INVITATION FOR BIDS

TO

COUNTY OF DURHAM

GENERATOR FOR NORTHERN CONVENIENCE SITE

IFB No. 25-013R2

Date: January 2025

ENGINEERS:
HDR ENGINEERING, INC. OF THE CAROLINAS
555 FAYETTEVILLE STREET, SUITE 900
RALEIGH, NC 27601

Generator for Northern Convenience Site
IFB No. 25-013 R2

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BID SCHEDULE

(Note: The dates below are subject to change)

Generator for Northern Convenience Site
Bid No. 25-013R2

Advertisement Date	January 22, 2025
Site Visit	January 29, 2025 at 10:00 A.M., Eastern Time
Last Date for Questions	February 12,2025, at 3:00 P.M., Eastern Time
Bids Due Date	February 27, 2025, at 2:00 P.M., Eastern Time

0001 – Advertisement for Bids

ADVERTISEMENT FOR BIDS

IFB No. 25-013R2

Generator for Northern Convenience Site

Bids will be received by the County of Durham Purchasing Division, Durham County, 201 East Main Street, 7th Floor, Durham, North Carolina 27701, until 2:00 P.M. Eastern Time, on February 27, 2025 The work contemplated will include procurement and installation of a 100KW diesel backup generator for the Durham County Northern Convenience Site located at 11894 North Roxboro Road, Rougemont, North Carolina, 27572. The work includes site preparation, installation of concrete pad, relocation of an existing generator tap box and installation of new panel, breaker, automatic and manual transfer switches and all related electrical work.

Site Visit will be held on January 22, 2025, at 10:00 A.M., Eastern Time at Northern Durham Convenience Site, 11894 North Roxboro Road, Rougemont, North Carolina 27572. All bidders who intend to bid are encouraged to attend.

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Instructions for submitting bids, specifications, a complete description of the work involved, and the apparatus, supplies, materials, and equipment for this bid, can be invited can be examined at the office of HDR Engineering, Inc., 555 Fayetteville Street, Suite 900, Raleigh NC, 27601 (919) 232-6600.

Questions concerning administrative matters should be directed to purchasinggroup@dconc.gov.

A hard copy of the Plans, Specifications and other contract documents may be obtained by those qualified and who will make a bid, upon a deposit of $50.00 for each set issued to Contractors. Deposit checks shall be made payable to the **"HDR Engineering, Inc.".** Contractors may secure document sets after 8:30 A.M. until 5:00 p.m. Eastern Time, Monday through Friday at the office of HDR Engineering, Inc, 555 Fayetteville Street, Suite 900, Raleigh, NC 27610, (919) 232-6600 The full deposit shall be returned to those Contractors who return the Specifications and Plans in good condition within ten (10) days after the date set for receiving bids. **Document can be issued electronically at no cost if preferred, by contacting Jeffrey Murray, Sr. Project Mangager, at jeffrey.murray@hdrinc.com, or 919-232-6682.**

Contractors who bid must be licensed to do work in the State of North Carolina under the Act to Regulate the Practice of General Contracting. The Contractor's North Carolina License number shall be designated on the outside of the envelope containing the bid.

A 5% bid security is required with each bid that equals or exceeds $300,000.00.

Bids will be evaluated and the Contract will be awarded in accordance with statutory public contract requirements as supplemented or altered by the Minority/Women Business Enterprise Utilization Ordinance of the County of Durham (MWBE).

Bid Proposals are encouraged and welcome from historically underutilized businesses (HUBs).

The County reserves the right to reject any and/or all bids, waive informalities, and/or accept such bid as appears in its judgement to be in the best interest of the County.

Publication Date: January 22, 2025

0002 – Instructions to Bidders

INSTRUCTIONS TO BIDDERS

1. For a Bid to be considered, it must be in accordance with the following instructions:

   Bids must be made in strict accordance on the "Bid Form" provided therefore and all blank spaces for the Bid Alternates and Unit Prices shall be properly filled in When alternates are requested, and alternates are not included in the bid, the bid will be considered non-responsive. The Bidders agree that Bids on Bid Form detached from Specifications will be considered and will have the same force and effect as if attached hereto. **Numbers shall be stated both in writing and in figures for the Base Bid and Alternates. One (1) original copy shall be submitted to the Purchasing Division.**

   Any modification to the Bid Form (including Alternates and Unit Prices) may disqualify the Bid and may cause the Bid to be rejected.

   The Contractor shall fill in the Bid Form as follows:

   A. If the documents are executed by a sole Owner, that fact shall be evidenced by the word of "Owner" appearing after the name of the person.

   B. If the documents are executed by a Partnership, that fact shall be evidenced by the word of "Co-Partner" appearing after the name of the partner executing them.

   C. If the documents are executed on the part of a Corporation, they shall be executed by either the President or the Vice-President and attested by the Secretary or Assistant Secretary in either case, and the title of the office of such person shall appear after their signatures. The Seal of the Corporation shall be impressed on each signature page of the documents.

   D. If the Bid is made by a Joint Venture, it shall be executed by each member of the Joint Venture in the above form for sole Owner, Partnership, or Corporation, whichever form is applicable.

   E. All signatures shall be properly witnessed.

   F. It shall be the specific responsibility of the Bidder to deliver this Bid to the proper official at the appointed place and prior to the time for the opening of the Bids. Late delivery of a Bid for any reason, including delivery by the United States Mail, shall disqualify the Bid.

   G. Modifications of previously deposited Bids will be acceptable only if delivered to the place of the bid opening prior to the time for opening Bids.

   H. Unit Prices quoted in the Bids shall include overhead and profit and shall be the full compensation for the Contractor's cost involved in the work.

2. It is understood and mutually agreed that by submitting a Bid the Contractor acknowledges that he/she has carefully examined the bidding documents pertaining to the work, the locations, accessibility and general character of the site of the work and all existing buildings and structures within and adjacent to the site; and has satisfied him/herself as to the nature of the work, the condition of the existing buildings and structures, the conformation of the ground, the character, quality and quantity of the materials to be encountered; the character of the equipment, machinery, plant and other facilities needed preliminary to and during prosecuting of the work; the general and local conditions; the construction hazards; and all other matters, including but

not limited to, the labor situation which can in any way affect the work under the Contract; and including all safety measures required by the Occupational Safety Health Act of 1970 and all rules and regulations issued pursuant thereto. It is further mutually agreed that by submitting a Bid, the Contractor acknowledges that he/she has satisfied him/herself as to the feasibility and meaning of the plans, drawings, Specifications, and other contract documents for the construction of the work and that he/she accepts all terms, conditions and stipulations contained therein and that he/she is prepared to work in cooperation with the other contractors performing work on the site.

3. Material substitutions will be considered during the bidding phase until 3:00 P.M., on February 12, 2025. No substitutions will be considered after that time and date. The request for substitution must be sent to Jeffrey Murray, Sr. Project Manager at jeffrey.murray@hdrinc.com.

   For proposed material substitutions submit the following information directly to the Architect/Engineer:

   Name of manufacturer
   Address of manufacturer
   Phone number of manufacturer
   Trade name
   Model or catalogue designation
   Manufacturer's date including:
      Performance and test data
      Reference standards

   Detailed comparison with specified product including:
      Performance
      Test results
      Warranties
      Gauge, thickness or strength of material finish
   Other pertinent data
   Other information requested by the Project Manager

4. To ensure a fair bidding process, all other questions from the contractors must be emailed to purchasinggroup@dconc.gov no later than 3:00 P.M., Eastern Time, on February 12, 2025. These questions will be addressed in an Addendum.

   Any Addenda to Specifications issued during the time of bidding will be sent to each bidder and are to be considered covered in the bid and in closing a Contract will become part thereof. All Addenda issued will be posted on our eBid System. All Addenda shall be acknowledged by the bidder(s) on the Bid Form. Failure to do so may disqualify the bid and may cause the bid to be rejected.

   It shall be the Contractor's responsibility to ascertain prior to bid time the Addenda issued and to see that his/her bid includes any changes thereby required.

5. Neither the Owner nor the Project Manager will be responsible for any oral instructions. Any interpretation of the proposed document will be made only by Addendum duly issued, a copy of which will be mailed or delivered to each person receiving a set of such documents.

6. For projects that equals or exceeds $300,000.00 on the bids, a bid bond is required. No bid that equals or exceeds the $300,000.00 amount will be considered or accepted unless accompanied by a Bid Guarantee in the form a cash deposit or certified check drawn on a bank authorized to do business in North Carolina and licensed by the Federal Deposit Insurance Corporation and is payable to the order of County of Durham, representing five percent (5%) of the total Bid. Said deposit to be retained by the Owner if the successful bidder fails to execute the contract within fifteen (15) days after the award or gives satisfactory Surety as required by law.

   Such deposit of cash or certified check may be held by the County of Durham until the successful bidder has executed and delivered the contract documents, including Performance and Payment Bonds, to the County of Durham. Bid deposits submitted in the form of cash, cashier's check or certified check will be deposited in the County's account as required by North Carolina Local Government Budget and Fiscal Control Act (N.C. General Statute Chapter 159, Article 3). The bids will be evaluated, and the contract will be awarded in accordance with statutory public contract requirements as supplemented or altered by the Minority/Women Business Enterprise Utilization Ordinance of the County of Durham (MWBE).

7. Bids shall be received in strict accordance with requirements of the General Statutes. All copies of the Bid, the Bid Security, if any and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope can be hand delivered or mailed and shall be addressed to the Durham County Purchasing Division, Durham County Administrative Complex, 201 East Main Street, 7th Floor, Room 703, Durham, NC 27701, and should be identified with the project name, time and date of Bid Opening, the Bidder's name and address, Bidder's license number and designated portion of the work for which the Bid is submitted.

8. It is the responsibility of the bidder to ensure that the bid arrives at or before the time and date indicated.

   A Bidder may withdraw its formal Bid after the Bids are opened without forfeiting its Bid deposit in certain limited circumstances. Withdrawal after opening is permitted only if all conditions specified in North Carolina General Statutes Section 143-129.1 are met.

9. Bids shall be evaluated using the Total Bid. The Total Bid shall be the summation of the product of all of the Items' Unit Bid Prices by their Estimated Quantities. In the event of a math error, the Extended Totals and the Total Bid will be corrected based on the Unit Price furnished in the bid. Bids with math errors will be compared using the corrected Total Bid (i.e., the math must be correct before a bid is considered for award).

10. The Owner shall award the contract to the lowest responsible, responsive bidder taking into consideration the past performance of the Bidder on Construction Contracts for the County of Durham, the State of North Carolina, or other governmental agencies with particular concern given to completion times, quality of work, cooperation with other Contractors, and cooperation with the Project Manager and Owner. The Owner shall have the right to accept Alternates in any order of combination.

11. The successful Bidder, upon award of the Contract, shall furnish a Performance Bond in an amount equal to one hundred percent (100%) of the Contract Price.

12. The successful Bidder, upon award of Contract, shall furnish a Payment Bond in an amount equal to one hundred percent (100%) of the Contract Price.

13. For all work being performed under this Contract, the County of Durham has the right to inspect, examine, and to make copies of any books, accounts, records, and other writings related to the performance of the work. Audit shall take place at times and locations mutually agreed upon by both parties, although the contractor must make the materials to be audited available within one
(1) week of the request.

14. Contract completion time for all work on this project is 150 calendar days or 30 days from substantial completion, whichever is first. Bidders shall note the 120-calendar day-time limit for the substantial completion of such work as may be contracted for as follows: Northern Durham Convenience Site Generator, 11894 North Roxboro Road, Rougemont, North Carolina, 27572.

