside Diameter:	_____	_____
C.	Wall Thickness:	_____	_____
D.	Pipe Material:	_____	_____
E.	Specification/Grade or class:	_____	_____
F.	Min. Yield Point of Material	_____	_____
G.	Process of Manufacture	_____	_____
H.	Name of Manufacturer	_____	_____
I.	Type of Joint	_____	_____
J.	Working Pressure	_____	_____

K. Maximum operating pressure (by gauge) _____psi

L. Length of Casing pipe: _____ft.

M. Casing pipe/uncased carrier pipe cathodically protected? Y / N

N. Hydrostatic pressure carrier pipe test pressure _____psi

O. Will casing pipe be vented? Y / N

P. Pipe Vent Size: _____in.

Q. Will casing pipe/uncased carrier pipe have a protective coating? Y / N

R. Protective Coating Type _____

S. Depth of top of casing or uncased carrier pipe below base of rail or top of ground. _____ft.
(Closest point of utility to any base of rail or ground)

T. Method of installing casing pipe /uncased carrier pipe _____
(Dry bore & jack, directional, tunnel, other – specify)

U. Depth of pipe below the ground. (not beneath tracks) _____ft.

V. Depth of pipe below ditches. _____ft.

W. Distance from centerline of track to face of jacking/receiving pits. _____ft.

X. Depth from base of rail to bottom of jacking /receiving pits. _____ft.

Name of Submitter	Signature	Telephone #	Date

INSURANCE REQUIREMENTS

1. By Licensee

Before commencing work, and until this Agreement shall be terminated or the FACILITY shall be removed (whichever date is later), the LICENSEE shall provide and maintain the following insurance in form and amount with companies satisfactory to and as approved by the RAILROAD.

a. Statutory Workers Compensation and Employer's Liability insurance.

b. Automobile Liability in an amount not less than $1,000,000 dollars combined single limit.

c. Comprehensive General Liability (Occurrence Form) in an amount not less than $5,000,000 dollars combined single limit, with an aggregate of at least $10,000,000 dollars. The Policy must name the appropriate RAILROAD as an Additional Insured and must not contain any exclusions related to:

   1. Doing business on, near, or adjacent to railroad facilities.

   2. Loss or damage resulting from surface, subsurface pollution contamination or seepage, or handling, treatment, disposal, or dumping of waste materials or substances.

Before commencing work, the LICENSEE shall deliver to the RAILROAD a certificate of insurance evidencing the foregoing coverage and upon request the LICENSEE shall deliver a certified, true and complete copy of the policy or policies. The policies shall provide for not less than ten (10) days prior written notice to the RAILROAD of cancellation of or any material change in, the policies; and shall contain the waiver of right of subrogation.

It is understood and agreed that the foregoing insurance coverage is not intended to, and shall not, relieve the LICENSEE from or serve to limit LICENSEE's liability under the indemnity provisions of any applicable agreement.

It is further understood and agreed that, so long as the Agreement shall remain in force or the FACILITY shall have been removed (whichever shall be later), the RAILROAD shall have the right, from time to time, to revise the amount or form of insurance coverage provided as circumstances or changing economic conditions may require. The RAILROAD shall give the LICENSEE written notice of any such requested change at least thirty (30) days prior to the date of expiration of the then existing policy or policies; and the LICENSEE agrees to, and shall, thereupon provide the RAILROAD with such revised policy or policies thereof.

2. By the Licensee's Contractor

If a contractor is to be employed by the Licensee for the installation of the FACILITY, then, before commencing work, the contractor shall provide and maintain the following insurance, in form and amount and with companies satisfactory to, and as approved by, the RAILROAD.

d. Statutory Workers' Compensation and Employer's Liability insurance.

e. Automobile Liability in an amount not less than $1,000,000 dollars combined single limit.

f. An Occurrence Form Railroad Protective Policy with limits of not less than $5,000,000 dollars per occurrence for Bodily Injury Liability, Property Damage Liability and Physical Damage to Property with $10,000,000 dollars aggregate for the term of the policy with respect of Bodily Injury Liability, Property Damage Liability and Physical Damage to Property. The policy must name the appropriate RAILROAD as the insured, and shall provide for not less than ten (10) days prior written notice to the RAILROAD'S as cancellation of, or any material change, in the policy.

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED EPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:
	PHONE (A/C, No, Ext): FAX (A/C, No):
	E-MAIL ADDRESS

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A :	
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:** 1

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

INSR LTR	TYPE OF INSURANCE	ADD L	SUB R	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
X	GENERAL LIABILITY COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR GEN AGGREGATE LIMIT APPLIES PER: POLICY PRO-JECT LOC	Y	Y		EFF DATE	EXP DATE	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$5,000,000 $ $ $ $10,000,000 $
X	AUTOMOBILE LIABILITY ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS NON-OWNED AUTOS	Y	Y		EFF DATE	EXP DATE	COMBINED SINGLE BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$1,000,000 $ $ $
X	UMBRELLA LIAB X OCCUR EXCESS LIAB CLAIMS-MADE DED RETENTION $	Y	Y		EFF DATE	EXP DATE	EACH OCCURRENCE AGGREGATE	$5,000,000 $10,000,000
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y / N N	Y		EFF DATE	EXP DATE	OTH-ER	MIN STATUTORY

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

Certificate holder is an additional insured under all polices on this certificate including Commercial General Liability and Umbrella Liability.

A Waiver of Subrogation applies in favor of the Certificate Holder for all policies on this certificate including Commercial General Liability and Umbrella Liability.

50 foot railroad exclusion is removed through CG 2417 10 01

CERTIFICATE HOLDER

(Appropriate Railroad Company Subsidiary for work location)

Example: Wisconsin Central Ltd. and its Parents

Attn: CN Flagging - US
17641 South Ashland Avenue
Homewood, IL 60430

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
of

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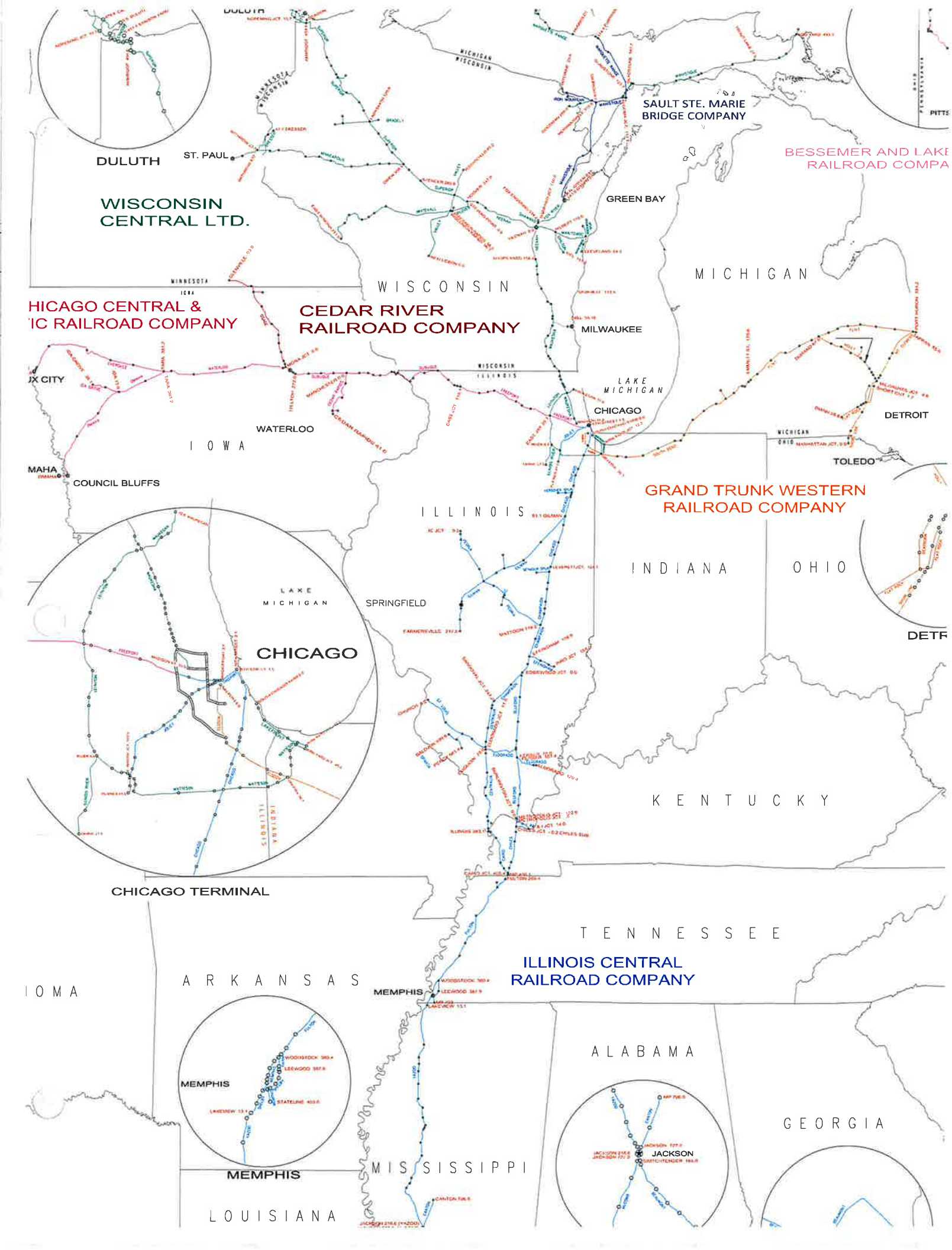
DULUTH
ST. PAUL
WISCONSIN CENTRAL LTD.
MINNESOTA
IOWA
WISCONSIN
MICHIGAN
SAULT STE. MARIE BRIDGE COMPANY
BESSEMER AND LAKE RAILROAD COMPA
GREEN BAY
MILWAUKEE
CHICAGO CENTRAL & IC RAILROAD COMPANY
CEDAR RIVER RAILROAD COMPANY
WISCONSIN
ILLINOIS
LAKE MICHIGAN
CHICAGO
DETROIT
TOLEDO
WATERLOO
IOWA
MAHA
COUNCIL BLUFFS
GRAND TRUNK WESTERN RAILROAD COMPANY
ILLINOIS
INDIANA
OHIO
SPRINGFIELD
CHICAGO
CHICAGO TERMINAL
KENTUCKY
TENNESSEE
ILLINOIS CENTRAL RAILROAD COMPANY
ARKANSAS
MEMPHIS
ALABAMA
GEORGIA
MISSISSIPPI
LOUISIANA
JACKSON

CN Request for Flagging Services and Cable Location

Project Information:

Please fill in each cell for processing

Is this a new project?	
List CN Project # (Example SO# 123456, Network# R1234, PSC-132):	
Contractor's Right of Entry (ROE), License, Permit #:	
Date of Agreement for ROE, License or Permit:	
Termination Date of Agreement for ROE, License or Permit (If Applicable):	
Does the scope of work include underground, piledriving, excavation or other activities which would require a Railroad Cable Locate? Note: railroad cables and fibers are not part of any state utility locate programs. If a contractor shows up on site to perform work that requires a cable locate and it was not requested, the flagger will shut down the project	
Does your project require vehicular traffic to be shifted out of its intended lane against the current of traffic at a railroad grade crossing?	
Railroad Subsidiary (listed on your agreement):	

Licensee and/or their contractor shall request, prepay, and secure Railroad Company signal facility locates by written notice to Railroad Company along with submission of CN's "Request for Flagging Services" form at least,
10 business days in advance of proposed performance of any work or access to Railroad Company property.
Notice to Railroad Company does not fulfill or satisfy any other notification requirements for utility locates for non-railroad facilities.
You must have an agreement with a CN railroad subsidiary, such as a Right of Entry, Permit, License or Formal Agreement in addition to any necessary flagging before you may enter CN property.