15. Bids will be examined promptly after opening and award will be made at the earliest possible date. The prices quoted must be held firm for ninety (90) days. Bids may be withdrawn by written notice of a request to withdraw the bid within seventy-two hours of the bid opening date, not including Saturdays, Sundays, or other days (such as holidays) on which the local government offices are closed.

16. Durham County has established the following goals for minority/women business enterprise (MWBEs) participation in the procurement of goods, services and construction. **Questions concerning MWBE should be directed to Jonathan Hawley, Procurement Manager at jkhawley@dconc.gov or (919) 560-0056.**

Categories	**Construction**	**Architect/ Engineer**	**Services**	**Goods**	**MWBE Availability %** *(Median Availability)*
Black American	14.6	9.8	10.9	2.8	**10.4%**
Asian American	1.3	3.0	1.1	.43	**1.3%**
Hispanic American	4.2	1.8	1.1	.43	**1.5%**
American Indian	.65	.75	1.0	.5	**.70%**
White Female	13.8	11.0	9.5	7.1	**10.3%**
				Overall MWBE Participation Goal =	**25.0%**

Bidders are required to submit information about participating MWBEs with their bid. The information must include the name and address of each MWBE, a description of the work to be performed by each, and the dollar value of the work to be performed by each. Any bidder who fails to achieve the indicated MWBE participation goal stated above is required to provide documentation demonstrating that good faith efforts were made in an attempt to meet the established goal. Any bid which does not include MWBE information and documentation may be considered non-responsive.

A MWBE business is at least 51% owned and controlled by minority group members or a woman. A MWBE is bona fide only if the minority group or female ownership interests are real and continuing and not created solely to meet the MWBE requirement. In addition, the MWBE must itself perform satisfactory work or service or provide supplies under the contract and not act as a conduit. The contractual relationship must be bona fide.

Owned and controlled: (1) A sole proprietorship legitimately owned by an individual who is a minority group member or female; (2) a partnership or joint venture controlled by minorities and/or females; (3) a corporation or other entities controlled by minorities or females, and in which at least 51% of the voting interests and 51% of the beneficial ownership interests are

legitimately held by minorities and/or females. These persons must control the management and operations of the business on a day-to-day basis.

A person who is a citizen or lawful permanent resident of the United States and who is:

"Black American"; a person having origins in any of the Black racial groups of Africa;

"Asian American"; A person having origins in any of the original peoples of the Far East, Southeast Asia, Asia, Indian continent, or Pacific islands;

"Hispanic American"; a person of Spanish culture with origins in Mexico, Central or South America, or the Caribbean, regardless of race;

"Native American"; a person who is a member or is eligible to be a member of a federally recognized Indian tribe. A federally recognized Indian tribe means an Indian tribe, or band, nation, ranchero, pueblo, colony, or other organized group or community, including any Alaska native village, which is recognized by the Secretary of the Interior on October 1, 1985 as having special rights and is recognized as eligible for service provided by the United States to Indians because of their status as Indians, and any tribe that has a pending application for federal recognition on October 1, 1985, as having special rights and is recognized as eligible for services provided by the United States to Indians because of their status as Indians, and any tribe that has a pending application for Federal recognition on October 1, 1985.

17. All bidders must complete the Vendor Application/W-9 Form and include it with their bid package. This information will be used to create or update Durham County's electronic Bidder/Vendor files if awarded bid.

18. A Site Visit will be held on January 29,2025, at 10:00 A.M., Eastern Time, at Northern Durham Convenience Site, 11894 North Roxboro Road, Rougemont, North Carolina 27572. All bidders who intend to bid are encouraged to attend.

19. **Security of Non-public Records:** Pursuant to N.C.G.S. § 132-1.7, entitled, "Sensitive Public Security Information", public records, as defined in G.S. 132-1, shall not include information containing specific details of public security plans and arrangements or the detailed plans and drawings of public buildings and infrastructure facilities. Therefore, all information provided, received, gathered or obtained by BIDDER containing specific details of public security plans and arrangements or the detailed plans and drawings of public buildings and infrastructure facilities shall be held confidential and shall be used by the BIDDER only for the purpose of responding to this bid. All plans and drawings shall be returned to the County. Any breach of this paragraph by the BIDDER may result in BIDDER being barred from being awarded any contracts with the COUNTY.

20. **E-VERIFY**: As a condition of payment for services rendered under this agreement, CONTRACTOR shall comply with the requirements of Article 2 of Chapter 64 of the General Statutes. Further, if CONTRACTOR provides the services to the County utilizing a subcontractor, CONTRACTOR shall require the subcontractor to comply with the requirements of Article 2 of Chapter 64 of the General Statutes as well. CONTRACTOR shall verify, by affidavit, compliance of the terms of this section upon request by the COUNTY.

21. **DRUG FREE WORKPLACE:** The Contractor acknowledges and certifies that they understand that the following acts by the Contractor, its employees and/or agents performing services on County property is prohibited.
    - The unlawful manufacture, distribution, dispensing, possession or use of alcohol or other drugs, and;
    - Any impairment or incapacitation from the use of alcohol or other drugs (except the use of drugs for legitimate medical purposes).

    The Contractor further acknowledges and certifies that it understands that a violation of these prohibitions constitutes a breach of contract and may result in default action being taken by the County of Durham in addition to any criminal penalties that may result from such conduct.

22. The following forms/documents must be returned with your original Bid Proposal:
    a. Bid Form (All Addenda issued must be acknowledged on the Bid Form)
    b. Non-Collusion Affidavit **(Notarized)**
    c. Vendor Application with W-9 Form
    d. Bid Deposit, if required (Bid Bond, cash, cashier's check, or certified check). Power of Attorney must be included when submitting a Bid Bond.
    e. Affidavit of Compliance **(Notarized)**
    f. MWBE Forms:

Affidavit A – List of the Good Faith Efforts
DUE WITH BID

All Bidders are required to make good faith efforts and to demonstrate that they have made such efforts. Affidavit A is a tool for Bidders to use to show that they have made good faith efforts. Affidavit A is required to be submitted with your bid.

Affidavit B – Intent to Perform Contract with Own Workforce
DUE WITH BID

Affidavit B is required if your company has no opportunity to sub-contract and will complete all work with Bidder's own workforce. Even if utilizing your own workforce, Affidavit A is also required.

Affidavit C - Portion of Work to be Performed by Certified MWBE Businesses
DUE WITH BID

Bidders shall complete Affidavit C to identify the minority business that it will use on the project. Affidavit C is required to be submitted with your bid. Even if your company has MWBE participation, Affidavit A is also required.

Affidavit D – Good Faith Efforts
DUE 72 HOURS AFTER NOTIFICATION

Affidavit D is to be submitted **only** by the apparent lowest, responsible, responsive bidder within 72 hours after notification.

The apparent lowest, responsible, responsive Bidder shall file within 30 days after the award of the contract, a list of all identified subcontractors that the Contractor (Bidder) will use on the project.

IMPORTANT MWBE INSTRUCTIONS: It is mandatory for all Bidders to demonstrate their good faith efforts in seeking MWBE participation and provide supporting documentation upon

request. The MWBE supporting documentation and information is still required even if using your own workforce. MWBE Prime Contractors will also be required to document good faith efforts.

The above information must be provided as required. Failure to submit these MWBE documents may be grounds for rejection of the bid.

END OF INSTRUCTIONS TO BIDDERS

0003 – Equal Employment Opportunity

EQUAL EMPLOYMENT OPPORTUNITY

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, handicap, age, 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 race, handicap, age, color, religion, sex or national origin. Such action shall include but not be limited to the following: employment, upgrading, demotion or transfer, recruitment or recruiting 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 setting forth the provisions of the 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, handicap, age, color, religion, sex, or national origin.

C. 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 labor union or workers' representative of the contractor's commitments under the Equal Employment Opportunity section of this contract and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

D. In the event of the contractor's noncompliance with nondiscrimination clauses of this contract or with any such rules, regulations or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further County contracts.

E. The contractor will include the provisions of this section in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Board of County Commissioners of the County of Durham, North Carolina so that such provisions will be binding such subcontractor or vendor.

0004 – General Conditions of the Contract for Construction

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

TABLE OF ARTICLES

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

ARTICLE 1
GENERAL PROVISIONS

1.1. BASIC DEFINITIONS

1.1.1 Contract for Construction. The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification.

1.1.2 Contract Documents. The Contract Documents consist of the Agreement between Owner and Contractor (hereinafter the Agreement), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, addenda issued prior to execution of the Contract, advertisement or invitation to bid, Instructions to Bidders, other documents listed in the Agreement and Modifications issued after execution of the Contract. In the event of conflicts among the contract documents, the Specifications shall take precedence over the Drawings, and the Supplementary Conditions shall take precedence over the General Conditions. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Owner and a Subcontractor or Sub-subcontractor.

1.1.3 Contractor. The person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. Unless otherwise stated, the term "Contractor" means the General Contractor or the General Contractor's authorized representative.

1.1.4 Drawings. The Drawings are the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

1.1.5 Designer. The Architect or Engineer registered in accordance with the provisions of Chapter 89C of the NC General Statutes, identified as such in the Contract for Construction and is referred to throughout the Contract Documents as if singular in number. The term "Designer" refers to the Designer or the Designer's authorized representative(s). The Designer shall be entitled to performance and enforcement of obligations under the Contract for Construction intended to facilitate performance of the Designers' duties.

1.1.6 Modification. A Modification is (1) a written amendment to the Contract signed by the parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Designer.

1.1.7 Owner. The person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Owner" means the Owner or the Owner's authorized representative.

1.1.8 Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate contractors.

1.1.9 Project Manual. The Project Manual is the volume usually assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

1.1.10 Specifications. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.

1.1.11 Work. The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the project.

1.2 EXECUTION, CORRELATION, AND INTENT

1.2.1 The Contract Documents shall be signed by the Owner and Contractor as provided in the Agreement. If either the Owner or Contractor or both do not sign all the Contract Documents, the Designer shall identify such unsigned Documents and insure that they are properly signed by the necessary parties.

1.2.2 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Work is to be performed, correlated personal observations with requirements of the Contract Documents, has checked and verified all site conditions, and hereby waives any and all claims, present or future, for misrepresentation on the part of the Owner or Designer.

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all.

1.2.4 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any Subcontractor.

1.2.5 Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

1.3 OWNERSHIP AND USE OF DESIGNER'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

1.3.1 The Drawings, Specifications and other documents prepared by the Designer are instruments of the Designer's service through which the Work to be executed by the Contractor is described. The Contractor may retain one contract record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Designer. The Owner will retain all common law, statutory and other reserved rights, in addition to the copyright of the drawings, specifications and other documents prepared by the Designer. All copies of them, except the

Contractor's record set, shall be returned or suitably accounted for to the Designer, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Designer, and copies thereof furnished to the Contractor, are for use solely with respect to this Project; they are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects without the specific written consent of the Owner and Designer. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Designer appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this license shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Designer. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Owner's copyright or other reserved rights.

1.4 CAPITALIZATION

Terms capitalized in these General Conditions include those which are (1) specifically defined, (2) the titles of numbered articles and identified references to Paragraphs, Subparagraphs and Clauses in the document or (3) the titles of other documents.

1.5 INTERPRETATION

In the interest of brevity, the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

ARTICLE 2
OWNER

2.1 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.1.1 The Owner shall furnish plan and profile of existing County utilities. The Contractor is responsible for locating all existing utilities prior to Work.

2.1.2 Except for permits and fees which are the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

2.1.3 Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in orderly progress of the Work.

2.1.4 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, such copies of Drawings and Project Manuals as are reasonably necessary for execution of the Work.

2.2 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the

Owner may after such seven-day period, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case, an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Designer's additional services and expenses made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior review and confirmation by the Designer. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3
CONTRACTOR

3.1. REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

3.1.1 The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the Owner pursuant to Section 2.1, and shall at once report to the Designer errors, inconsistencies or omissions discovered. If the Contractor performs any construction activity knowing or should have known it involves an error, inconsistency or omission in the Contract Documents without such notice to the Designer, the Contractor shall assume full responsibility for such performance and shall bear the full costs for correction.

3.1.2 The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Designer immediately.

3.1.3 The Contractor shall perform the Work in accordance with the Contract Documents and submittals approved pursuant to Section 3.11.

3.2 SUPERVISION AND CONSTRUCTION PROCEDURES

3.2.1 The Contractor shall supervise and direct the Work using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless Contract Documents give other specific instructions concerning these matters.

3.2.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work under a contract with the Contractor.

3.2.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Designer in the Designer's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

3.2.4 The Contractor shall be responsible for inspection of portions of Work already performed under this Contract to determine that such portions are in proper condition to receive subsequent Work.

3.3 LABOR AND MATERIALS

3.3.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

3.3.2 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

3.3.3 Materials, equipment or items required for a complete job which are shown on the drawings but not mentioned in the specifications or materials, equipment or items required by the specifications but not shown on the drawings, shall be furnished and installed the same as though both shown on the drawings and required by the specifications.

3.4 WARRANTY

3.4.1 The Contractor warrants to the Owner and Designer that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents; that the Work will be free from defects not inherent in the quality required or permitted; and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the Designer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

3.4.2 Except as otherwise specifically stated below, the Contractor shall guarantee his materials and workmanship against defect due to faulty materials or faulty workmanship or negligence for a period of twelve (12) months following Substantial Completion of the Work. Where the manufacturer's warranty on equipment or parts thereof exceeds twelve (12) months, the guarantee period on such equipment or parts thereof shall be extended to include the full warranty of the manufacturer. The Contractor shall repair or replace such defective materials, equipment or workmanship to the full satisfaction of the Owner within the stipulated guarantee period without cost to the Owner.

3.5 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

3.6 PERMITS, FEES AND NOTICES

3.6.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the

Contract for Construction and which are legally required when bids are received or negotiations concluded.

3.6.2 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on performance of the Work.

3.6.3 It is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the Designer and Owner in writing, and necessary changes shall be accomplished by appropriate Modification.

3.6.4 If the Contractor performs Work the Contractor knows or should have known it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Designer and Owner, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs.

3.7 ALLOWANCES

3.7.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities against which the Contractor makes reasonable objection.

3.7.2 Unless otherwise provided in the Contract Documents:

(1) materials and equipment under an allowance shall be selected promptly by the Owner to avoid delay in the Work;
(2) allowances shall cover the cost to the Contractor of materials and equipment delivered to the site and all required taxes, less applicable trade discounts;
(3) Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum and not in the allowances;
(4) whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by a Change Order. The amount of the Change Order shall reflect (a) the difference between actual costs and the allowances under Clause 3.7.2. (2) and (b) changes in Contractor's costs under Clause 3.7.2.(3).

3.8 SUPERINTENDENT

The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing upon request.

3.9 CONTRACTOR'S CONSTRUCTION SCHEDULES

3.9.1 Promptly after being awarded the Contract, the Contractor shall prepare and submit for the Designer's review and comment a construction schedule for the Work. The schedule shall not exceed time limits provided in the Contract Documents. The Contract Documents shall be revised at appropriate intervals as required by the conditions of the Work and Project. The Contract Documents shall be related to the entire Project to the extent required by the Contract Documents. The Contract Documents shall provide for expeditious and practicable execution of the Work. If separate prime contracts are awarded by the Owner in connection with this Project, the Contractor shall additionally submit a Contractor's construction schedule for the Work to the General Contractor in order for the General Contractor to carry out its duties under Article 6.

3.9.2 The Contractor shall prepare and keep current, for the Designer's approval, a schedule of submittals which is coordinated with the Contractor's construction schedule and allows the Designer reasonable time to review submittals.

3.9.3 The Contractor shall conform to the most recent schedules.

3.10 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one record copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record changes and selections made during construction, and in addition approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Designer and shall be delivered to the Designer for submittal to the Owner upon completion of the Work.

3.11 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

3.11.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

3.11.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

3.11.3 Samples are physical examples, which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

3.11.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the Designer is subject to the limitations of Paragraph 4.1.6.

3.11.5 The Contractor shall review, approve and submit to the Designer Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate

contractors. Submittals made by the Contractor which are not required by the Contract Documents may be returned without action.

3.11.6 The Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed and approved or other appropriate action taken by the Designer. Such Work shall be in accordance with approved submittals.

3.11.7 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

3.11.8 The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Designer's review and approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Designer in writing of such deviation at the time of submittal and the Designer has given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Designer's approval thereof.

3.11.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, product Data, Samples or similar submittals, to revisions other than those requested by the Designer on previous submittals.

3.11.10 Informational submittals upon which the Designer is not expected to take responsive action may be so identified in the Contract Documents.

3.11.11 When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Designer shall be entitled to rely upon the accuracy and completeness of such calculations and certifications.

3.12 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

3.13 CUTTING AND PATCHING

3.13.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

3.13.2 The Contractor shall not damage or endanger a portion of the work or fully or partially completed construction of the Owner or separate contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably

withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

3.14 CLEANING UP

3.14.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials.

3.14.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

3.15 ACCESS TO WORK

The Contractor shall provide the Owner and Designer access to the Work in preparation and progress wherever located.

3.16 ROYALTIES AND PATENTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of patent rights and shall hold the Owner and Designer harmless from loss unless a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Designer.

3.17 INDEMNIFICATION

3.17.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Designer, Designer's consultants, and agents and employees of any of them from and against claims, damages, economic losses and expenses of any kind (including but not limited to fees and charges of engineers, attorneys, and other professionals and costs related to court action or arbitration), arising out of or resulting from performance of the Work under this Agreement, provided 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, caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable unless caused in whole or part by the negligence of Owner. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.17.

3.17.2 In claims against any person or entity indemnified under this Section 3.17, by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Section 3.17, shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

3.17.3 The obligations of the Contractor under this Section 3.17, shall not extend to the liability of the Designer, the Designer's consultants, and agents and employees of any of them arising out of (a) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications, or (b) the giving of or the failure to give directions or instructions by the Designer, the Designer's consultants, and agents and employees of any of them provided such giving or failure to give is the primary cause of the injury or damage.

ARTICLE 4
ADMINISTRATION OF THE CONTRACT

4.1 DESIGNER'S ADMINISTRATION OF THE CONTRACT

4.1.1 The Designer will provide administration of the Contract as described in the Contract Documents and will be the Owner's representative during construction through final payment, and with the Owner's concurrence, from time to time during the correction period described in Paragraph 11.2. The Designer will advise and consult with the Owner. The Designer will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument in accordance with other provisions of the Contract.

4.1.2 The Designer will not have control over or charge of and will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility as provided in Paragraph 3.2. The Designer will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Designer will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons performing portions of the Work.

4.1.3 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate through the Designer. Communications by and with the Designer's consultants shall be through the Designer. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Designer.

4.1.4 Based on the Designer's inspections, observations and evaluations of the Contractor's Applications for Payment, the Designer will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

4.1.5 The Designer will have authority to reject Work which does not conform to the Contract Documents. Whenever the Designer considers it necessary or advisable for implementation of the intent of the Contract Documents, the Designer will have authority to require additional inspection or testing of the Work in accordance with Paragraphs 12.5.2 and 12.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Designer nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Designer to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.

4.1.6 The Designer will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Designer's action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time in the Designer's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Designer's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Article 3. The Designer's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Designer, of any construction means, methods, techniques, sequences or procedures. The Designer's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

4.1.7 The Designer will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Paragraph 7.4.

4.1.8 The Designer will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, will receive and forward to the Owner for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of the Contract Documents.

4.1.9 The Designer will interpret and decide matters concerning performance under and requirements of the Contract documents on written request of either the Owner or Contractor. The Designer's response to such requests will be made with reasonable promptness and within any time limits agreed upon. If no agreement is made concerning the time within which interpretations required of the Designer shall be furnished in compliance with this Paragraph 4.1.9, then delay shall not be recognized on account of failure by the Designer to furnish such interpretations until 15 days after written request is made for them.

4.1.10 Interpretations and decisions of the Designer will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Designer will endeavor to secure faithful performance by both Owner and Contractor and will not show partiality to either.

4.1.11 The Designer's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

4.1.12 If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Article 11.2 or persistently fails to carry out Work in accordance with the Contract Documents, the Designer may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Designer to stop the Work shall not give rise to a duty on the part of the Designer to exercise this right for the benefit of the Contractor or any other person or entity.

4.2 CLAIMS AND DISPUTES

4.2.1 A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be made pursuant to the Dispute Resolution Procedure set forth in Paragraph 4.4. The responsibility to substantiate Claims shall rest with the party making the Claim.

4.2.2 DECISION OF DESIGNER. Claims, including those alleging an error or omission by the Designer, shall be referred initially to the Designer for action as provided in Paragraph 4.4. A decision by the Designer shall be required as a condition precedent to mediation and litigation of a Claim between any party involved in this construction Project as to all such matters arising prior to the date final payment is due, regardless of whether such matters relate to execution and progress of the Work or the extent to which the Work has been completed. The decision by the Designer in response to a Claim shall not be a condition precedent to litigation in the event (1) the position of Designer is vacant, (2) the Designer has not received evidence or has failed to render a decision within agreed time limits, or (3) 45 days have passed after the Claim has been referred to the Designer.

4.2.3 TIME LIMITS ON CLAIMS. Claims by the Contractor must be made within 10 days after occurrence of the event giving rise to such Claim or within 10 days after the Contractor first recognizes the condition giving rise to the Claim, whichever is later. Claims must be made by written notice. An additional Claim made after the initial Claim has been implemented by Change Order will not be considered.

4.2.4 CONTINUING CONTRACT PERFORMANCE. Pending final resolution of a Claim, unless otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

4.2.5 WAIVER OF CLAIMS: FINAL PAYMENT. The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

(1) unsettled claims arising out of the Contract; or
(2) failure of the Work to comply with the requirements of the Contract Documents; or
(3) terms of special warranties required by the Contract Documents.

4.2.6 CLAIMS FOR CONCEALED OR UNKNOWN CONDITIONS. If conditions are encountered at the site which are (a) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (b) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 10 days after first observance of the conditions. The Designer will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will

recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Designer determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified the Designer shall so notify the Owner and Contractor in writing stating the reasons, Claims by either party in opposition to such determination must be made within 21 days after the Designer has given notice of the decision. If the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Designer for initial determination, subject to further proceedings pursuant to paragraph 4.4.

4.2.7 CLAIMS FOR ADDITIONAL COST. If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Paragraph 10.3. If the Contractor believes additional cost is involved for reasons including but not limited to (a) a written interpretation from the Designer, (b) a written order for a minor change in the Work issued by the Designer, (c) termination of the Contract by the Owner, Claim shall be filed in accordance with the procedure established herein. This Article and Article 7 shall be the exclusive means by which the Contractor may claim additional cost or damages from the Owner, and the Contractor hereby waives any and all right to claim additional cost or damages by any other remedy including, without limitation, quantum meruit, subrogation, or implied contract.