Flagging Protection Schedule:

Requested Dates for Flagger Protection: Dates requested are subject to Flagging Co. availability and any project needing a cable locate will need 10 days minimum advance notice. This should be considered when requesting dates for flagging.	
Estimated Duration (in days) for Flagger:	
Estimated Work Schedule (example Mon. – Sat.)	
Daily Start Time / End Time (example 0700 to 1700 etc.): (Flagger start and end time may vary based on type of protection required)	

Flagging Protection Location:

Railroad Mile Post (MP):		
Railroad Subdivision:		
Project's Location (Street location/intersection):		
Project - City / State:		
Project Description (example HDD, Jack and Bore, Encroachment, Underground or Overhead Pipeline / Wireline crossing, etc.):		
Location for flagger to report:		
Field Contact Person(s):	1st	Alternate
Mobile Phone Number(s):	1st	Alternate
Email Address(es):		

SAMPLE

CN REQUEST FOR FLAGGING SERVICES AND CABLE LOCATION

Billing Information:

Company Name:	
Contact Name:	
E-Mail:	
Billing Address:	
City/State:	
ZIP Code:	
Company Phone:	

Electronic Payment Instructions		Payment Information	
Financial Institution	HARRIS TRUST AND SAVINGS BANK 311 WEST MONROE, CHICAGO, IL	Customer Number (if available)	
Account Name	Grand Trunk Western	CN Contact	
Account	274-733-5	Service Requested (Flagging MP, Request Date)	
US ROUTING (ABA)	071 000 288		
Remittance Details	nfcashmanagement@cn.ca	Prepayment Amou	

Please send payment remittance details and copy of this flagging request to nfcashmanagement@cn.ca

Before Flagging Service is provided:

CN required online training must be completed before Flagging Protection will be scheduled.

Prepayment must be received before Flagging Protection will be scheduled.

There is an 8-hour minimum per day. The base rate for Flagging Protection is $2,500.00 for 10 hours: this includes 2 overtime hours for flagger to set up/take down protection if needed. Additional overtime hour must be prepaid at the rate of $275.00.00 per hour. Weekends and Holidays must be prepaid at the overtime rate with a $3,025.00 / 10 hour minimum. (Rates Effective October 1st, 2023.)

*******New Rates effective March 10, 2025 below*******

A fixed rate of $2,900 per flagging day (12-hour day) ($3,300 on Weekends and Holidays) for flagging protection and it needs to be prepaid. Railroad Cable Locate must be prepaid at $1,025. Fixed fees prepaid for full unused days will be refunded. For greater clarity, if a customer prepaid for 5 flagging days and used 3 days, CN will refund 2 days.

If additional days of flagging protection are required, they must be prepaid in advance.

Any prepayment not used can be refunded.

Railroad Cable Location must be prepaid, the cost is $9750.00 per locate.

New rate effective March 10, 2025 $1,025 per locate.

This completed form must be sent with a map, confirmation of electronic prepayment, and proof of insurance to US_Flagging@cn.ca

CN Flagging Department

SAMPLE

US Flagging
T: **248-914-9695**
17641 South Ashland Ave.
Homewood, IL 60430
S Flagging@cn.ca

I, _____, agree to pay for flagging and/or cable locate services as requested _____
Print Name **Signature**

APPENDIX B

Track Movement Monitoring Guidelines for Trenchless Pipe and Utility Crossing(s) Installation under Railway Tracks

(Last updated – May 16, 2022)

The monitoring of track settlement should be carried out by means of surface and subsurface settlement points. The intent of subsurface settlement points is to measure voids created just in the vicinity and above the pipe during construction in order to predict the potential movement of overlying CP tracks.

The settlement point essentially consists of a small diameter pipe anchored at the bottom of a vertical borehole and an outer casing to isolate the pipe from down drag forces caused by settlement of soil above the anchor (see Figure B). The subsurface settlement points would be installed to 1 m above the crown of the casing profile. The total number of subsurface settlement points within CP Right-of-Way (ROW) along the axis of the proposed pipe crossing(s) would be installed as per the configuration shown in Figure A – Sample Surface and Subsurface Settlement Monitoring Layout.

Surface points installed directly along the base of both rails at a spacing of 9.45 m (31 ft.) over the projected settlement trough would be used to monitor differential transversal elevation between both rails. The total number of surface settlement points within CP ROW would be installed as per the configuration shown in Figure A – Sample Surface and Subsurface Settlement Monitoring Layout. These points shall be monitored simultaneously with the subsurface settlement points that would act as a precursor to potential surface movement during pipe installation.

Once the installation is complete, a monitoring program of all points is to be carried out in accordance with the following instructions:

1. Monitoring should start before the excavation of the pits and pipe installation begins and readings should be taken at least twice per day for no less than two days. This is required to establish a reliable methodology and demonstrate the accuracy to be achieved.

2. Monitoring should proceed through the construction period and should be completed:

    1) For branch lines/lines with low traffic - (Class 1-2 Track) - At least twice daily.

    2) For main lines and heavy traffic lines – (Class 3-5 Track) Every 2 hours or after each train, whichever provides the most number of readings while the boring operation is within the ZPTL (Zone of Potential Train Loading).

3. Monitoring should continue for at least 3 days after the completion of construction.

4. If there is any loss of ground during pipe installation, any reason to believe settlement may be delayed or any settlement is identified during the installation of pipe or subsequent

monitoring period, the monitoring must be continued until the applicant's Geotechnical Engineer of Record deems it is safe to discontinue such monitoring. This must be approved by CP Geotechnical Engineering group or CP approved service provider reviewing the monitoring results.

Monitoring measurements should be taken with sufficient frequency (as noted above) to capture the unexpected performance at the earliest possible stage and be evaluated in a timely manner. Additional measures will be proposed should this monitoring protocol be considered insufficient based on the ground conditions or installation process. Track survey preference would be for survey shots to be taken remotely (i.e. off CP property) and without the requirement of a CP Flagger or representative presence on site.

Two alarm levels are proposed:-

Level 1:

"WARNING/ALERT" will be indicated on the field memo/report when a settlement of **50 (%)** of the critical monitoring threshold is obtained from the subsurface and/or surface settlement points. A survey of the surface points will then be carried out and work will be authorized to continue if no movement of the subsurface point has been measured from the previous reading. If movement of the rails is recorded, monitoring will be continued until rail movement is stopped. At this point, the drilling work will then be authorized to continue. See Figure C – Track Settlement Monitoring Review and Alert Threshold for Threshold values per Class of Track designation. Please contact CP Public Work-Utilities Supervisor to obtain Class of Track designation pertaining to the proposed Utility Crossing location.

Level 2:

"CRITICAL/REVIEW" will be indicated on the field memo/report when a settlement of specified monitoring threshold is obtained from the subsurface settlement point. A survey of the surface points will then be carried out and work will be authorized to continue if no movement is measured for at least two (2) readings taken 12 hours apart. If movement of the rails is recorded, monitoring will be continued until movement is stopped and the applicant has submitted a new pipe installation procedure. This procedure must be reviewed and approved by CP Geotechnical Engineering group or CP approved service provider reviewing the monitoring results.

The applicant and their Geotechnical Engineer of Record are responsible for ensuring that track settlement does not occur and for notifying CP Roadmaster or their designate, as indicated on the 24 hr Emergency Contact List, should unforeseeable track settlement occur or be expected.

The above guidelines do not relieve the applicant and their engineer(s) of this responsibility. The applicant or their engineer(s) shall provide the settlement information and their interpretation of the data including information such as. no track settlement, deep settlement etc., a quantitative number of how much track settlement has occurred, is likely to occur and when it is likely to occur. This information should be provided in easily understandable terms for

all parties involved in the construction and monitoring and should be directed to local CP Roadmaster, CP approved service provider, Supervisor – CP Public Works – Utilities and Director of Geotechnical Engineering.