4.2.8 CLAIMS FOR ADDITIONAL TIME. If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary. Adverse weather conditions shall not be a basis for a Claim for additional time nor costs.

4.3 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, of any of the other party's employees or agents, or of others for whose acts such party is legally liable, written notice as such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 10 days after first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. If a Claim for additional cost or time related to this Claim is to be asserted, it shall be filed as provided in Subparagraphs 4.2.7 or 4.2.8.

4.4 DISPUTE RESOLUTION PROCEDURE

4.4.1 To prevent all disputes and litigation, it is agreed by the parties that any claim, question, difficulty or dispute arising from this Agreement or the construction process shall be first submitted to the Designer to address the issue. Upon review of the Claim, the Designer shall take one or more of the following preliminary actions within ten (10) days of receipt of a Claim: (1) request additional supporting data from the claimant, (2) submit a schedule to the parties indicating when the Designer expects to take action, (3) reject the Claim in whole or in part stating reasons for rejection, (4) recommend approval of the Claim by the other party, or (5) suggest a compromise. The Designer may also, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim.

4.4.2 If a Claim has been resolved, the Designer will prepare or obtain appropriate documentation.

4.4.3 If a Claim has not been resolved, the party making the Claim shall, within ten (10) days after the Designer's preliminary response, take one or more of the following actions: (1) submit additional supporting data requested by the Designer, (2) modify the initial Claim and resubmit it to the Designer, or (3) notify the Designer that the initial Claim stands and submit the Claim to the Durham County Manager for mediation pursuant to Paragraph 4.4.4, below.

4.4.4 The Durham County Manager, as mediator, shall address any properly submitted claim, question, difficulty or dispute arising from this Agreement or the construction process, which has not been satisfactorily resolved by the Designer. Such requests shall be made to the Durham County Manager in writing within ten (10) days after the Designer's preliminary response. The mediator shall notify Contractor in writing of the decision within thirty (30) calendar days from the date of the submission of the claim, question, difficulty or dispute, unless the mediator requires additional time to gather information or allow the parties to provide additional information. The mediator's orders, decisions and decrees shall be non-binding. Mediation, pursuant to this Section, shall be a pre-condition to initiating litigation concerning the dispute. During the pendency of any dispute and after a determination thereof, the parties to the dispute shall act in good faith to mitigate any potential damages including utilization of construction schedule changes and alternate means of construction.

4.4.5 The mediation session shall be private. Prior to commencement of mediation, if requested by either party or the mediator, the parties and the mediator shall execute a written confidentiality agreement in accordance with the provisions of North Carolina law. All such mediation sessions shall be held in Durham County, North Carolina.

4.4.6 If, as a result of mediation, a voluntary settlement is reached and the parties to the dispute agree that such settlement shall be reduced to writing, the mediator shall be deemed appointed and constituted an arbitrator for the sole purpose of signing the mediated settlement agreement. Such agreement shall be and shall have the same force and effect as an arbitration award, and judgement may be entered upon it in accordance with applicable law in any court of competent jurisdiction.

4.4.7 If the disputed issue cannot be resolved in mediation or either party disagrees with the results of the mediation, the parties may seek resolution in the General Court of Justice in the County of Durham and the State of North Carolina. If a party fails to comply in strict accordance with the requirements of this Article, the non-complying party specifically waives all of its rights provided hereunder, including its rights and remedies under State law.

4.4.8 The dispute resolution procedure set forth in this Section shall be made available to any party involved in this construction project including County, Contractor, Designer, Subcontractors as well as Sub-subcontractors and is a precondition to initiation of litigation concerning the dispute.

ARTICLE 5
SUBCONTRACTORS

5.1 DEFINITIONS

5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of

the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Designer the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work, including (1) Heating, ventilating, and air conditioning, (2) Plumbing, (3) Electrical, and (4) General. The Designer will promptly reply to the Contractor in writing stating whether or not the Owner or the Designer, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Designer to reply promptly shall constitute notice of no reasonable objection.

5.2.2 The Contractor shall NOT substitute any person or company listed in the Contractor's original Bid Proposal, except (1) of the listed subcontractor's bid is later determined by the Contractor to be non-responsible or non-responsive or the listed subcontractor refuses to enter into a contract for the complete performance of the work, or (2) with the approval of the Owner for good cause shown by the Contractor.

5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms and conditions of the Contract Documents and Contract for Construction, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these documents, assumes toward the Owner and Designer. Each subcontract agreement shall preserve and protect the rights of the Owner and Designer under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement which may be at variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

ARTICLE 6
CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

6.1.1 The Owner reserves the right to perform construction or operations related to the project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site.

6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner- Contractor Agreement.

6.1.3 The General Contractor shall provide for coordination of the activities of each separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate Contractors and the General Contractor in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor and separate contractors until subsequently revised.

6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights which apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10 and 11.

6.1.5 The General Contractor shall be responsible for scheduling the work of all contractors; the maintenance of the progress schedule for all prime contractors for this project; and for the notification of the Designer of any changes in the progress schedule.

6.2 MUTUAL RESPONSIBILITY

6.2.1 The Contractor shall afford the Owner and separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

6.2.2 If part of the Contractor's Work depends on proper execution or results upon construction or operations by the Owner or a separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Designer apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor to report shall constitute an acknowledgment that the Owner's or separate Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

6.2.3 Costs caused by delays, by improperly timed activities, defective construction, or any other damages shall be borne by the party responsible therefor. The Owner shall not be liable nor

responsible for any delays or damages to the Contractor caused by separate Contractors or the Designer.

6.2.4 The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate Contractors as provided in Paragraph 10.2.5.

6.2.5 Claims and other disputes and matters in question between the Contractor and a separate Contractor shall be subject to the provisions of Sections 4.2 and 4.4, provided the separate Contractor has reciprocal obligations.

6.2.6 The Owner and each separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Paragraph 3.13.

6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate Contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Paragraph 3.14, the Owner may clean up and allocate the cost among those responsible as the Designer determines to be just.

ARTICLE 7
CHANGES IN THE WORK

7.1 CHANGES

7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive, or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Designer; a Construction Change Directive requires agreement by the Owner and Designer and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Designer alone pursuant to Paragraph 7.4.

7.1.3 Changes in the work shall be performed under applicable Provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

7.1.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are so changed in a proposed Change Order or Construction Change Directive that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

7.1.5 Overhead and profit shall not exceed 15% of the value of labor and material for work performed by any contractor or subcontractor. If the work is performed by a subcontractor, the prime contractor's overhead and profit shall not exceed 5%.

7.2 CHANGE ORDERS

7.2.1 A Change Order is a written instrument prepared by the Designer and signed by the Owner, Contractor, and Designer, stating their agreement upon all of the following:

(1) a change in the Work;
(2) the amount of the adjustment in the Contract Sum, if any; and
(3) the extent of the adjustment in the Contract Time, if any.

7.2.2 Methods used in determining adjustments to the Contract Sum may include those listed in Paragraph 7.3.3.

7.3 CONSTRUCTION CHANGE DIRECTIVES

7.3.1 A Construction Change Directive is a written order prepared by the Designer and signed by the Owner and Designer, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

(1) mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
(2) unit prices stated in the Contract Documents or subsequently agreed upon;
(3) cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or as provided in Paragraph 7.3.6.

7.3.4 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Designer of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

7.3.5 A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

7.3.6 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Designer on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, and also under clause 7.3.3(3), the Contractor shall keep and present, in such

form as the Designer may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Paragraph 7.3.6 shall be limited to the following:

(1) costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
(2) costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
(3) rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
(4) costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
(5) additional costs of supervision and field office personnel directly attributable to the change.

7.3.7 Pending final determination of cost to the Owner, amounts not in dispute may be included in Applications for Payment. The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Designer. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

7.3.8 If the Owner and Contractor do not agree with the adjustment in Contract Time or the method for determining it, the adjustment or the method shall be referred to the Designer for determination.

7.3.9 When the Owner and Contractor agree with the determination made by the Designer concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.

7.4 MINOR CHANGES IN THE WORK

The Designer will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be affected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 8
TIME

8.1 DEFINITIONS

8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

8.1.2 The date of commencement of the Work is the date established in the Agreement. The date shall not be postponed by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible.

8.1.3 The date of substantial Completion is the date certified by the Designer in accordance with Paragraph 9.9.

8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

8.2 PROGRESS AND COMPLETION

8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work. The Contractor and the Contractor's surety shall be liable for and shall pay the Owner such sums as shall be set forth in the Agreement between Owner and Contractor as liquidated damages each calendar day of delay until the work is substantially complete.

8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by the Contract for Construction to be furnished by the Contractor. The date of commencement of the work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by a notice to proceed given by the Designer, the Contractor shall notify the Owner and Designer in writing not less than five days before commencing the Work.

8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 If the Contractor is delayed at any time in progress of the Work by an act or neglect of the Owner or Designer, or of an employee of either, or of a separate Contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidably casualties or other causes beyond the Contractor's control, or by delay authorized by the Owner pending litigation, or by other causes which the Designer determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Designer may determine.

8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Paragraph 4.2.8.

8.3.3 Should the work be interrupted or hindered by the Owner or Designer, the Contractor shall be entitled to an extension of time pursuant to Paragraph 4.2 in an amount equal to such interruption or hindrance but such interruption or hindrance shall not constitute a claim for damages nor for loss of anticipated profits by the Contractor.

8.3.4 Should the work be delayed in whole by any act or acts of the Contractor, the Contractor shall not be entitled to an extension of time pursuant to Paragraph 4.2, nor shall such delay constitute a claim either for damages or for loss of anticipated profits by the Contractor. Should the work be delayed in part by any act or acts of the Contractor and in part by any act or acts of the Owner or Designer, the Contractor shall be entitled to an extension of time pursuant to Paragraph 4.2 in an amount

equal to that portion of the delay for which the Contractor is not responsible, but such delay shall not constitute a claim either for damages or for loss of anticipated profits by the Contractor.

8.3.5 Should the work be delayed, interrupted or hindered, in whole or in part, by any act or acts of any separate prime contractors, the Contractor shall be entitled to an extension of time pursuant to Paragraph 4.2.8 in an amount equal to such delay, interruption or hindrance but such delay, interruption or hindrance shall not constitute a claim for damages nor for loss of anticipated profits by the Contractor.

ARTICLE 9
PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

9.2 SCHEDULE OF VALUES

Before the first Application for Payment, the Contractor shall submit to the Designer a Schedule of Values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Designer may require. This Schedule of Values, unless objected to by the Designer, shall be used as a basis for reviewing the Contractor's Applications for Payment.

9.3 APPLICATIONS FOR PAYMENT

9.3.1 At least twenty (20) days before the date established for each progress payment, the Contractor shall submit to the Designer an itemized Application for Payment for operations completed in accordance with the schedule of values. Such application shall be notarized, supported by such data substantiating the Contractor's right to payment as the Owner or Designer may require, such as copies of requisitions from subcontractors and material suppliers and reflecting retainage if provided for elsewhere in the Contract Documents.

9.3.2 Such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives but not yet included in Change Orders.

9.3.3 Such applications may not include requests for payment of amounts the Contractor does not intend to pay to a Subcontractor or material supplier because of a dispute or other reason.

9.3.4 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

9.3.5 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests, or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work.

9.3.6 Provided an Application for Payment is received by the Designer not later than the tenth (10^{th}) day of a month, the Owner shall make payment to the Contractor not later than the thirtieth (30^{th}) day of the month.

9.4 **RETAINAGE**

To ensure proper performance of this Contract, Owner shall retain five percent (5%) of the amount of each approved Application for Payment until the project work is 50% complete provided that the Contractor continues to perform satisfactorily, and any non-conforming work identified in writing prior to that date has been corrected by the Contractor and accepted by the Owner. If the Owner determines the Contractor's performance is unsatisfactory, the Owner may reinstate retainage in the amount of 5% for each subsequent periodic Application for Payment until the Contractor's performance becomes satisfactory. The project shall be deemed fifty percent (50%) complete when the Contractor's gross project invoices, excluding the value of materials stored off-site, equal or exceed fifty percent (50%) of the value of the contract, except the value of materials stored on-site shall not exceed twenty percent (20%) of the contractor's gross project invoices for the purpose of determining whether the project is fifty percent (50%) complete. Following 50% completion of the project, the Owner may also withhold additional retainage from any subsequent periodic payment, not to exceed 5%, in order to allow the Owner to retain 2½% total retainage through the completion of the project. Within sixty (60) days after the submission of a final pay application, the Owner with written consent of the Surety shall release to the Contractor all retainage on payments held by the Owner if (1) the Owner receives a certificate of substantial completion from the architect, Designer or design consultant in charge of this Project, or (2) the Owner receives beneficial occupancy or use of the project. However, the Owner may retain sufficient funds to secure completion of the project or corrections to any work. If the Owner retains funds, the amount retained shall not exceed two and one half times the estimated cost of the work to be completed or corrected. Any reduction in the amount of retainage on payments shall be with the consent of the Contractor's Surety. Retainer provisions contained Contractor's subcontracts may not exceed the terms and conditions for retainage provided herein. Contractor is further required to satisfy the retainage provisions of N.C.G.S. 143-134.1(b2) with regard to subcontracts for early finishing trades (structural steel, piling, caisson, and demolition) and to coordinate the release of retainage for such trades from the retainage held by Owner from the Contractor pursuant to statute. Nothing herein shall prevent the Owner from withholding payment to the Contractor in addition to the amounts identified herein for unsatisfactory job progress, defective construction not remedied, disputed work, or third party claims filed against the owner or reasonable evidence that a third party claim will be filed.

9.5 CERTIFICATES FOR PAYMENT

9.5.1 The Designer will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Designer determines is properly due, or notify the Contractor and Owner in writing of the Designer's reasons for withholding certification in whole or in part as provided in Paragraph 9.6.1.

9.5.2 The Designer's certification for payment shall constitute a representation to the Owner, based on the Designer's inspections at the site and on the data comprising the Contractor's Application for Payment, that the Work has progressed to the point indicated and that the inspections of the construction, repairs, or installations have been conducted with the degree of care and professional skill and judgment ordinarily exercised by a member of his profession; and that to the best of his knowledge and in the professional opinion of the Designer, the Contractor has fulfilled the obligations of such plans, specifications, and contract. The Designer's certification for payment shall be signed and sealed by the Designer and presented to the Owner. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion and to specific qualifications expressed by the Designer. The issuance of a Certificate for Payment shall further constitute a representation by the Designer, that the Contractor is entitled to payment in the amount certified.

9.6 DECISIONS TO WITHHOLD CERTIFICATION

9.6.1 The Designer may decide not to certify payment and may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Designer's opinion, the representations to the Owner required by Paragraph 9.5.2 cannot be made. If the Designer is unable to certify payment in the amount of the Application, the Designer will notify the Contractor and Owner as provided in Paragraph 9.5.1. If the Contractor and Designer cannot agree on a revised amount, the Designer will promptly issue a Certificate for Payment for the amount for which the Designer is able to make such representations to the Owner. The Designer may also decide not to certify payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Designer's opinion to protect the Owner from loss due to:

(1) defective Work not remedied;

(2) third party claims filed or reasonable evidence indicating probable filing of such claims;

(3) failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;

(4) reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

(5) damage to the Owner or another contractor;

(6) reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or persistent failure to carry out the Work in accordance with the Contract Documents.

9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

9.7 PROGRESS PAYMENTS

9.7.1 After the Designer has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Designer.

9.7.2 The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in similar manner.

9.7.3 The Designer will furnish to a Subcontractor, upon request and if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Designer and Owner on account of portions of the Work done by such Subcontractor.

9.7.4 Neither the Owner nor Designer shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

9.7.5 Payment to material suppliers shall be treated in a manner similar to that provided in Paragraphs 9.7.2, 9.7.3, and 9.7.4.

9.7.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

9.8 FAILURE OF PAYMENT

The Contractor shall not stop the Work for the failure of the Designer to issue a Certificate of Payment, or the Owner to make timely payment.

9.9 SUBSTANTIAL COMPLETION

9.9.1 Substantial Completion is the stage in the progress of the Project when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents, so the Owner can occupy or utilize the Work for its intended use.

9.9.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Designer a comprehensive list of items to be completed or corrected. The Contractor shall proceed promptly

to complete and correct items on the list. Failure to include an item or such list does not alter the responsibility for the Contractor to complete all Work in accordance with the contract Documents. Upon receipt of the Contractor's list, the Designer will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Designer's inspection discloses any item, whether or not included on the Contractor's list, which is not in accordance with the requirements of the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Designer. The Contractor shall then submit a request for another inspection by the Designer to determine Substantial Completion. When the Work or designated portion thereof is substantially complete, the Designer will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate.

9.9.3 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Designer, the Owner shall make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof as provided in the Contract Documents.

9.10 PARTIAL OCCUPANCY OR USE

9.10.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is authorized by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Designer as provided under Subparagraph 9.9.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Designer.

9.10.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Designer shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

9.10.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

9.11 FINAL COMPLETION AND FINAL PAYMENT

9.11.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Designer will promptly make such inspections and, when the Designer finds the Work acceptable under the Contract Documents and the Contract fully performed, the Designer will promptly issue a Final Certificate for Payment stating that to the best of the Designer's knowledge, information and belief, and on the basis of the Designer's observations and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in said Final Certificate is due and payable. The Designer's Final Certificate for Payment will constitute a further representation that the conditions listed in Paragraph 9.11.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

9.11.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Designer (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract for Construction to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5) if required by the Owner, other or additional data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances rising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

9.11.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Designer so confirms, the Owner shall, upon application by the Contractor and certification by the Designer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for work not fully completed and accepted is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Designer prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

9.11.4 Acceptance of final payment by the Contractor, Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10
PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract and construction of the Project.

10.1.2 In the event the Contractor encounters on the site material reasonably believed to be asbestos or polychlorinated biphenyl (hereinafter PCB) which has not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and Designer by phone and in writing. The Work in the affected area shall not thereafter be resumed except by written agreement of the Owner and Contractor if in fact the material is asbestos or PCB and has not been rendered harmless. The Work in the affected area shall be resumed in the absence of asbestos or PCB, or when it has been rendered harmless, by written agreement of the Owner and Contractor, or in accordance with final determination by the Designer.

10.1.3 The Contractor shall not be required to perform without consent of Owner and Designer any Work relating to asbestos or PCB.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

(1) employees on the working on the Project and other persons who may be affected thereby;

(2) the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

(3) other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury, or loss.

10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including erecting necessary barricades or other temporary walls and structures as required during the period of construction, posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities.

10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

10.2.5 The Contractor shall promptly remedy damage and loss to property referred to in Paragraphs 10.2.1.(2) and (3), caused in whole or in part by the Contractor, Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Paragraphs 10.2.1.(2) and (3), except damage or loss attributable to acts or omissions of the Owner or Designer and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Article 3. All costs to repair any damage and loss to property referred to in Paragraphs 10.2.1.(2) and (3), shall be the sole responsibility of the Contractor and such repair or replacement shall be performed expeditiously without cost to the Owner.

10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's Superintendent, required under Paragraph 3.8, unless otherwise designated by the Contractor in writing to the Owner and Designer.

10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

10.2.8 Existing utilities have been identified and described in the Contract Documents insofar as information is reasonably available, however, it is the Contractor’s responsibility to verify such information and to preserve all existing utilities whether shown in the Contract Documents or not. If utility conflicts are encountered by the Contractor during construction, Contractor shall file sufficient notice to the owners of the utilities so that they may make the necessary adjustments, as well as the Designer or Designer.

10.3 EMERGENCIES

In an emergency affecting the safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Paragraphs 4.2.7, 4.2.8 and Article 7.

ARTICLE 11
UNCOVERING AND CORRECTION OF WORK

11.1 UNCOVERING OF WORK

11.1.1 If a portion of the Work is covered contrary to the Designer's request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Designer, be uncovered for the Designer's observation and be replaced at the Contractor's sole expense without change in the Contract Time.

11.1.2 If a portion of the Work has been covered which the Designer has not specifically requested to observe prior to its being covered, the Designer may request to see such Work and it shall be

uncovered by the Contractor. If such Work is not in accordance with the Contract Documents, the Contractor shall pay such costs unless the condition was caused by the Owner or a separate contractor in which event the Owner or separate contractor shall be responsible for payment of such costs. If such work is in accordance with the Contract Documents, the Owner, by appropriate Change Order, shall be charged with the cost of uncovering and replacement.

11.2 CORRECTION OF WORK

11.2.1 The Contractor shall promptly correct Work rejected by the Designer or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear any and all costs of correcting such rejected Work, including additional testing and inspections and compensation for the Designer's services and expenses made necessary thereby.

11.2.2 If, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Paragraph 9.10.1 or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. This period of one year shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the work. This obligation under this Paragraph 11.2.2 shall survive acceptance of the Work under the Contract and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

11.2.3 The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

11.2.4 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Paragraph 2.2. If the Contractor does not proceed with correction of such nonconforming Work within a reasonable time fixed by written notice from the Designer, the Owner may remove it and store the salvageable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten days after written notice, the Owner may upon ten additional days written notice sell such materials and equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Designer's services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Sum shall be reduced by the deficiency. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

11.2.5 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

11.2.6 Nothing contained in this Section 11.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the time period of one year as described in Paragraph 11.2.2, relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the work.

11.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be affected whether or not final payment has been made.

ARTICLE 12
MISCELLANEOUS PROVISIONS

12.1 GOVERNING LAW. This Contract for Construction shall be governed by and in accordance with the laws of the State of North Carolina. All actions relating in any way to this Contract, shall be brought in the General Court of Justice in the County of Durham and the State of North Carolina, after exhausting the dispute resolution procedure set forth in Section 4.4, herein.

12.2 SUCCESSORS AND ASSIGNS. The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

12.3 WRITTEN NOTICE. Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the business address listed in the Contract for Construction.

12.4 RIGHTS AND REMEDIES. Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

12.5 WAIVER OF RIGHTS. No action or failure to act by the Owner or Designer shall constitute an obligation or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

12.6 COMPLIANCE WITH LAWS. Contractor represents that it is in compliance with all Federal, State, and local laws, regulations or orders, as amended or supplemented. The implementation of this contract will be carried out in strict compliance with all Federal, State, or local laws regarding discrimination in employment.

12.7 TESTS AND INSPECTIONS

12.7.1 Tests, inspections, and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and the Owner shall bear the costs of tests, inspections, and approvals. Should any retest be necessary due to the failure of the Work to pass the first test or for any other reason whatsoever, the Contractor shall bear all related costs of retests, inspections or re-inspections, and approvals. The Contractor shall give the Designer timely notice of when and where tests and inspections are to be made so the Designer may observe such procedures.