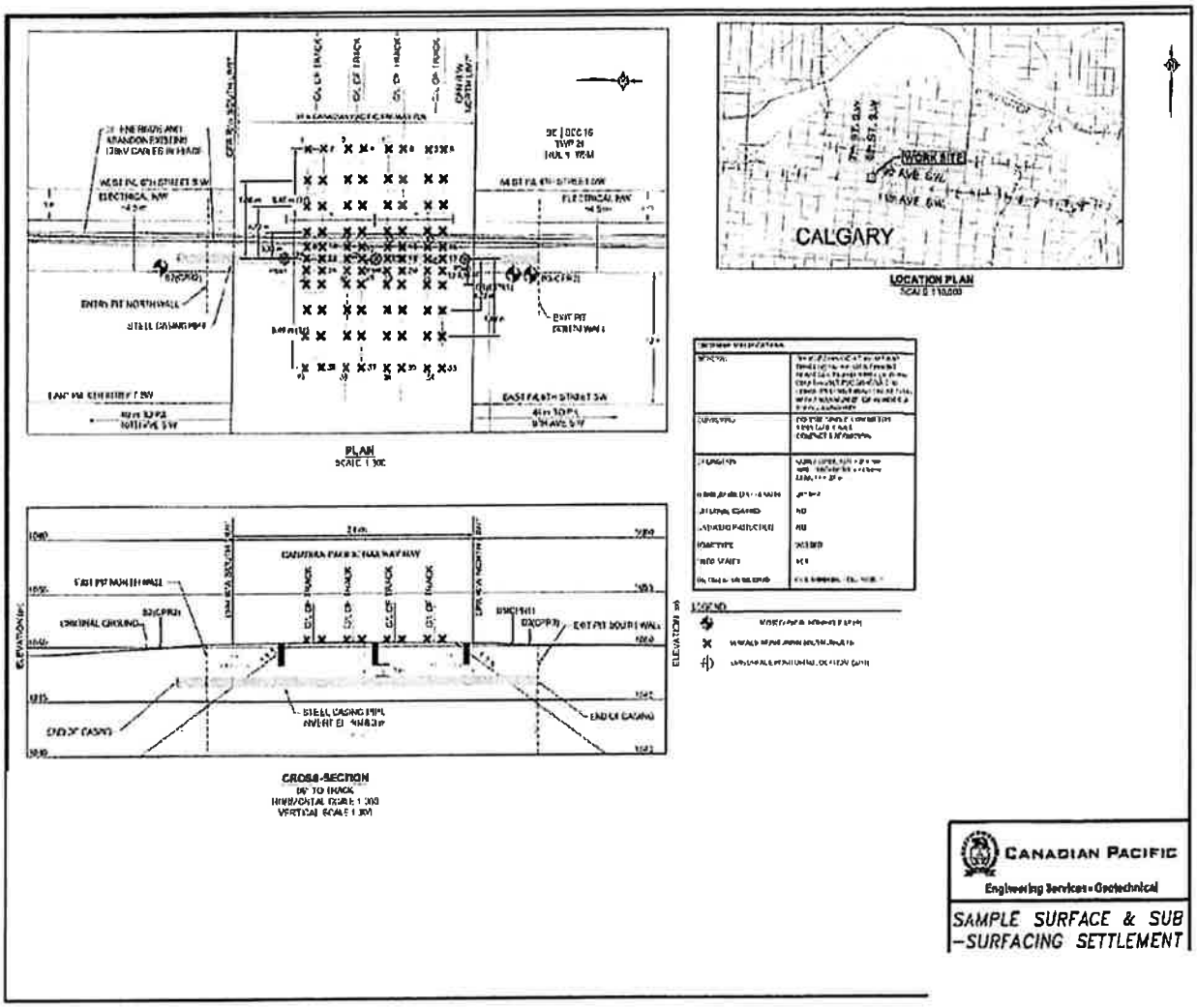

Figure A - Sample Surface and Subsurface Settlement Monitoring Layout

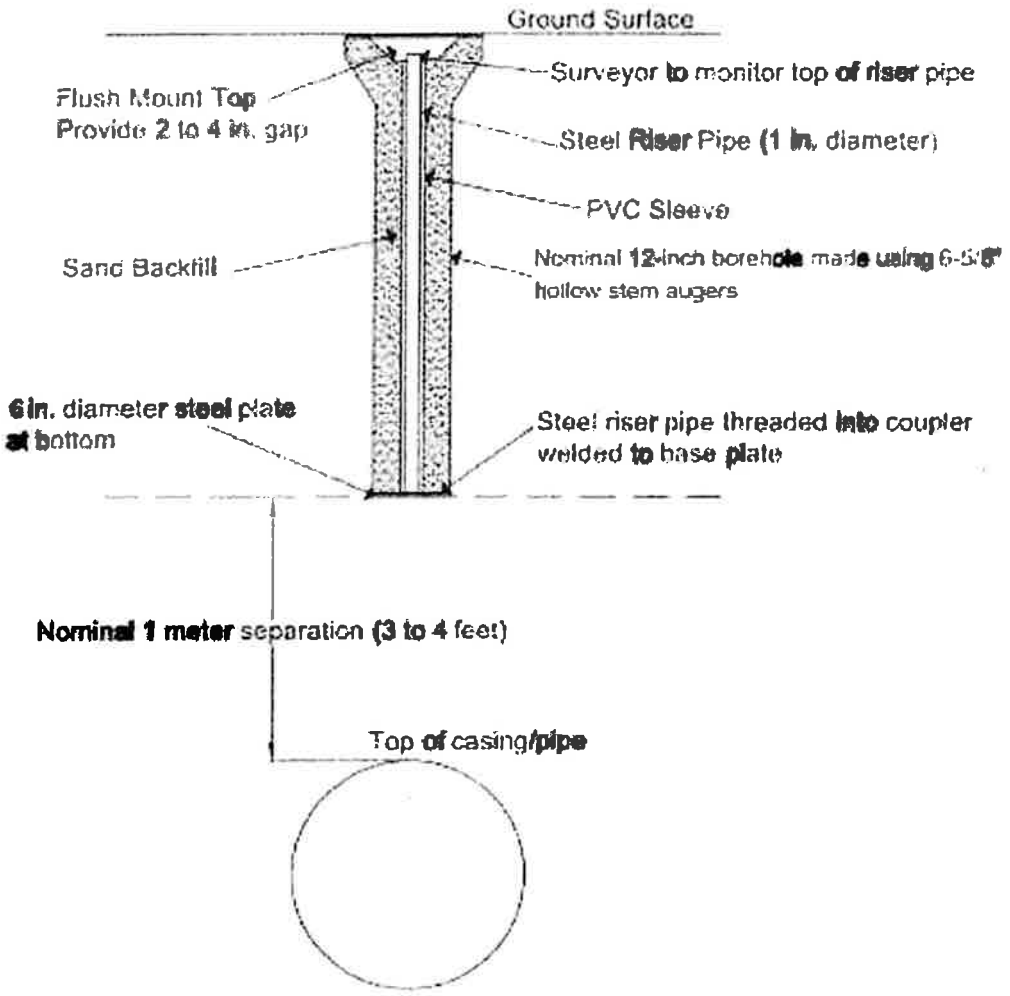

Figure B - Typical Subsurface Settlement Point Detail

Figure C – Track Settlement Monitoring Review and Alert Thresholds (Surface and Subsurface)

Class of track	Critical/Review Threshold	Alert/Warning Threshold
1	22 mm	11 mm
2	22 mm	11 mm
3	19 mm	10 mm
4	16 mm	8 mm
5	13 mm	6 mm
6	10 mm	5 mm

Note – All above numbers are maximum values

Class of Track

TRACK CLASSES

Class	Freight Train Speed	Passenger Train Speed
1	10 MPH	15MPH
2	25 MPH	30 MPH
3	40 MPH	60 MPH
4	60 MPH	80 MPH
5	80 MPH	95 MPH* 90 MPH **
*Denotes for LRC trains – 100 MPH	** - Applies to US only	Note – Numbers above are maximum values

Appendix C

TRACK MOVEMENT MONITORING GUIDELINES FOR TRENCHLESS PIPE INSTALLATION

APPENDIX B

CP RAILROAD CROSSING PERMIT REQUIREMENTS

GEOTECHNICAL PROTOCOL

FOR

PIPELINE AND UTILITY CROSSING(S) UNDER

RAILWAY TRACKS

Engineering

Geotechnical and Public Works – Utilities

Last Updated: May 16, 2022

2	May 16, 2022	DJW	Fig C – Pg 39 & other sections highlighted
1	Feb 25, 2020	MR	Level 2 criteria – Pg 36
No	Date	By	Revision

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Appendices

Appendix A – Sample Figures 1 to 3

Appendix B – Sample Daily Report and Settlement Report

Appendix C – Track Movement Guidleine for Trenchless Pipe Installation

1.0 Limitations of the Document

The following protocol is independent of the requirements for assessing the structural components of the pipeline and pipeline crossing. The structural requirements for all pipeline crossings are included in CP – SP-TS-2.39- Pipeline and Cable Installations within Railway Right of Way. An agreement or permit from Canadian Pacific Railway's Public Works - Utilities is required before commencing with any work within the railway corridor. **Proposals for pipelines and utilities parallel to the track(s) are not covered under this protocol.**

In addition, this document does not cover review on any of the engineering design aspects of the proposed pipelines and utility crossings. Suitable engineering design is the sole responsibility of the applicant. Geotechnical approval of a proposed pipeline crossing by Canadian Pacific (CP) in no way warrants the suitability of construction methods/techniques for anticipated ground conditions, nor does it warrant the suitability of existing ground and site conditions for the use proposed by the applicant of the crossing. CP does not take any responsibility for the suitability of the construction method or warrantee the ground and/or site conditions. CP geotechnical approval of a pipeline and utility installation application merely indicates that based on the provided and available information, the proposed construction and design addresses CP's needs at the time of review and approval. CP does not provide engineering recommendations, directions or minimum standards to the applicant or their contractor(s) for design and execution of their work within CP Right-of-Way (ROW).

Due to third party work on CP ROW, CP will not be liable for any damages or delays to the applicant and/or CP assets and operation because of its approval of an application. In addition, any damages incurred to CP due to third party pipeline and utility crossing(s) will be the responsibility of the applicant.

CP requires that the applicant provide adequate documentation as outlined in this protocol; clearly identify the responsible Professional Engineer of Record and the components of the project for which they are responsible.

2.0 General Terminology

Base of Rail (BOR): is the bottom surface of the rail and is frequently used as a local datum from which vertical measurements are referenced. If an external datum is utilized the elevation of the BOR will be identified.

Geotechnical Engineer of Record's onsite designate/representative: A geotechnical trained and competent person assigned by the Geotechnical Engineer of Record to act as site inspector

who will be present onsite during the full duration of the construction and installation within railway operating corridor, unless, otherwise directed by CP Public Works - Utilities Supervisor. The site inspector must have the required training, experience and understanding of the site conditions, proposed design, and construction methodology to make sound engineering judgement and decisions, and reports during the course of the work.

Service Provider(s): include professional engineering firm(s) or individual(s) representing relevant or applicable engineering disciplines, to be retained on behalf of CP for engineering related review and/or oversight of fieldwork and track settlement monitoring results, for which the compensation will be paid by the applicant.

Zone of Potential Track Loading (ZPTL): is considered as the area under the track and within a 1V to 1.5H soil zone extending down from a point at the level of the BOR and 2 m (6.6 ft.) from The centerline of track as shown in Figure 3.

FRA: Federal Railroad Administration.

TC: Transport Canada.

3.0 Introduction

The purpose of this document is to ensure efficient application process and ensure safety and uninterrupted operation of Canadian Pacific (CP) Railway's operations during the execution of proposed third party pipeline and utility crossing(s) within CP ROW. This document is intended to guide the applicant of the minimum application requirements, review and approval process for proposed pipeline and utility crossing(s) as completed by CP Public Works - Utilities and Geotechnical groups. The goal of this protocol is to:

3.1 Provide safe track(s) conditions during and after the installation of proposed pipeline and utility crossing(s);

3.2 Establish requirements and procedures to be followed by the applicant(s) to minimize difficulties and risks to CP's operations and its assets during the installation and operation of pipeline and utility crossing(s) under CP's tracks and within its ROW;

3.3 Specify minimum criteria to be met for CP's review;

3.4 Ensure adequate subsurface information including geotechnical and groundwater information is available and an assessment by CP's geotechnical group or a CP approved service provider has been completed prior to providing approval; and

3.5 Allow timely processing of application for pipeline and utility crossing(s) approvals.

4.0 Emergencies

In the event of any occurrence due to construction/contractor activities that does or could pose a hazard, immediately contact CP at **1-800-716-9132**.

5.0 Winter Work Restriction within CP ROW

No construction and installation of pipeline and utility crossing(s) will take place from January 1st to March 31st. This restriction is particularly critical to areas where frost penetrates the ground and may make it difficult to observe surface settlement and loss of soil from underneath the track substructure due to misperception of a levelled frozen surface. Such conditions pose a risk to the stability of CP's track and its substructure during thawing season and are not acceptable.

In areas where the applicant does not consider frost as a potential risk, the applicant is required to assure and demonstrate to CP as to why winter work restriction is not applicable to their proposed work. Exceptions to winter work restriction will be evaluated on case by case basis.

6.0 Application Process Identification

To identify the applicable process, complete appropriate level of assessment and allow timely processing of a pipeline and utility crossing(s) proposal, the requirement criteria have been divided into three levels as identified in Table 1, i.e. Minimum, Intermediate and Detailed. These processes are categorized based on the size, cover, location and proximity of pipeline from tracks and other structures, and construction methodology of the proposed pipeline and utility crossing(s).

Applicant is expected to consult Table 1 to identify the level of effort and detail of submission required to meet CP review requirements for review. Details of each process are discussed in the following sections.

Table 1 – Process Identification

		Process Levels		
		1. Minimum[1]	**2. Intermediate**	**3. Detailed**
Dimension Criteria	Outside diameter of pipe	Less than 300 mm (12 in.)	300 mm (12 inches) to 1500 mm (59 in.)	Greater than 1500 mm (59 in.)
	Cover between BOR and top of pipe	Greater than 1.5 m (5 ft.) or three pipe diameters whichever is greater.	Greater than 1.5 m (5 ft.) or two (2) pipe diameters whichever is greater.	Less than 1.5 m (5 ft.) or two (2) pipe diameters.
	Adjacent structures including switches and signals	Greater than 10 m (32.8 ft.) from centerline	Within 2.5 times, cover between BOR and top of pipe.	
	Depth of pipes outside ZPTL	Refer to SP-TS 2.39 All pipes will be at least 0.91 m (3 ft.) below ground (below sub-ballast layer) where pipes are not below the ZPTL.	Less than 0.91 m (3 ft.) burial within ZPTL.	
Excavation Criteria	Excavation close to CP track(s)	Jacking/access pits shall be more than 10 m (32.8 ft.) from the closest track centerline and shall not encroach on the ZPTL.	Excavations or jacking/access pits within 10 m (32.8 ft.) of the closest track centerline.	
	Crossing angle	Less than 45 degrees off perpendicular to the track.	More than 45 degrees off perpendicular to the track.	

<table>
<tr><th></th><th colspan="3">Process Levels</th></tr>
<tr><th></th><th>1. Minimum[1]</th><th>2. Intermediate</th><th>3. Detailed</th></tr>
<tr><td rowspan="2">Construction Method</td><td colspan="2">Trenchless method[2]</td><td rowspan="2">All methods considered.</td></tr>
<tr><td colspan="2">Pipe bursting will only be considered where the predicted heave is less than 10% of the movement that would result in a change of the FRA or TC track class.</td></tr>
<tr><td>Approval Process</td><td>Public Works - Utility group to approve with no geotechnical submission.</td><td colspan="2">Full review of design, geotechnical and construction method Applicant to pay for the review cost of CP approved service provider.</td></tr>
</table>

[1] Move to next class if one or more criteria are not met.

[2] Trenchless methods include Auger Boring (AB), Pipe Jacking, Pipe Ramming (PR), Horizontal Directional Drilling (HDD) except high pressure fluid jetting method, Microtunnelling (MT) but exclude any type of mining techniques where any stand up time is required before the tunnel support is placed.