12.7.2 If the Designer, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Paragraph 12.5.1, the Designer will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Designer of when and where tests and inspections are to be made so the Designer may observe such procedures.

12.7.3 If such procedures for testing, inspection or approval under Paragraphs 12.5.1 and 12.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs made necessary by such failure including those of repeated procedures and compensation for the Designer's services and expenses.

12.7.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Designer.

12.7.5 If the Designer is required by the Contract Documents to observe tests, inspections, or approvals, the Designer will do so promptly and, where practicable, at the normal place of testing.

12.7.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

12.8 COMMENCEMENT OF STATUTORY LIMITATION PERIOD

As between the Owner and Contractor:

Before Substantial Completion. As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run, and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;

Between Substantial Completion and Final Certificate for Payment. As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the Final Certificate for Payment, any applicable statute of limitations shall

commence to run, and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the Final Certificate for Payment; and

After Final Certificate for Payment. As to acts or failures to act occurring after the relevant date of issuance of the Final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any warranty provided under Paragraph 3.4, the date of any correction of the Work or failure to correct the Work by the Contractor under Section 11.2 or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.

ARTICLE 13
TERMINATION OR SUSPENSION OF THE CONTRACT

13.1 TERMINATION BY THE CONTRACTOR

13.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 180 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor, for any of the following reasons:

issuance of an order of a court or other public authority having jurisdiction;
an act of government, such as a declaration of national emergency, making material unavailable; because the Designer has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Paragraph 9.6.

13.1.2 If one of the above reasons exists, the Contractor may, upon seven (7) additional days written notice to the Owner and Designer, terminate the Contract and recover from the Owner payment for work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, not including overhead, profit, or damages.

13.2 TERMINATION BY THE OWNER FOR CAUSE

13.2.1 The Owner may terminate the Contract if the Contractor:

persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or otherwise is in substantial breach of a provision of the Contract Documents.

13.2.2 When any of the above reasons exist, the Owner, upon certification by the Designer that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days written notice, terminate employment of the Contractor and may, subject to any prior rights of surety:

take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor; and
finish the Work by whatever reasonable method the Owner may deem expedient.

13.2.3 When the Owner terminates the Contract for one of the reasons stated in Paragraph 13.2.1, the Contractor shall not be entitled to receive further payment.

13.2.4 If the unpaid balance of the Contract Sum does not cover the cost of finishing the Work, the Contractor shall pay the difference to the Owner. The amount to be paid to the Owner, shall be certified by the Designer, upon application, and this obligation for payment shall survive termination of the Contract.

13.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

The Owner may, without cause, order the Contractor in writing to suspend, delay, or interrupt the Work in whole or in part for such period of time as the Owner may determine.

13.4 BANKRUPTCY

13.4.1 The bankruptcy of the Contractor shall not terminate this Contract until such time that it is specifically rejected by the Trustee or Contractor in bankruptcy. During the election period the Contractor has to assume or reject this Contract, the Contractor shall continue to perform its Work under the Contract.

13.4.2 In the event the Contractor in Bankruptcy assumes the Contract, the Contractor shall apply progress payments to all of its unpaid obligations on this project before using any of these monies for either administrative expenses of the bankruptcy or as general assets of the estate.

13.5 SECURITY OF NON-PUBLIC RECORDS

Pursuant to N.C.G.S. § 132-1.7 entitled, “Sensitive Public Security Information”, public records, as defined in N.C.G.S. § 132-1, shall not include information containing specific details of public security plans and arrangements or the detailed plans and drawings of public buildings and infrastructure facilities. Therefore, all information provided, received, gathered or obtained by Contractor containing specific details of public security plans and arrangements or the detailed plans and drawings of public buildings and infrastructure facilities shall be held confidential and shall be used by the Contractor only for the purpose of fulfilling the terms of this Agreement. All plans and drawings shall be returned to the County, or otherwise destroyed at the direction of the County, upon termination or expiration of this Agreement. Any breach of this paragraph by Contractor shall result in the immediate termination of this contract.

0005 – Special Conditions

SPECIAL CONDITIONS

PROJECT: Generator for Northern Durham Convenience Site, 11894 North Roxboro Road, Rougemont, North Carolina, 27572

SCOPE OF WORK: Durham County General Services desires to install 100KW diesel backup generator to provide continuous operation of the site during disruption of power service to the site. The work includes procurement and installation of the backup generator, site preparation, installation of concrete pad, relocation of an existing generator tap box and installation of new panel, breaker, automatic and manual transfer switches and all related electrical work.

PROJECT DESCRIPTION: Work on this project shall be covered by a Single Prime Contract.

BASE CONTRACT: The Work includes furnishing of all materials and labor necessary for the completion of the Project: Northern Convenience Site Generator as shown on the plans and as outlined in these specifications. The scope includes all work indicated or implied by the drawings or specifications. It includes all items that may not be specifically shown but are required for a complete and finished job or may be required by codes or regulations.

LOCATION:
11894 North Roxboro Road
Rougemont, North Carolina 27572

DURHAM COUNTY'S REPRESENTATIVE(S):
Chrissie Koroivui, Solid Waste Program Manager
4527 Hillsborough Road, Durham, North Carolina
(919) 560-0442

ARCHITECT/ENGINEER:
HDR Engineering, Inc. of the Carolinas
Attn: Jeffrey Murray, PE
555 Fayetteville Street, Suite 900
Raleigh, NC 27601
(919) 232-6682

CONTRACTOR USE OF PREMISES:
Access to the site shall be from North Roxboro Road. Contractor shall keep North Roxboro Road and the residential shared driveway entrance to the facility clear at all times; do not use the road for parking unless otherwise permitted by the Durham County General Services and/or Engineering Departments and/or Sheriff's Department.

CONTRACT COMPLETION TIME/SCHEDULE: Contract substantial completion time for all work on this project is for 120 calendar days from the Notice to Proceed. Final Completion must be met within 30 calendar days from Substantial Completion date. Failure to complete the work within the designated time periods will result in the assessment of liquidated damages in the amount of $500.00 per calendar day.

WORK SCHEDULE: Within **ten (10) days** from the Contract Award, the Contractor shall submit a **schedule of work** for the installation of all the work under this contract to the Owner for approval.

END OF SPECIAL CONDITIONS

0006 – Affidavit of Compliance (E-Verify)

STATE OF NORTH CAROLINA

COUNTY OF DURHAM

AFFIDAVIT OF COMPLIANCE
with N.C. E-Verify Statutes

I, _____ (hereinafter the "Affiant"), being duly authorized by and on behalf of _____ (hereinafter "Contractor") after first being duly sworn hereby swears or affirms as follows:

1. Contractor understands that E-Verify is the federal E-Verify program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program used to verify the work authorization of newly hired employees pursuant to federal law in accordance with Article 2 of Chapter 64 of the North Carolina General Statutes; and

2. Contractor understands that an "Employer", as defined in NCGS§64-25(4), is required by law to use E-Verify to verify the work authorization of its employees through E-Verify in accordance with NCGS§64-26(a). The term "Employer" does not include State agencies, counties, municipalities, or other governmental bodies.

3. Contractor is a person, business entity, or other organization that transacts business in this State and that employs 25 or more employees in the state of North Carolina. (Mark Yes or No)

a. YES _____

b. NO _____

4. Contractor will ensure compliance with E-Verify to the extent applicable and will ensure compliance by any subcontractors subsequently hired by Contractor to perform work under Contractor's contract with Durham County.

This ____ day of _____, 20__.

_____
Signature of Affiant

Print or Type Name: _____

State of _____

County of _____

Signed and sworn to (or affirmed) before me, this the _____

day of _____, 20__.

My Commission Expires:

_____

_____
Notary Public

(Affix Official/Notarial Seal)

0007 – Bid Form

BID FORM

GENERAL CONSTRUCTION CONTRACT

PROPOSAL
TO THE
COUNTY OF DURHAM

Generator for Northern Durham Convenience Site

DURHAM, NORTH CAROLINA
IFB No. 25-013R2

BID FROM: _____

_____

_____

1. The undersigned BIDDER agrees, if this Bid is accepted, to enter into an agreement with OWNER, in the form included in the Bidding Documents, to perform and furnish the work as specified or indicated in the Bidding Documents for the Bid Price and within the Bid Times indicated in this Bid in accordance with the other terms and conditions of the Contract Documents.

2. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

   a) This Bid will remain subject to acceptance for ninety (90) days after the day of Bid opening;
   b) The Owner has the right to reject this bid;
   c) Accompanying this proposal is a certified check (or bid bond) for $_____, which represents not less than five (5) percent of the aggregate amount of the proposal. Said check, or the full amount of the bond, shall become the property of County and be retained by the County in the event of withdrawal of the bid after the public opening or should the undersigned fail to execute a contract with the County and give satisfactory surety within fifteen (15) days after the award. Otherwise, said check or bid bond, to be returned to the undersigned. The undersigned agree, if awarded the contract, to deliver satisfactory surety bond in the amount equal to not less than 100 percent (100%) of the contract within fifteen (15) days after Notice of Award;
   d) BIDDER will sign and submit the Agreement with the Bonds and other documents within 15 days after the date of the Owner's Notice of Award;
   e) BIDDER has examined copies of all the Bidding Documents.
   f) BIDDER has visited the site and become familiar with the general and local site conditions;
   g) BIDDER is familiar with federal, state, and local laws and regulations;
   h) **BIDDER certifies that no federal excise or state sales taxes have been included in this bid**;
   i) BIDDER has correlated the information known to BIDDER, information and observations obtained from visits to the site, reports and drawings identified in the Bidding Documents and additional examinations, investigations, tests, studies and data with the Bidding Documents;
   j) BIDDER certifies that this proposal is made in good faith and without collusion or connection with any other person bidding on the same work, or that any official or employee of the County of Durham will be admitted to any share or part of the contract or any benefits that may arise therefrom if the contract is awarded to this company;

k) BIDDER acknowledges receipt of the following **Addenda**, which have been considered in the preparation of this Bid:

No: _____ Dated: _____

No: _____ Dated: _____

No: _____ Dated: _____

No: _____ Dated: _____

Dated in _____ this _____ day of _____, 20___.

3. BIDDER will complete the work in accordance with the Contract Documents for the following price(s):

SINGLE PRIME CONTRACT:

Base Bid Lump-Sum Price

$_____

_____

Base Lump Sum Price In Words

BIDDER SHALL COMPLETE AND SUBMIT THE ATTACHED BID PROPOSAL FORM

Pursuant to N.C.G.S. 143-128(d), all bidders shall identify on their bid the contractors they have selected for the subdivisions or branches of work for:

(1)	Heating, ventilating, and air conditioning;	_____	Lic. #_____
		_____	Lic. #_____
(2)	Plumbing	_____	Lic.#_____
		_____	Lic. #_____
(3)	Electrical	_____	Lic. #_____
		_____	Lic. #_____
(4)	General	_____	Lic. #_____
		_____	Lic. #_____

A contractor whose bid is accepted shall not substitute any person as subcontractor in the place of the subcontractor listed in the original bid, except (i) if the listed subcontractor's bid is later determined by the contractor to be non-responsible or non-responsive or the listed subcontractor refuses to enter into a contract for the complete performance of the bid work, or (ii) with the approval of the awarding authority for good cause shown by the contractor. The terms, conditions, and requirements of each contract between the contractor and a subcontractor performing work under a subdivision or branch of work listed in this subsection shall incorporate by reference the terms, conditions, and requirements of the contract between the contractor and the County.