7.0 Minimum Information Requirements

7.1 All proposals for pipeline and utility crossing(s) approvals will be under the signature and seal of a locally registered professional Geotechnical Engineer referred to as Geotechnical Engineer of Record (GER). The objective is to ensure that a registered professional from applicant's design firm or organization is given the opportunity and responsibility to assess the site and subsurface conditions and demonstrates due diligence to assure CP that the proposal is appropriate for such conditions. This, however, depending on the complexity of design and proposal, may be in addition to the requirements of meeting industry standards or current regulatory requirements for structural integrity of the pipeline/utility. Such design will also require signature and seal by a professional geotechnical and/or structural engineer.

7.2 The application package must include a construction plan that specifies the terms and conditions for the execution of the proposed work, including assignment of responsibility. The applicant of the crossing(s) is responsible to ensure that the work is executed in accordance with the terms of the agreement with CP.

7.3 **Engineering Drawings:** All pipeline and utility crossing(s) application packages will be accompanied by following documents, at minimum, showing features on drawings in true scale.

7.3.1 Plan of the proposed pipe and utility crossing(s) under the track (Appendix A, Figure 1). This drawing will show the following features:

7.3.1.1 Location of the crossing(s), referencing identifiable landmarks including Mileage and Subdivision of the proposed crossing(s) as per CP Subdivision naming and Mileage convention. Applicant can obtain the Mileage and Subdivision information from CP Public Works - Utilities group; The title of the plan will include the subdivision name and mileage of the location.

7.3.1.2 Pipe centerline, diameter, length, size, limits, thickness and material;

7.3.1.3 Location of any adjacent structures including but not limited to signals, switches, culverts, other existing underground/buried services including Fibre Optics Transmission Systems (FOTS) and relevant distances from the centerline of the track(s);

7.3.1.4 Location of the ditch line and any breaks in slope;

7.3.1.5 Location of drilled boreholes or test pits from geotechnical investigation;

7.3.1.6 Location of all tracks and distances from track centerline to the proposed work area location; and

7.3.1.7 Location of all access pits, size, depth and details of support of excavation, if applicable.

7.3.2 Profile of the track and proposed pipeline and utility crossing(s) along the centerline of the track (Appendix A, Figure 2). The profile will show the following features:

7.3.2.1 Location of the crossing(s), referencing identifiable landmarks including Mileage and Subdivision of the proposed crossing(s) as per CP Subdivision naming and Mileage convention. Applicant can obtain the Mileage and Subdivision information from CP Public Works - Utilities Group;

7.3.2.2 Pipe centerline, diameter, length, size, limits, thickness and material;

7.3.2.3 Location of any adjacent structures including but not limited to signals, switches, culverts, other existing underground/buried services including Fibre Optics Transmission Systems (FOTS) and vertical distance from BOR;

7.3.2.4 Elevation of surface water in ditches, elevation of the ground water table in all boreholes and the date it was measured;

7.3.2.5 Test pit/borehole locations along with the stratigraphic profile as determined through the geotechnical investigation;

7.3.2.6 Depth of top of pipe to the BOR; and

7.3.2.7 Location of all jacking/access pits, size, depth and details of support of excavation, if applicable.

7.3.3 Section of the track along the centerline of the proposed pipeline and utility crossing(s) (Appendix A, Figure 3). This drawing will show the following features:

7.3.3.1 Location of the crossing(s), referencing identifiable landmarks including Mileage and Subdivision of the proposed crossing(s) as per CP Subdivision naming and Mileage convention. Applicant can obtain the Mileage and Subdivision information from CP Public Works - Utilities group;

7.3.3.2 Pipe centerline, diameter, length, size, limits, thickness and material;

7.3.3.3 Any adjacent structures including but not limited to signals, switches, culverts, other existing underground/buried services including FOTS and vertical distance from BOR;

7.3.3.4 Elevation of surface water in ditches, elevation of the ground water table in all boreholes and the date they were measured;

7.3.3.5 Test pit/borehole locations along with the stratigraphic profile as determined through the geotechnical investigation;

7.3.3.6 Location of jacking or access pits and proposed cut slope angles;

7.3.3.7 Location of the centerline of all tracks;

7.3.3.8 Depth of the top of pipe to the BOR; and

7.3.3.9 Any excavations that encroach on the ZPTL; Indicate ZPTL and distance from ground to the top of pipe.

7.3.3.10 Cross-Sections of perpendicular to the track shall be displayed as viewing in the direction of increasing CPR mileage; left and right-hand being so determined.

7.4 Geotechnical Investigation Report (if applicable) signed and sealed by a locally registered professional Geotechnical Engineer;

7.5 Settlement Monitoring Plan indicating layout and types of settlement monitors to be installed, frequency of measurements, alarm thresholds i.e. "Warning" and "Critical" thresholds, reporting protocol, and immediate actions to take when required. General track movement monitoring guidelines are provided in Appendix C.

7.6 Other Information: This includes information related to additional design and requirements based on the ground conditions and proposed construction. This may include excavation support/shoring, dewatering requirements etc. If required, complete design and relevant drawings will be required.

7.7 Applicant is expected to restore the site to its original condition.

7.8 Proposals for open cut will only be considered at sites where conditions make other installation techniques impractical or where rail traffic is low. This, however, will be assessed on case by case basis.

7.9 Installations using high pressure fluid jetting will not be considered.

7.10 The cost of remediation incurred to CP as a result of pipeline and utility crossing(s) construction and installation and related activities will be borne by the crossing(s) applicant. Some of the issues include settlement or soil heave induced by the crossing(s) installation during and after the construction.

7.11 All pipelines and utilities installed below the highest ground water level predicted will be sealed during construction.

7.12 All pipelines that will or could carry water shall be:

7.12.1 Installed with even bearing throughout its length to limit local settlement; and

7.12.2 Sloped to one end and prevent standing water. Special exemptions will be considered for inverted siphons or other applications requiring level pipes.

8.0 Process 1 – Minimum

8.1 Criteria

The general requirements included in Table 1 in conjunction with the following requirements must be met to obtain approval for a pipeline and utility crossing(s) that qualifies as a Process 1 crossing(s).

Table 2: Process 1 – Minimum

Dimension Criteria	
Outside pipe diameter	Less than 300 mm (12 in.)
Cover between BOR and top of pipe	Greater than 1.5 m (5 ft.) or three pipe diameters whichever is greater.
Adjacent structures including switches and signals	Greater than 10 m (32.8 ft.) centerline.
Depth of pipes outside ZPTL	Refer to SP-TS 2.39 All pipes will be at least 0.91 m (3 ft.) below ground where pipes are not below the ZPTL.
Excavation Criteria	
Excavation close to CP track(s)	Jacking/access pits shall be more than 10 m (33 ft.) from the closest track centerline and not encroach on the ZPTL.
Crossing angle	Less than 45 degrees off perpendicular to the track.
Construction Method	

1. Trenchless method[1]
2. Pipe bursting will only be considered where the predicted soil heave is less than 10% of the movement that would result in a change of the FRA or TC track class.

[1] Trenchless methods include Auger Boring (AB), Pipe Jacking, Pipe Ramming (PR), Horizontal Directional Drilling (HDD) except high pressure fluid jetting method, Microtunnelling (MT) but exclude any type of mining techniques where any stand up time is required before the tunnel support is placed.

8.2 Application Requirements

8.2.1 The applicant will provide documents and drawings containing the information identified in Section 7.0.

8.2.2 Generally,a geotechnical investigation is not required. However, in areas or conditions where problems have arisen with similar pipe crossings CP reserves the right to require a geotechnical investigation to be completed and submitted with the application.

8.2.3 Even if not required by CP, a geotechnical investigation may be completed at the discretion of the applicant.

8.3 Application Review and Approval Process

8.3.1 Applicant submits engineering documents to CP Public Works - Utilities.

8.3.2 CP Public Works – Utilities reviews documents to ensure applicable and complete engineering documents are provided.

8.3.3 An assessment is completed by CP Public Works – Utilities to provide decision/approval documentation.

9.0 Process 2 – Intermediate

The Intermediate process pertains to those proposed pipeline/track crossing(s) that exceed the minimum criteria but do not exceed the maximum criteria. The applicant will be required to submit information for review and approval by CP Geotechnical group, Public Works – Utilities or a CP

approved service provider but may not be subjected to additional engineering, monitoring and construction requirements.

9.1 Criteria

The general requirements included in Table 1 in conjunction with the following requirements must be met to obtain approval for a pipeline and utility crossing(s) that qualifies as a Process 2 crossing(s).

Table 3: Process 2 – Intermediate

Dimension Criteria	
Outside pipe diameter	300 mm (12 in.) to 1500 mm (59 in.)
Cover between BOR and top of pipe	Greater than 1.5 m (5 ft.) or two (2) pipe diameters whichever is greater.
Adjacent structures including switches and signals	Within 2.5 times, cover between BOR and top of pipe.
Depth of pipes outside ZPTL	Less than 0.91 m (3 ft.) burial within ZPTL.
Excavation Criteria	
Excavation close to CP track(s)	Excavations or jacking/access pits within 10 m (32.8 ft.) of the closest track centerline.

Crossing angle	More than 45 degrees off perpendicular to the track.
Construction Method	
	1. Trenchless method[1] 2. Pipe bursting will only be considered where the predicted soil heave is less than 10% of the movement that would result in a change of the FRA or TC track class.

[1] Trenchless methods include Auger Boring (AB), Pipe Jacking, Pipe Ramming (PR), Horizontal Directional Drilling (HDD) except high pressure fluid jetting method, Microtunnelling (MT) but exclude any type of mining techniques where any stand up time is required before the tunnel support is placed.

9.2 Application Requirements

9.2.1 Identification of the Geotechnical Engineer of Record (GER). The GER will be responsible for the proposed works on CP's ROW from project start up to project closeout including submission of construction summary report and as-built drawing.

9.2.2 Description of the subsurface soil and ground water conditions within and adjacent to CP embankment along the proposed pipe/track crossing alignment and to a depth no less that 1.5 times the invert depth below the BOR. This will consider the impact of silt, fine sand or sand soil, and their relation to the water table and pipe depth.

9.2.3 An estimate of the expected extent and magnitude of ground movement over time based on the proposed pipe installation method will be provided.

9.2.4 A program of ground surface and subsurface (settlement plates) movement monitoring will be implemented. The program must be capable of detecting movement of no less than 50 percent of the movement that would result in a change of the track class as determined by the FRA or TC track safety rules.

9.2.5 A procedure for notification of the appropriate CP personnel in the event that excessive or unexpected settlement occurs. A complete 24HR CP Emergency

contact list, including local personnel and OC will be compiled and in place before any work proceeds within the railway right of way.

9.2.6 A recovery plan will be provided outlining the steps to be implemented in the event of failure (excessive ground loss or settlement / collapse, heaving etc).

9.2.7 Design of de-watering control measures where applicable for the proposed construction method.

9.2.8 Temporary track support system will be required if any of the excavation is closer than 6 m (19.7 feet) from the centre of track and encroaches on the zone of potential track loading. The length of the excavation and an estimated stand-up time of the proposed cut within these limits must be provided and demonstrated to be safe.

9.2.9 A complete description of the proposed construction method.

9.2.10 Confirmation that the proposed construction/installation technique is suited to the site conditions and performance criteria. An assessment of the influence of construction on the track structure including estimated settlement/heave and assessment of risk associated with uncontrolled loss of ground or heaving.

9.2.11 Based on CP's review of the conditions, CP Geotechnical group may elevate a proposed crossing to Process 3 if deemed necessary.

9.2.12 A qualified independent CP approved engineer is required to provide periodic or continuous (at the discretion of CP) on-site supervision and document conditions during construction.

9.3 Application Review and Approval Process

9.3.1 Applicant submits engineering documents and applications to CP Public Works – Utilities.

9.3.2 CP Public Works – Utilities reviews documents to check if appropriate engineering documents have been provided.

9.3.3 CP approved service provider to review initially & sign off on behalf of CP at applicant's expense. CP Geotechnical to provide final geotechnical approval.

9.3.4 CP Structural Engineering Group may have to provide structural approval, if required.

9.3.5 CP Public Works – Utilities to provide final decision or permits.

10.0 Process 3 – Detailed

Process 3 will be applicable to those crossing(s) applications that do not meet the conditions of Process 2. In this case, expert engineering submissions are required, along with additional work such as dewatering as well as monitoring by on site engineering consultants during construction.