4. BIDDER agrees that the Work will be substantially complete and ready for final payment in accordance with the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

5. The following documents are attached to and made a condition of the Bid:
   (a) Required Bid security in the form of _____
   _____:

6. BIDDER acknowledges the provisions in the General Conditions for Liquidated Damages of $500.00 per calendar day.

SUBMITTED ON _____, 20_____.

SIGNATURE OF BIDDER:

North Carolina Contractor's License Number _____

If an Individual: _____

as: _____

If a Partnership: _____

by: _____, partner

If a Corporation: _____

(a _____Corporation)

by: _____ Attested By: _____ (SEAL &

Title: _____ Title: _____ ATTEST)

Business Address of Bidder: _____

_____

If Bidder is a joint venture, other party must sign below.

North Carolina Contractor's License Number _____

If an Individual: _____

_____

Doing business as: _____

If a Partnership: _____

by: _____

Title: _____

If a Corporation: _____

(a _____Corporation)

by: _____ Attested By: _____ (SEAL &

Title: _____ Title: _____ ATTEST)

We have the following necessary and suitable equipment in good condition and ready for use on this work.

_____

_____

_____

Exhibit A - Attachment 1

Durham County Northern Convenience Site Generator

Item No.	Description	Bid Quantity	Unit	Unit Price	Bid Total Price
	GENERAL CONDITIONS				
1	Bonds and Insurance	1	LS		$ -
2	Mobilization/Demobilization	1	LS		$ -
3	Administration	1	LS		$ -
4	Electrical Permit	1	LS		$ -
				Subtotal	$ -
	SITE PREPARATION				
5	Remove and Relocate Plantings	1	LS		$ -
6	Site Work and Grading	1	LS		$ -
7	Foundation Excavation	1	LS		$ -
				Subtotal	$ -
	FOUNDATIONS				
8	Foundations and Concrete Pad	1	LS		$ -
				Subtotal	$ -
	ELECTRICAL EQUIPMENT				
9	Relocate Tap Box	1	LS		$ -
10	Manual Transfer Switch	1	LS		$ -
11	Automatic Transfer Switch	1	LS		$ -
12	Service Breaker	1	LS		$ -
13	Panel LP	1	LS		$ -
14	100 kW Backup Generator	1	LS		$ -
				Subtotal	$ -
	ELECTRICAL BULKS				
15	Electrical Conduits	1	LS		$ -
16	Electrical Cables	1	LS		$ -
17	Grounding System	1	LS		$ -
				Subtotal	$ -
				TOTAL PRICE (ITEMS 1-17)	**$ -**

BID ITEM MEASUREMENT AND BASIS FOR PAYMENT

DURHAM COUNTY NORTHERN CONVENIENCE SITE GENERATOR

GENERAL CONDITIONS

1. BONDS AND INSURANCE: This Work shall consist of securing all performance and payment bonds and insurance coverage required for the project. Payment for this item will be made on a Lump Sum basis, wherein no measurement will be made.

2. MOBILIZATION: This Work shall consist of performance of preparatory construction operations, including the movement of personnel and equipment to the Project site, providing safety equipment and other facilities including field trailers and storage containers required in conformance with the Drawings and Specifications. The cost shall be full compensation for performing the Work specified and the furnishing of all materials, labor, tools, equipment, and incidentals necessary to mobilize and subsequently demobilize. Payment for this item will be made on a Lump Sum basis, wherein no measurement will be made

3. ADMINISTRATION: This Work shall consist of provide on-site superintendent observation, project management and office administrative support throughout the project. Payment for this item will be made on a Lump Sum price basis, wherein no measurement will be made.

4. ELECTRICAL PERMIT: This Work shall consist of completing and submitting all necessary permitting documents to City-County Inspections Department for the Electrical Permit Application, coordination with building inspection services throughout the project and until project is accepted. Contractor shall be responsible for payment of the applicable permit fees. Payment for this item shall be made on a Lump Sum basis, wherein no measurement will be made.

SITE PREPARATION

5. REMOVE AND RELOCATE PLANTINGS: This Work shall consist of furnishing all materials, labor, equipment, and appurtenances necessary to remove and relocate existing shrubs and plantings and mulch materials in the project area. Plantings shall be relocated to area adjacent to the generator pad at location approved by Owner. Payment for this item shall be made on a Lump Sum basis, wherein no measurement will be made.

6. SITE WORK AND GRADING: This Work consists of furnishing all equipment, materials, labor, and appurtenances necessary to temporarily remove and reset guardrail, excavate and fill soil materials for the installation of the generator and equipment concrete pads and relocated plantings in conformance with the Drawings and Specifications. Work shall include excavation of soils, placement and compaction. Payment for this item shall be made on a Lump Sum basis, wherein no measurement will be made.

7. FOUNDATION EXCAVATION: This Work consists of furnishing all equipment, materials, labor, and appurtenances necessary to excavate soil materials for the construction of foundation for the generator and equipment pads in conformance with the Drawings and Specifications. Work shall include excavation of soils, and onsite spreading of soils removed from these areas in coordination with the Owner and Engineer. Payment for this item shall be made on a Lump Sum basis, wherein no measurement will be made.

FOUNDATIONS

8. FOUNDATIONS AND CONCRETE PADS: This Work shall consist of furnishing all materials, labor, equipment, and appurtenances necessary to construct the concrete foundations and pads for the backup generator and equipment racks in conformance with the Drawings and Specifications. Work shall include all fine grading to establish subgrade, stone subgrade installation, geotextile, reinforcement, concrete forming, pouring and testing and all other appurtenant work. Payment for this item shall be made on a Lump Sum basis, wherein measurement will not be made.

ELECTRICAL EQUIPMENT

9. RELOCATE TAP BOX: This Work shall consist of furnishing all materials, labor, equipment, and appurtenances necessary for the relocation of the existing portable generator tap box in conformance with the Drawings and Specifications. Work shall include removal of existing tap box, removal of existing manual transfer switch, termination of existing connections in new junction box, and resetting tap box at new equipment pad area and all other appurtenant work. Payment for this item will be on a Lump Sum basis, wherein no measurement will be made.

10. MANUAL TRANSFER SWITCH: This Work shall consist of furnishing all materials, labor, equipment, and appurtenances necessary for the supply and installation of a new manual transfer switch for the portable generator tap box in conformance with the Drawings and Specifications. Work shall include installation new switch, connections and all other appurtenant work. Payment for this item will be made on a Lump Sum basis, wherein no measurement will be made.

11. AUTOMATIC TRANSFER SWITCH: This Work shall consist of furnishing all materials, labor, equipment, and appurtenances necessary for the supply and installation of a new 400 AMP, 3 phase automatic transfer switch for operation of the backup generator in conformance with the Drawings and Specifications. Work shall include installation of new switch, connections and all other appurtenant work. Payment for this item will be made on a Lump Sum basis, wherein no measurement will be made.

12. SERVICE BREAKER: This Work shall consist of furnishing all materials, labor, equipment, and appurtenances necessary for the supply and installation of a new 400 AMP, 3 phase service breaker in conformance with the Drawings and Specifications. Work shall include installation of new breaker, connections and all other appurtenant work. Payment for this item will be made on a Lump Sum basis, wherein no measurement will be made.

13. PANEL LP: This Work shall consist of furnishing all materials, labor, equipment, and appurtenances necessary for the supply and installation of a new 280/120 V, 3 phase electrical panel in conformance with the Drawings and Specifications. Work shall include installation of new panel, breakers, connections to existing MDP and generator and all other appurtenant work. Payment for this item will be made on a Lump Sum basis, wherein no measurement will be made.

14. 100 KW BACKUP GENERATOR: This Work shall consist of furnishing all materials, labor, equipment, and appurtenances necessary for the supply and installation of a new 100 kW backup generator and load bank in conformance with the Drawings and Specifications. Work shall include installation of new generator, connections and all other appurtenant work. Payment for this item will be made on a Lump Sum basis, wherein no measurement will be made.

ELECTRICAL BULKS

15. ELECTRICAL CONDUITS: This Work shall consist of furnishing all materials, labor, equipment, and appurtenances necessary for the supply and installation of a new electrical conduits to make connections to existing MDP panel, new LP panel, breakers and switches and the generator in conformance with the Drawings and Specifications. Work shall include installation of new conduits and spares, fittings, hand holes, concrete duct bank and all other appurtenant work. Payment for this item will be made on a Lump Sum basis, wherein no measurement will be made.

16. ELECTRICAL CABLES: This Work shall consist of furnishing all materials, labor, equipment, and appurtenances necessary for the supply and installation of a new electrical power and communication cables for connections to existing MDP panel, new LP panel, breakers and switches and the generator in conformance with the Drawings and Specifications. Work shall include installation of new cables, fittings, connections and all other appurtenant work. Payment for this item will be made on a Lump Sum basis, wherein no measurement will be made.

17. GROUNDING SYSTEM: This Work shall consist of furnishing all materials, labor, equipment, and appurtenances necessary to construct the equipment grounding system in conformance with the Drawings and Specifications. Work shall include ground rods, conductors, and all appurtenant work. Payment will be made on Lump Sum basis, wherein no measurement will be made.

END OF SECTION

0008 – Special Notice

SPECIAL NOTICE

NORTH CAROLINA SALES TAX

The Committee Substitute for Senate Bill No. 78, passed by l961 Legislature, requires that contractors pay North Carolina Sales Tax on materials and equipment purchased for construction of municipal work, and further provides that those taxes on certain items are refundable to municipalities under submission of proper evidence by the Owner to the North Carolina Department of Revenue. Reference is made to "Sales and Use Tax Regulation 42".

BIDDER WILL NOT INCLUDE REFUNDABLE NORTH CAROLINA SALES TAX IN HIS OR HER LUMP-SUM BID. The Contractor will be reimbursed at the time each monthly estimate is paid for refundable North Carolina Sales Taxes paid during any preceding month, provided he or she submits to the Owner information which will make it possible to show the sales tax as a separate item on the estimate. The tax may be shown at the bottom of the estimate in the following manner.

"Total of refundable N.C. Sales Tax paid on the above estimate amounted to $_____."

To substantiate the payment of the sales tax indicated, the CONTRACTOR MUST IN ADDITION,

> Submit a SWORN NOTARIZED statement itemizing the tax, showing each amount and to whom paid, and certifying that the articles purchased were used in the work performed for the Owner. Receipts for these amounts must be included with the estimate. Such receipts should include all taxes paid by the prime contractor and any of his subcontractors.

The above must accompany each estimate for payment and is required by the Owner in making claims for tax refunds.

Every person/business who purchases any taxable tangible personal property, taxable services or certain digital property for storage, use, or consumption in North Carolina (NC) for business use from out-of-state vendors upon which the tax has not been fully paid must register with the NC Department of Revenue and remit the balance of tax due on such purchases based on NC's sales and use tax rate. Out-of-state contractors are required to register for sales and use tax purposes with the State of NC. Registration Application, Form NC-BR, must be completed and mailed to the NC Department of Revenue. Out-of-state contractors should also seek a Certificate of Exemption or Certificate of Resale Form from their state's Department of Revenue office when purchasing taxable tangible personal property from their local state to be stored, used, or consumed in NC provided their state participates in the Streamlined Sales Tax Agreement. Out of state sales tax is not reimbursable by the state of North Carolina. For additional information on North Carolina regarding sales and use tax, please contact the NC Department of Revenue.