10.1 Criteria

The general requirements included in Table 1 in conjunction with the following requirements must be met to obtain approval for a pipeline crossing(s) that qualifies as a Process 3 crossing.

Table 4: Process 3 – Detailed

Dimension Criteria	
Outside pipe diameter	Greater than 1500 mm (59 in.)
Cover between BOR and top of pipe	Less than 1.5 m (5 ft.) or two (2) pipe diameters.
Adjacent structures, switches and signals	Within 2.5 times, cover between BOR and top of pipe.
Depth of pipes outside ZPTL	Less than 0.91 m (3 ft.) burial within ZPTL.

Excavation close to CP track(s)	Excavations or jacking/access pits within 10 m (33 ft.) of the closest track centerline.
Excavation Criteria	
Excavation close to CP track(s)	Excavations or jacking/access pits within 10 m (30 ft) of the closest track centerline.
Crossing angle	More than 45 degrees off perpendicular to the track.
Construction Method	
All methods considered	
Ground conditions, complex installation method, and/or the complexity of the project warrant that specialist-engineering personnel review the design and or construction of the pipe/track crossing(s).	

10.2 Application Requirements

10.2.1 The applicant will meet the requirement outlined in Process 2 - Section 9.2.

10.2.2 The applicant will provide resources for CP to retain CP approved service provider(s) or experts(s) to assess and review the application and advise CP on the impact of the applicant's proposal on CP ROW.

10.3 Application Process and Approval Process

10.3.1 Applicant submits engineering documents to CP Public Works – Utilities. All applications will be processed as per the procedure outlined in Section 9.3.

11.0 Pre-Construction Meeting Requirement

Prior to commencement of any work within CP property/ROW, the Geotechnical Engineer of Record (GER) or their designate shall arrange a pre-construction meeting with all stakeholders to discuss project and construction details including work description, construction methods and

schedule, restrictions, safety, hours/days of work, start time, Daily Reporting & other CP requirements and agreed upon Protocols governing Extreme Weather/Rainfall Warning Alerts issued from Local/National weather offices. This may mean that drilling operations ceases until these Alerts are no longer in effect. It is the responsibility of the GER or their designate to ensure that flagging protection has been arranged for the duration of the project, all construction oversight and track settlement monitoring review has been arranged with CP approved service provider and that the expectations have been clearly communicated before construction commences.

12.0 Daily Inspection & Reporting during Construction

This section is applicable to Process Levels 2 and 3 application proposals. The agreement holder or applicant will identify a Geotechnical Engineer of Record (GER) responsible for the complete work and installation of proposed crossing/excavation within CP ROW from start to finish. The Geotechnical Engineer of Record may assign a competent/trained person to act as Site Inspector/Engineer who will be present onsite during the full duration of the bore or any other ground disturbance activity within railway operating corridor, unless, otherwise directed by CP Public Works - Utilities Supervisor. Depending on the complexity of the installation and or field issues encountered during the installation that may adversely impact CP Infrastructure, CP may, at their discretion, assign a full time Geotech Monitor, of their choice, to be on site, at the Applicant's expense.

CP flagger or assigned representative must be present at all times when working or drilling within CP property or rail operating corridor. The Site Inspector/Engineer must have the required training, experience and understanding of the site conditions, proposed design, and construction methodology to make sound engineering judgement and decisions, and reports during the course of the work.

The Site Inspector/Engineer must ensure that the work is being carried out in accordance with the approved designs, permits and procedures, and/or relevant specifications. The Site Inspector/Engineer must immediately report any issues encountered during construction work and could have an impact on CP assets and its operations. Some examples include instability or potential of instability of the embankment or potential ground settlements either future or immediate.

Any concerns about the imminent stability of the grade shall immediately be escalated to CP Flagger or representative in order to protect against train operations. In addition, refer to CP 24HR Emergency Contact list to use in case of emergency. The concerns shall also be escalated to the GER and CP Public Work - Utilities supervisor so immediate remediation plans can be implemented.

The Site Inspector/Engineer will provide a daily report to CP approved service provider, copying CP Public Works – Utilities supervisor, CP's Director Geotechnical Engineering and the GER, outlining the progress during the day, any deviations from the original plans, any unexpected ground conditions, or any issues that were encountered during the construction. The report shall also contain relevant information that assures CP that the field activities are being monitored and documented to ensure that the installation is proceeding in accordance with approved plans and no unexpected conditions/issues are expected. Some examples of relevant information examples include some of the following information:

- A quantitative estimation of amount of material removed versus theoretical material;
- Auger location - Location of both, the leading edge of the pipe and the location of the leading edge of the auger should be documented;
- A description of the progress and any observations or issues encountered during the pipe installation including geologic conditions, change in material composition, characteristics, etc.

The daily report will also include all settlement monitoring data, along with any pertinent photos. If applicable, this report will also make notes and highlight any measures taken for "out of compliance" practice or when conditions requiring attention are expected or encountered. See Appendix B for a Sample Report.

Upon completion of the construction and installation of pipeline and utility crossing(s), the GER will provide a final sealed and stamped letter/construction report to CP approved service provider with a copy to CP Public Works – Utilities supervisor confirming that the work has been completed in accordance with the approved plans and procedures. If there are any deviations from the approved plans/procedures, these must be noted in the final letter/report. As-built stamped drawings are to be submitted to the CP Public Works – Utilities along with final settlement data collected and correspondence.

All costs associated with above mentioned i.e. complete geotechnical review, track settlement monitoring, flagging and construction oversight provided CP approved service provider will be borne by the applicant.
A contract between CP approved service provider(s) and the applicant must be place before proceeding with this work proposal.

13.0 Review Steps

The following is a checklist of steps that will be completed to ensure that the appropriate level of care has been taken for Process 2 and 3 pipe crossings below the track.

Table 5 – Review Steps

No.	Step	Action/Review by
13.1	Submission of crossing(s) proposal by applicant including details of the crossing(s) specification and potential construction method(s) to CP Public Works - Utilities.	Applicant
13.2	Review of the proposal as per this protocol to determine what level of geotechnical engineering and review is required.	CP Public Works - Utilities
13.3	Designation of review i.e. CP approved service provider. (ASP)	CP Public Works - Utilities
13.4	Identification of the Applicant's Geotechnical Engineer of Record.	CP Geotech Engineering/ASP
13.5	Assessment of adequacy of the geotechnical investigation and other required information.	CP Geotech Engineering/ASP
13.6	Applicant's geotechnical engineer determines that the proposed construction/installation method will not cause settlement of the CP track or structures.	CP Geotech Engineering/ASP
13.7	Settlement monitoring program, if required and developed by the applicant's geotechnical engineer.	CP Geotech Engineering/ASP
13.8	Once a contractor has been selected, the Geotechnical Engineer of Record (GER) will review the shop drawings submitted by the contractor or the sub-contractor(s) to determine if the tunnelling and dewatering (if required) method proposed could cause track settlement.	CP Geotech Engineering/ASP
13.9	Applicant will provide CP with written documentation of who will be completing the onsite review of the contractor's construction practice and the specifics of the assignment.	CP Geotech Engineering/ASP
13.10	Applicant will enlist the services of a Geotechnical Engineer of Record(GER) with the responsibility for inspection of the tunnelling contractor's work. They will also assure that adequate measures are in place to minimize the potential for track settlement. The intention is to assign an appropriate group with the task of assuring that actions undertaken by the contractor do not endanger the track structure because of ground loss during tunneling which may affect CP Train operations.	CP Geotech Engineering/ASP

No.	Step	Action/Review by
13.11	An emergency response will be developed and posted on site and will reside with key personnel.	CP Geotech Engineering/ASP
13.12	A contingency plan will be prepared and submitted by Tunneling contractor prior to start of construction, identifying tasks/activities that can be completed within hours to get track back in service, if significant track settlement is experienced.	CP Geotech Engineering/ASP
13.13	24 Hour Emergency Contact List to be provided prior to commencement of construction.	CP Public Works - Utilities

14.0 Abandoned Pipe/Track Crossing(s)

In the event that an existing installation is abandoned or a proposed crossing(s) is abandoned during construction, all potential hazards to CP property must be removed or abated. This may be achieved by removal of any buried pipes and the backfill and compaction of any excavations. Alternately, upon approval of the CP Geotechnical group any voids within ground may be backfilled with non-shrinkable fill, or pressured grout sufficient to prevent future sloughing or track settlement. Any buried material (wood or metal) that could increase or decrease volume over time due to chemical reaction (oxidation) or decomposition must be removed or stabilized to the satisfaction of CP.

----------*END OF TEXT*----------

APPENDIX A

SAMPLE FIGURES 1 TO 3

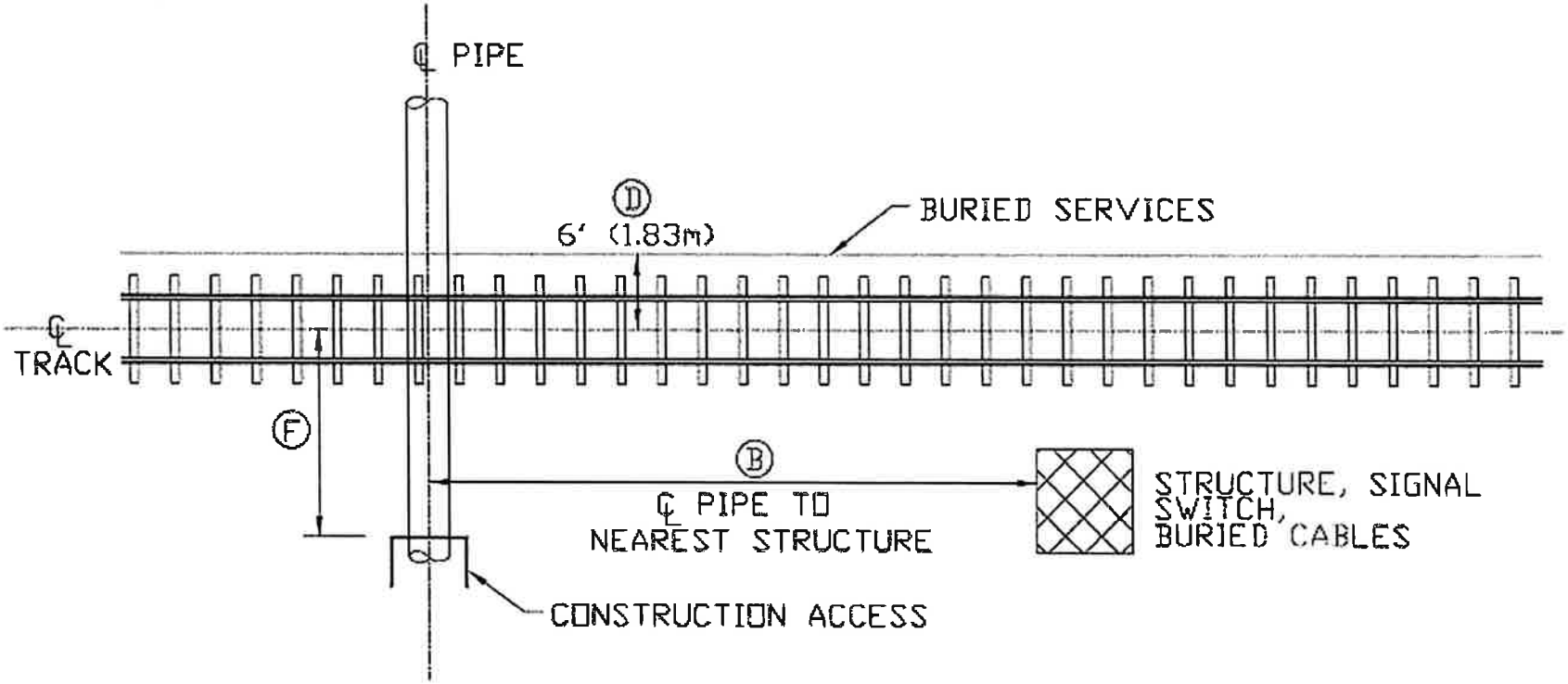


Figure 1 – Plan of the proposed pipe crossing

SAMPLE

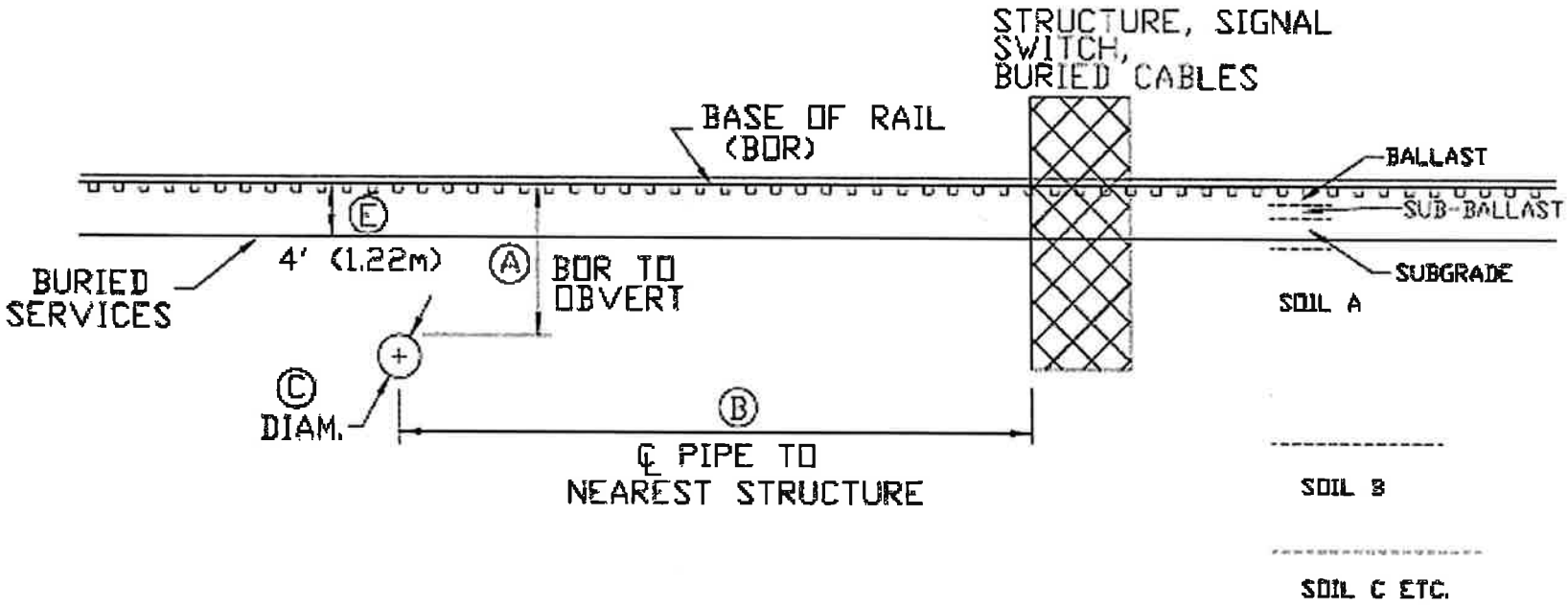
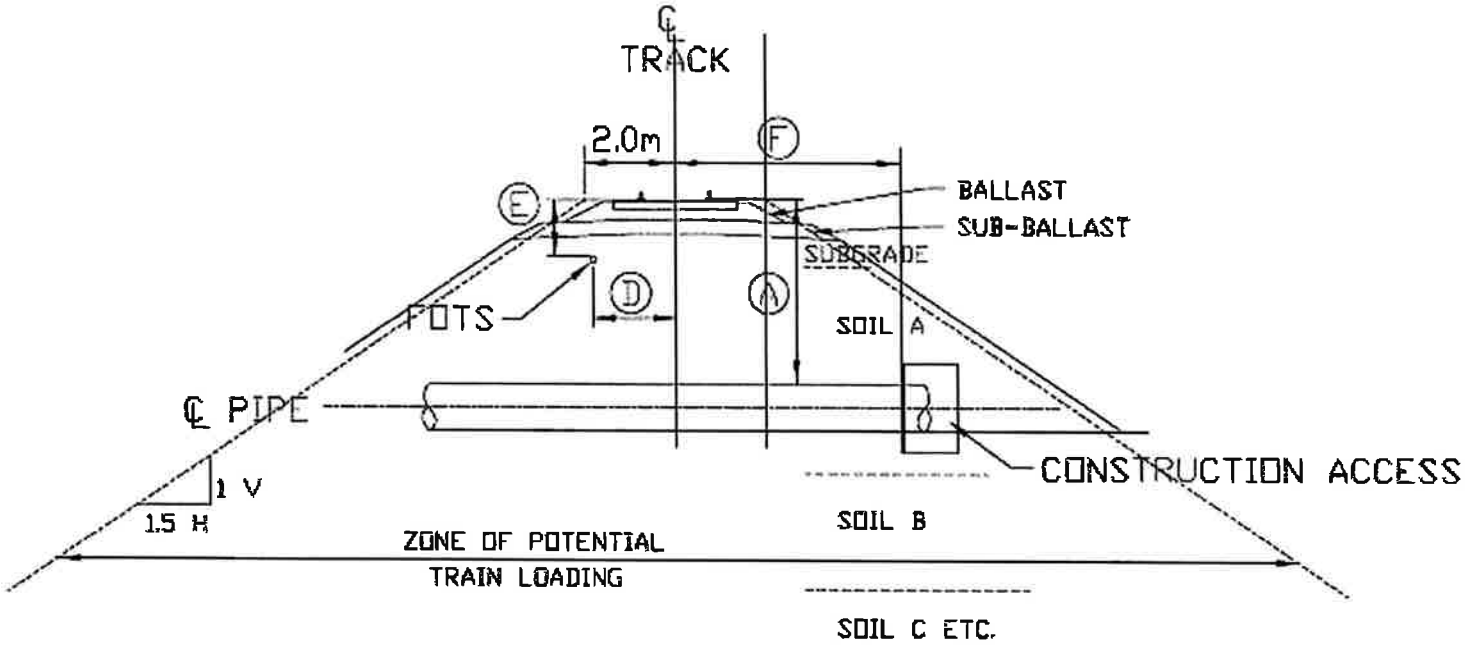


Figure 2 – Profile of the track and proposed pipe crossing along the centerline of track

SAMPLE



FOTS = FIBRE OPTICS TRANSMISSIONS SYSTEM

Figure 3 – Section of Track along centerline of proposed pipe

SAMPLE

Appendix B

SAMPLE DAILY REPORT AND SETTLEMENT REPORT

SAMPLE DAILY REPORT

PROJECT INFORMATION

Project Name:

Location:

Client:

Date: July 11, 2019

Contractor:

Site Rep:

DAILY SUMMARY

Excavation Details:

[i.e., depth, sideslopes, trench boxes, sloughing, etc.]

No additional casing installed today. No sloughing of CPR embankment noted.
See attached sketch.

Construction Summary:

[i.e., soil type, issues, etc.]

Contractor attaching shoes (wedges) to the casing exterior near the casing head behind the gravel plug (approx. station 0+031). One shoe on track west side of casing approx. 250 mm X 300 mm X 50 mm(deep outside of casing). One shoe on bottom of casing approx. 275 mm X 300 mm X 25 mm(deep outside of casing).

Cumulative Settlement Movement (mm): ☒ Minimal Movement (<8) ☐ Level 1 – Warning (≥8 to <16) ☐ Level 2 – Critical (≥16)

Compliance with Design: ☐ Yes ☒ No If No, discuss below

Issues with Installation: ☒ Yes ☐ No If Yes, discuss below

Other Notes, if any:

Casing was out of alignment by approximately 40 mm track west and 25 mm lower than designed location at about station 0+031. Contractor attaching shoes (wedges) to the casing exterior near the casing head behind the gravel plug (approx. station 0+031) for alignment correction.

Prepared By:

Reviewed By:

SAMPLE

SAMPLE DAILY SETTLEMENT MONITORING REPORT

SETTLEMENT MONITORING

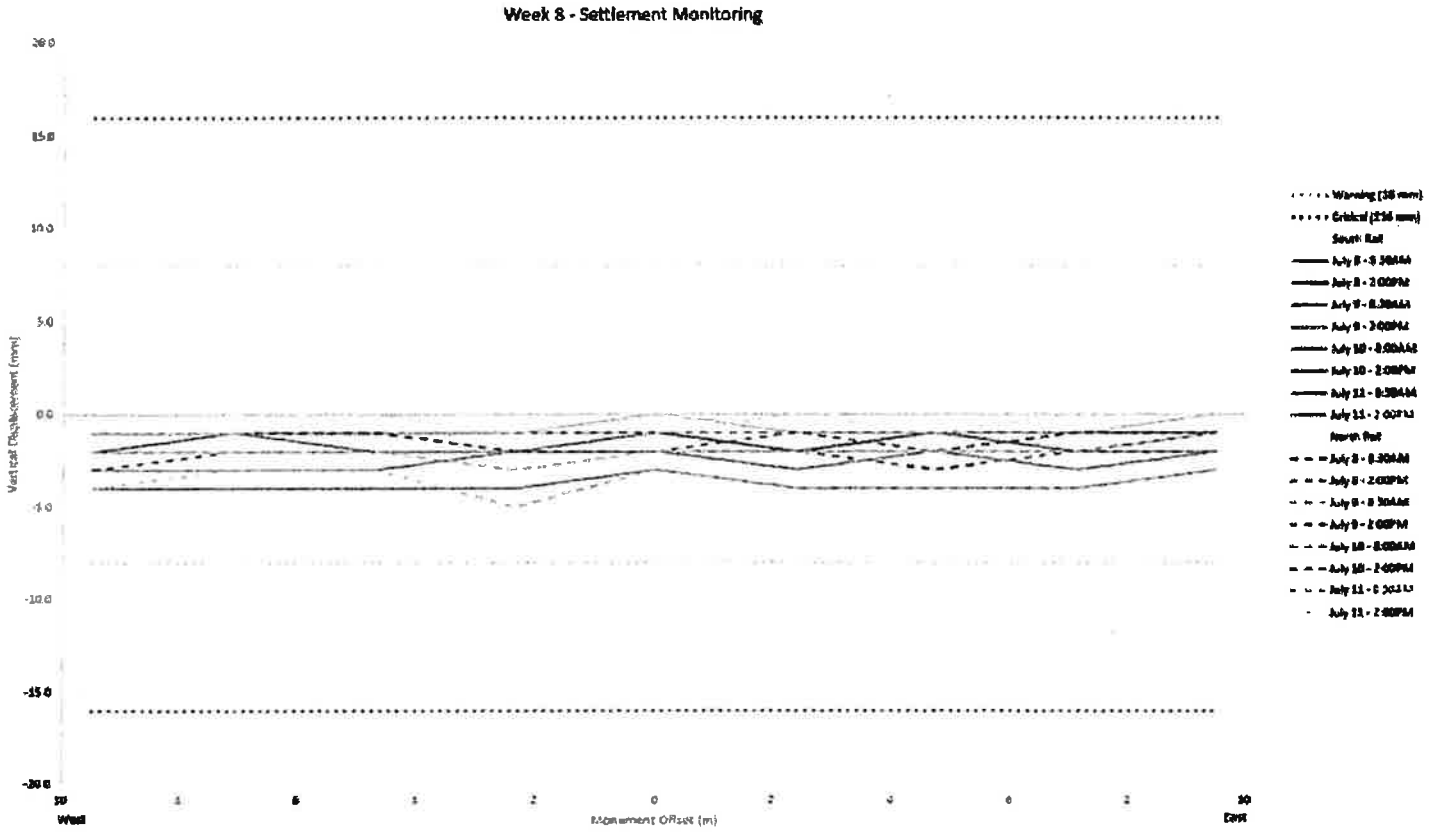
Surveyor: Date: July 11, 2019 CP Flagger

Weather: Sunny Temperature: 16°C at 8:30 am; 27°C at 2:00 pm

*Survey locations along the top of the rails. **Baseline elevation is average of 2 surveys on June 12, 2019. ***Positive numbers correspond to heave and negative numbers correspond to settlement

Rail Location	Location Description and Monument ID*	Baseline Elevation (m)**	Reading 1			Reading 2		
			Time	Elevation (m)	Cumulative Movement (mm)***	Time	Elevation (m)	Cumulative Movement (mm)***
South Rail	9.45 m East (S9)	1034.587	8:30 am	1034.585	-2	2:00 pm	1034.587	0
	7.08 m East (S8)	1034.593		1034.591	-2		1034.592	-1
	4.72 m East (S7)	1034.597		1034.595	-2		1034.596	-1
	2.36 m East (S6)	1034.601		1034.599	-2		1034.600	-1
	Centerline (S5)	1034.605		1034.603	-2		1034.605	0
	2.36 m West (S4)	1034.612		1034.610	-2		1034.611	-1
	4.75 m West (S3)	1034.618		1034.616	-2		1034.617	-1
	7.08 m West (S2)	1034.622		1034.620	-2		1034.621	-1
	9.45 m West (S1)	1034.626		1034.624	-2		1034.625	-1
North Rail	9.45 m West (N1)	1034.624		1034.622	-2		1034.623	-1
	7.08 m West (N2)	1034.621		1034.619	-2		1034.620	-1
	4.75 m West (N3)	1034.617		1034.615	-2		1034.617	0
	2.36 m West (N4)	1034.612		1034.609	-3		1034.611	-1
	Centerline (N5)	1034.604		1034.602	-2		1034.603	-1
	2.36 m East (N6)	1034.599		1034.597	-2		1034.599	0
	4.75 m East (N7)	1034.597		1034.595	-2		1034.596	-1
	7.08 m East (N8)	1034.590		1034.588	-2		1034.590	0
	9.45 m East (N9)	1034.586		1034.585	-1		1034.586	0

SAMPLE


Week 8 - Settlement Monitoring
20.0
15.0
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
Vertical Displacement (mm)
West
East
Warning (-16 mm)
Critical (-25 mm)
South Rail
North Rail

SAMPLE

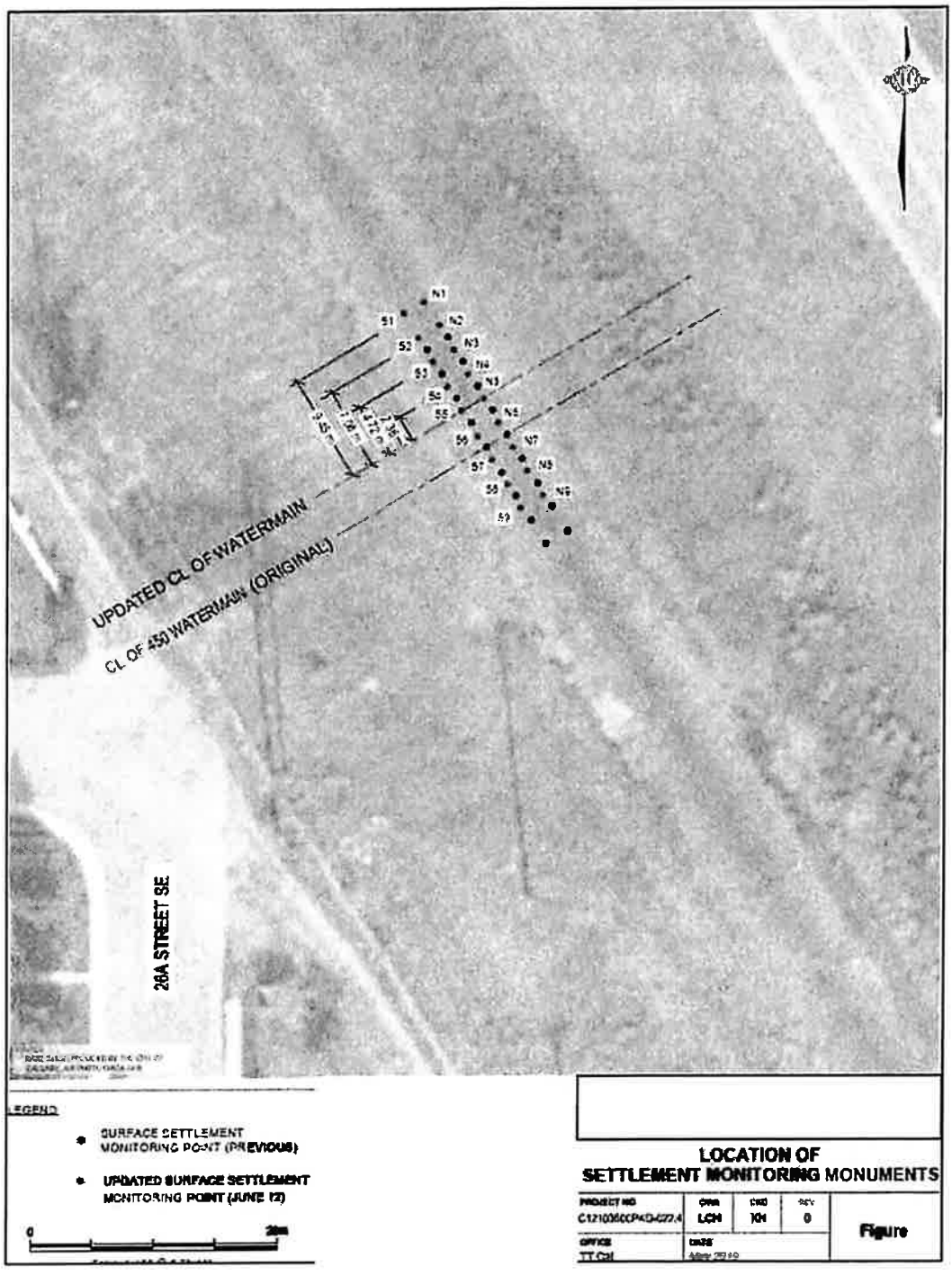
SAMPLE TRENCHLESS INSTALLATION MONITORING REPORT

TRENCHLESS INSTALLATION MONITORING

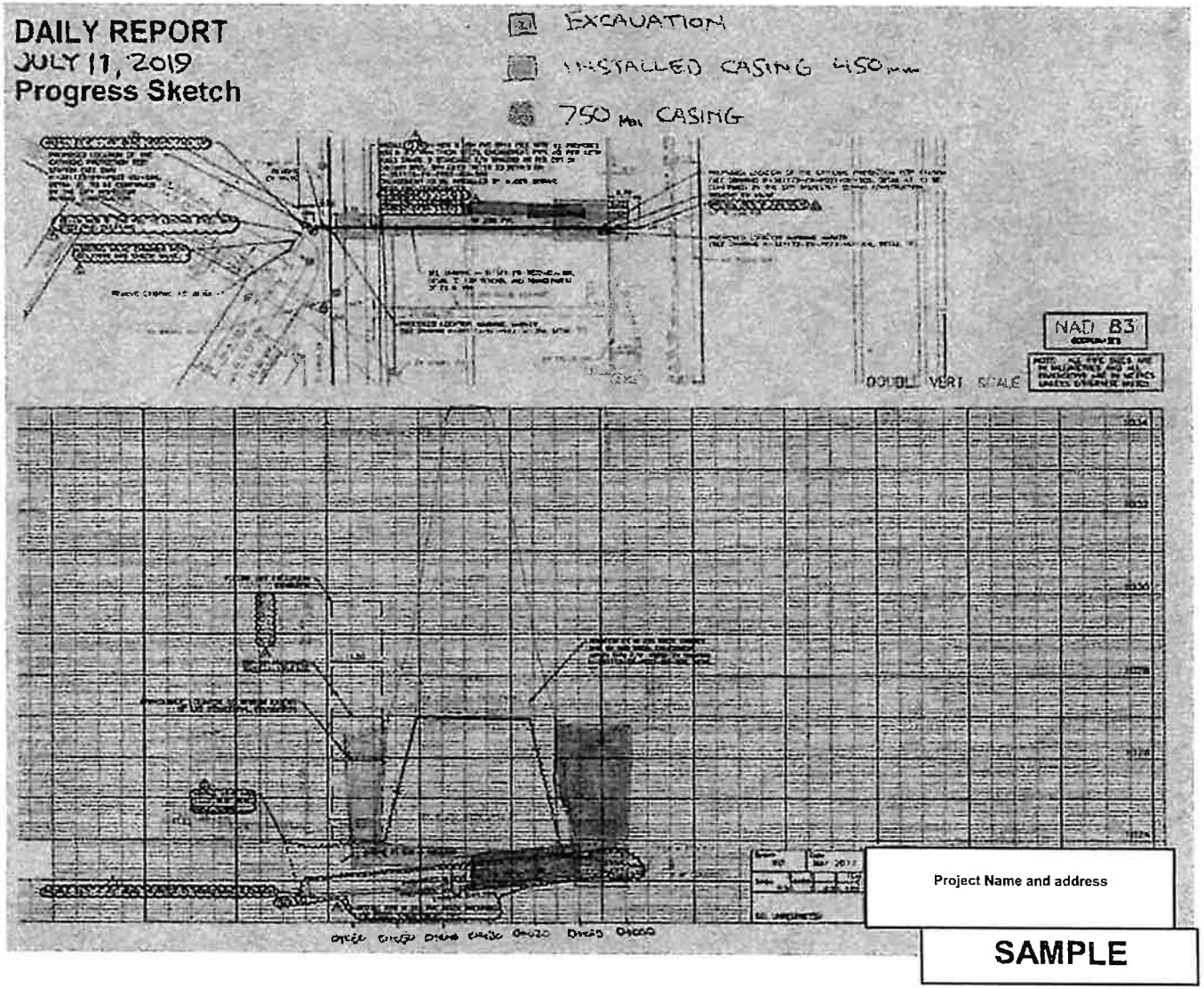
Equipment:	Air Hammer	Operator:
Casing Pipe Diameter:	750 mm	16 mm overcut on casing head
Date:	July 11, 2019	2m plug at casing head during installation

Date	Segment No.	Segment Length (m)	Station Interval along the Face of Installation	Length of Pipe Installed (m)	Distance of Head to CL Track (S or N) (m)	Soils Condition/Description
July 7, 2019	1	6.0	0+015	6.0	18 m N	Gravel, sandy, some silt, trace clay. Dry
July 8, 2019	2	6.0	0+021	6.0	12 m N	Gravel, sandy, some silt, trace clay. Dry
July 9, 2019	3	6.0	0+027	6.0	6 m N	Gravel, sandy, some silt. Damp
July 9, 2019	4	6.0	0+033	6.0	0 m (CL Track)	Gravel, sandy, some silt. Damp
July 10, 2019 July 11, 2019						No casing installed, contractor attaching shoes (wedges) to casing at station 0+031

SAMPLE


UPDATED CL OF WATERMAIN
CL OF 450 WATERMAIN (ORIGINAL)
26A STREET SE
LEGEND
SURFACE SETTLEMENT MONITORING POINT (PREVIOUS)
UPDATED SURFACE SETTLEMENT MONITORING POINT (JUNE 12)
LOCATION OF SETTLEMENT MONITORING MONUMENTS
Figure

SAMPLE


DAILY REPORT
JULY 11, 2019
Progress Sketch
EXCAVATION
INSTALLED CASING 450 mm
750 mm CASING
NAD 83
DOUBLE VERT SCALE
Project Name and address
SAMPLE

Appendix C

TRACK MOVEMENT MONITORING GUIDELINES FOR TRENCHLESS PIPE INSTALLATION

Track Movement Monitoring Guidelines for Trenchless Pipe and Utility Crossing(s) Installation under Railway Tracks

(Last updated – May 16, 2022)

The monitoring of track settlement should be carried out by means of surface and subsurface settlement points. The intent of subsurface settlement points is to measure voids created just in the vicinity and above the pipe during construction in order to predict the potential movement of overlying CP tracks.

The settlement point essentially consists of a small diameter pipe anchored at the bottom of a vertical borehole and an outer casing to isolate the pipe from down drag forces caused by settlement of soil above the anchor (see Figure B). The subsurface settlement points would be installed to 1 m above the crown of the casing profile. The total number of subsurface settlement points within CP Right-of-Way (ROW) along the axis of the proposed pipe crossing(s) would be installed as per the configuration shown in Figure A – Sample Surface and Subsurface Settlement Monitoring Layout.

Surface points installed directly along the base of both rails at a spacing of 9.45 m (31 ft.) over the projected settlement trough would be used to monitor differential transversal elevation between both rails. The total number of surface settlement points within CP ROW would be installed as per the configuration shown in Figure A – Sample Surface and Subsurface Settlement Monitoring Layout. These points shall be monitored simultaneously with the subsurface settlement points that would act as a precursor to potential surface movement during pipe installation.

Once the installation is complete, a monitoring program of all points is to be carried out in accordance with the following instructions:

1. Monitoring should start before the excavation of the pits and pipe installation begins and readings should be taken at least twice per day for no less than two days. This is required to establish a reliable methodology and demonstrate the accuracy to be achieved.

2. Monitoring should proceed through the construction period and should be completed:

    1) For branch lines/lines with low traffic - (Class 1-2 Track) - At least twice daily.

    2) For main lines and heavy traffic lines – (Class 3-5 Track) Every 2 hours or after each train, whichever provides the most number of readings while the boring operation is within the ZPTL (Zone of Potential Train Loading).

3. Monitoring should continue for at least 3 days after the completion of construction.

4. If there is any loss of ground during pipe installation, any reason to believe settlement may be delayed or any settlement is identified during the installation of pipe or subsequent

monitoring period, the monitoring must be continued until the applicant's Geotechnical Engineer of Record deems it is safe to discontinue such monitoring. This must be approved by CP Geotechnical Engineering group or CP approved service provider reviewing the monitoring results.

Monitoring measurements should be taken with sufficient frequency (as noted above) to capture the unexpected performance at the earliest possible stage and be evaluated in a timely manner. Additional measures will be proposed should this monitoring protocol be considered insufficient based on the ground conditions or installation process. Track survey preference would be for survey shots to be taken remotely (i.e. off CP property) and without the requirement of a CP Flagger or representative presence on site.

Two alarm levels are proposed:-

Level 1:

"WARNING/ALERT" will be indicated on the field memo/report when a settlement of **50 (%)** of the critical monitoring threshold is obtained from the subsurface and/or surface settlement points. A survey of the surface points will then be carried out and work will be authorized to continue if no movement of the subsurface point has been measured from the previous reading. If movement of the rails is recorded, monitoring will be continued until rail movement is stopped. At this point, the drilling work will then be authorized to continue. See Figure C – Track Settlement Monitoring Review and Alert Threshold for Threshold values per Class of Track designation. Please contact CP Public Work-Utilities Supervisor to obtain Class of Track designation pertaining to the proposed Utility Crossing location.

Level 2:

"CRITICAL/REVIEW" will be indicated on the field memo/report when a settlement of specified monitoring threshold is obtained from the subsurface settlement point. A survey of the surface points will then be carried out and work will be authorized to continue if no movement is measured for at least two (2) readings taken 12 hours apart. If movement of the rails is recorded, monitoring will be continued until movement is stopped and the applicant has submitted a new pipe installation procedure. This procedure must be reviewed and approved by CP Geotechnical Engineering group or CP approved service provider reviewing the monitoring results.

The applicant and their Geotechnical Engineer of Record are responsible for ensuring that track settlement does not occur and for notifying CP Roadmaster or their designate, as indicated on the 24 hr Emergency Contact List, should unforeseeable track settlement occur or be expected.

The above guidelines do not relieve the applicant and their engineer(s) of this responsibility. The applicant or their engineer(s) shall provide the settlement information and their interpretation of the data including information such as. no track settlement, deep settlement etc., a quantitative number of how much track settlement has occurred, is likely to occur and when it is likely to occur. This information should be provided in easily understandable terms for

all parties involved in the construction and monitoring and should be directed to local CP Roadmaster, CP approved service provider, Supervisor – CP Public Works – Utilities and Director of Geotechnical Engineering.

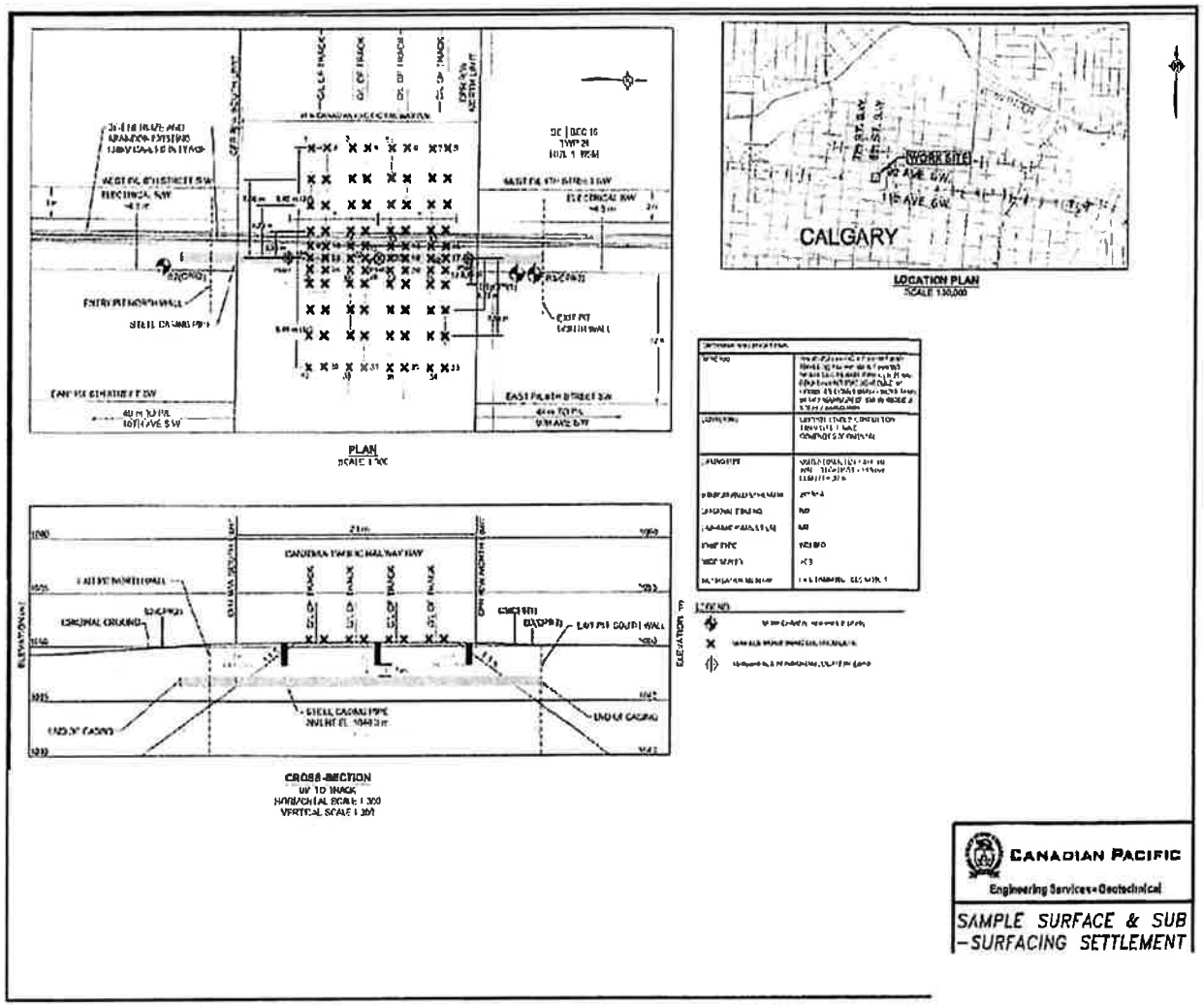


Figure A - Sample Surface and Subsurface Settlement Monitoring Layout

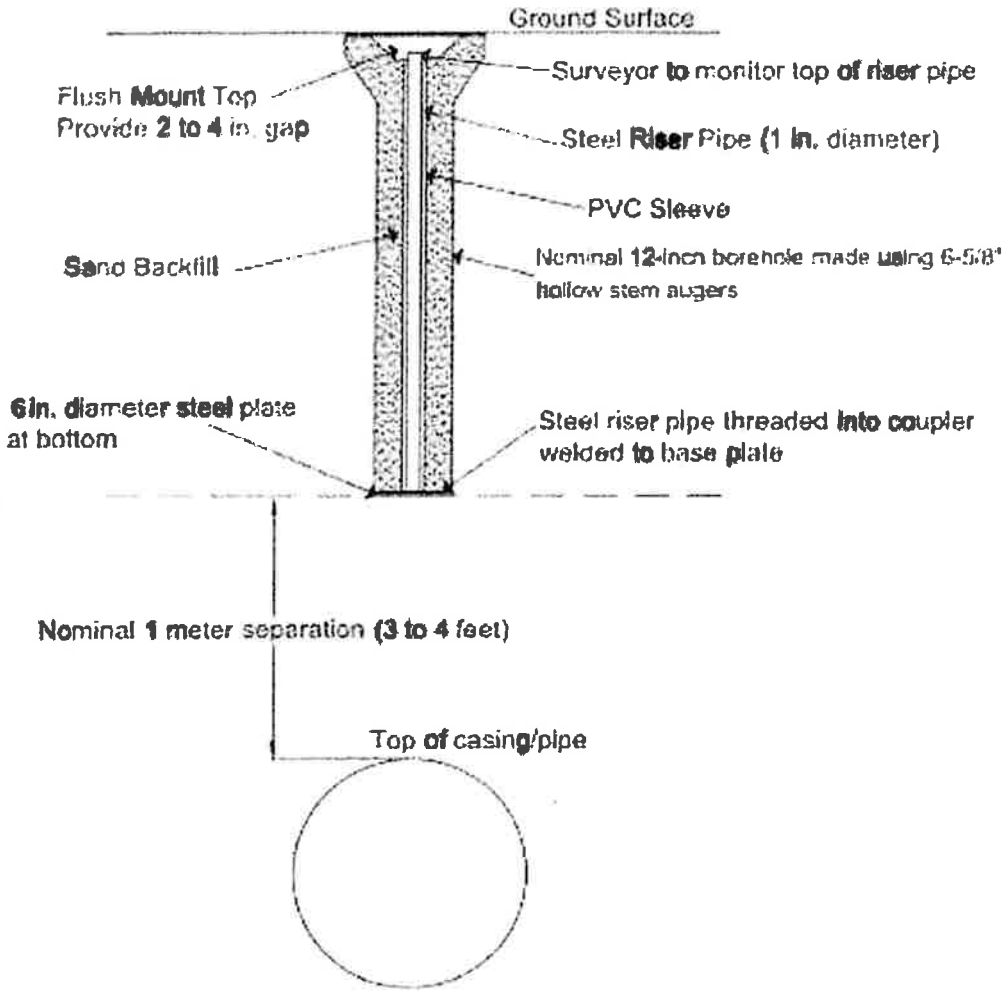


Figure B - Typical Subsurface Settlement Point Detail

Figure C – Track Settlement Monitoring Review and Alert Thresholds (Surface and Subsurface)

Class of track	Critical/Review Threshold	Alert/Warning Threshold
1	22 mm	11 mm
2	22 mm	11 mm
3	19 mm	10 mm
4	16 mm	8 mm
5	13 mm	6 mm
6	10 mm	5 mm

Note – All above numbers are maximum values

Class of Track

TRACK CLASSES

Class	Freight Train Speed	Passenger Train Speed
1	10 MPH	15MPH
2	25 MPH	30 MPH
3	40 MPH	60 MPH
4	60 MPH	80 MPH
5	80 MPH	95 MPH* 90 MPH **
*Denotes for LRC trains – 100 MPH	** - Applies to US only	Note – Numbers above are maximum values