0009 –Non-Collusion Affidavit

NON-COLLUSION AFFIDAVIT

STATE OF NORTH CAROLINA
COUNTY OF DURHAM

_____, being first duly sworn, deposes and says that:

1. He/She is the_____of _____, the bidder that has submitted the attached bid;

2. He/She is fully informed respecting the preparation and contents of the attached bid and of all pertinent circumstances respecting such bid;

3. Such bid is genuine and is not a **collusive** or **sham** bid;

4. Neither the said bidder nor any of its officers, partners, owners agents, representatives, employees, parties of interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly, with any other bidder, firm or person to submit a **collusive** or **sham** bid in connection with the contract for which the attached bid has been submitted or to refrain from bidding in connection with such contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other bidder, firm or person to fix the price or prices in the attached bid or of any other bidder, or to fix any overhead, profit or cost element of the bid price of any other bidder or to secure through collusion, conspiracy, connivance or unlawful agreement any advantage against the County of Durham or any person interested in the proposed contract; and

5. The price or prices quoted in the attached bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

_____
TITLE

Subscribed and sworn before me,
this_____day of_____, 20___.

(SEAL)

_____
Notary Public

My Commission Expires_____

0010 – Performance Bond

PERFORMANCE BOND

DATE OF EXECUTION: _____

NAME OF PRINCIPAL: _____
(CONTRACTOR) _____

NAME OF SURETY: _____
_____

NAME OF CONTRACTING BODY: COUNTY OF DURHAM

AMOUNT OF BOND: _____

CONTRACT NUMBER _____

KNOW ALL MEN BY THESE PRESENTS, THAT WE, the PRINCIPAL and SURETY above named, are held and firmly bound unto the above named CONTRACTING BODY, hereinafter the Contracting body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, 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 Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the PRINCIPAL shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also as well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements as of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed thus instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed, and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

_____ (SEAL)
Principal

_____
Name and Title

_____ (SEAL)
Surety

_____
Name and Title

Executed in _____counterparts.

_____
Witness

_____
Name of Principal (Contractor)
By_____
(Print)

_____
(Signature)

Title: _____
(Owner, Partner, or Corp.
Pres. or Vice President)

Attest: (Corporation)

By _____
(Print)

_____
(Signature)

Title: _____

(Corp. Sec. Or Assist. Sec.)

_____
(Corporate Seal)

_____
(Surety Company)

Witness:

By: _____
(Print)

_____
(Signature)

By: _____
(Print)

_____
(Signature)

Title: _____
(Attorney-in-Fact)

Countersigned:

_____

_____
N.C. Licensed Resident, Agent

_____

_____
(Surety Corporate Seal)

_____
Name and Address - Surety Agency

_____

_____
Surety Company Name and N.C.
Regional or Branch Office Address

0011 – Payment Bond

PAYMENT BOND

DATE OF EXECUTION: _____

NAME OF PRINCIPAL: _____
(CONTRACTOR) _____

NAME OF SURETY: _____
_____

NAME OF CONTRACTING BODY: COUNTY OF DURHAM

AMOUNT OF BOND: _____

CONTRACT NUMBER: _____

KNOW ALL MEN BY THESE PRESENTS, THAT WE, the PRINCIPAL and SURETY above named, are held and firmly bound unto the above named CONTRACTING BODY, hereinafter the Contracting body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, 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 Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the PRINCIPAL shall promptly make payment make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed thus instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed, and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

_____ (SEAL)
Principal

_____
Name and Title

_____(SEAL)
Surety

_____
Name and Title

Executed in _____counterparts. _____
Name of Principal (Contractor)

_____ By_____
Witness (Print)

_____
(Signature)

Title: _____
(Owner, Partner, or Corp.
Pres. or Vice President)

Attest: (Corporation)

By _____
(Print)

_____
(Signature)

Title: _____

(Corp. Sec. Or Assist. Sec.)

_____
(Corporate Seal)

_____
(Surety Company)

Witness:

By: _____
(Print)

_____
(Signature)

By _____
(Print)

_____
(Signature)

Title: _____
(Attorney-in-Fact)

Countersigned:

_____

_____
N.C. Licensed Resident, Agent

_____
(Surety Corporate Seal)

_____

_____
Name and Address - Surety Agency

_____

_____
Surety Company Name and N.C.
Regional or Branch Office Address

0012 – Project Procedure Forms

COUNTY OF DURHAM
Durham County General Services Department
310 S. Dillard Street
Durham, NC 27701

EMERGENCY TELEPHONE NUMBERS

Project Name _____ Project No. _____

The following are the business and home telephone numbers where project key personnel can be reached at all times. In addition, the emergency telephone numbers of other vital agencies are listed.

	Business	Residence
Contractor's Project Manager ……..	_____	_____
Contractor's Superintendent …….	_____	_____
Owner/A&E Project Manager ……..	_____	_____
Owner/A&E Resident Project Representative	_____	_____

OTHER EMERGENCY TELEPHONE NUMBERS

OSHA Representative …… _____

Fire …… _____

Ambulance …….. _____

Doctor …… _____

Hospital …….. _____

Police …….. _____

Gas Company …… _____

Electric Company …… …. _____

Water Company …… _____

Telephone Company …….. _____

Insurance Carrier …….. _____

Other …….. _____

Other …….. _____

All key personnel should have a copy of this information, and a copy should be posted in each field office in a prominent location.

COUNTY OF DURHAM
Durham County General Services Department
310 S. Dillard Street
Durham, NC 27701

REQUEST FOR PAYMENT FOR MATERIALS ON HAND

Project & Location: _____Project No. _____ Estimate No._____

Item No.	Material Description	Previous Units Stored	Units Received	Units Installed	Balance Units Stored	Unit Price	Materials Stored Cost

In accordance with the provisions of the General Conditions of the Contract, request is made for payment of materials on hand for the above listed materials.

AFFIDAVIT

The materials listed above have been purchased exclusively for use on the above-referenced project. The material is separate from the other like materials and is physically identified as our property for use on Contract No. _____. The Owner may enter upon the premises for inspection, checking or auditing, or for any other purpose as you consider necessary. It is expressly understood and agreed that this information and Affidavit is furnished to the Owner for the purpose of obtaining payment for the above materials before they are delivered to, or incorporated into, the project described above, and that the storage thereof at the location shown shall not relieve the Contractor of full responsibility for the security and protection of all materials until acceptance by the Owner of the completed project.

Contractor by:_____Title:_____Date:_____

COUNTY OF DURHAM
Durham County General Services Department
310 S. Dillard Street
Durham, NC 27701

CONSENT OF SURETY FOR FINAL PAYMENT

Project Name _____

Location _____

Project No. _____ Contract No. _____

Type of Contract _____

Amount of Contract _____

In accordance with the provisions of the above-named contract between the Owner and the Contractor, the following named surety:

_____

_____

on the Payment Bond of the following named Contractor:

_____

_____

hereby approves of final payment to the Contractor and further agrees that said final payment to the Contractor shall not relieve the Surety Company named herein of any of its obligations to the following named Owner as set forth in said Surety Company's bond:

_____

_____

In Witness Whereof, the Surety Company has hereunto set its hand and seal this _____ day of _____20___

_____
(Name of Surety Company)

_____
(Signature of Authorized Representative)

(Affix corporate Seal here)

Title _____

COUNTY OF DURHAM
Durham County General Services Department
310 S. Dillard Street
Durham, NC 27701

CONTRACTOR'S CERTIFICATION OF COMPLETION

Date _____

Project_____

Job No. _____

Contract No. _____

Owner _____

Attn: Resident Project Representative

From: _____
(Firm or Corporation)
_____

This is to certify that I, _____ am an authorized official of

_____

working in the capacity of _____

and have been properly authorized by said firm or corporation to sign the following statements pertaining to the subject contract:

I know of my own personal knowledge and do hereby certify that the work of the contract described above has been performed, and materials used and installed in every particular, in accordance with, and in conformity to, the contract, drawings and specifications.
The contract work is now complete in all parts and requirements and ready for final inspection.

I understand that neither the determination by the Engineer-Architect that the work is complete nor the acceptance thereof by the Owner shall operate as a bar to claim against the Contractor under the terms of the guarantee provisions of the contract documents.

By _____

Title _____

For _____

Distribution: 1. Project Manager
2. Field Office
3. File

COUNTY OF DURHAM
Durham County General Services Department
310 S. Dillard Street
Durham, NC 27701

MONTHLY PAYMENT ESTIMATE SUMMARY

Project Title		
Contractor		
Estimate No. **Period to**	**Contract Price**	**Date**

Description

	Previous	This Month	To Date
Total Contract Items……..	$_____	$_____	$_____
Change Orders Attached……	$_____	$_____	$_____
Materials On-hand……	$_____	$_____	$_____
Gross Estimate…….	$_____	$_____	$_____
Less 10% Retainage……	$_____	$_____	$_____
Less Previous Payments……	$_____	$_____	$_____
Net Estimate……..	$_____	$_____	$_____

Approved for Payment…… $_____

N.C. Sales Taxes applying to this estimate and not included in this estimate. …… $_____

% Time Elapsed	**% Work Completed**

Contract Completion Date

Notice to Proceed Received by Contractor…… _____

***Contract Completion Time** …….. _____

Contract Completion Date ……..._____

COUNTY AUTHORIZATION LIMIT _____

***As amended by Changed Order No.**

Submitted by (Signature & Title)	**Administrative Review – Final Payment**
Approved by (Signature & Title)	**Approved by - Final Payments**

ANY REQUEST FOR TIME EXTENSION WITH THIS PAYMENT? YES ( ) NO ( )

COUNTY OF DURHAM
Durham County General Services Department
310 S. Dillard Street
Durham, NC 27701

CHANGE ORDER # _____ Date _____

PROJECT TITLE: _____

PROJECT NO: _____ CONTRACT NO: _____ CONTRACT DATE: _____

The following changes are hereby made to the Contract Documents:

Justification:

CHANGE TO CONTRACT PRICE:

Original Contract Price	$ _____
Current Contract Price, as adjusted by previous change orders	$ _____
The Contract Price due to this change order will remain at	$ _____
The new Contract Price due to this change will be	$ _____

CHANGE TO CONTRACT TIME:

Original Contract time/date	_____
Contract time as amended by previous change orders	_____
This change order Contract will be (increased) (decreased) by	_____
Revised date of completion of all work under the Contract will be	_____

RECOMMENDED:

Project Manager_____ Date_____

APPROVALS:
To be effective this order must be approved by the Owner if it changes the scope or objective of the project, or as may be required under the terms of the General Conditions of the Contract.

HDR Engineering, Inc.		**County of Durham**
Project Engineer	**Contractor**	**Owner**
Signature/Title	Signature/Title	Signature/Title
Date	Date	Date

This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act.

_____
Durham County Chief Financial Officer

COUNTY OF DURHAM
Durham County General Services Department
310 S. Dillard Street
Durham, NC 27701

FINAL WAIVER OF LIEN

To All Whom It May Concern:

WHEREAS, the undersigned has been employed by (A) _____
_____
to furnish labor and material for B) _____ work,
under a contract (C) _____
for the improvement of the premises described as (D) _____
_____in
the _____(City-Village) of _____
County of _____, State of _____
of which _____is the Owner.

NOW, THEREFORE, this _____ day of _____ 20____.

For and in consideration of the sum (E) $_____
Dollars paid simultaneously herewith, the receipt whereof is hereby acknowledged by the undersigned, the undersigned does hereby waive and release any lien rights to, or claim of lien with respect to and on said above-described premises, and the improvements thereon and on the monies or other considerations due or to become due from the Owner, on account of labor, services, materials, fixtures, apparatus or machinery heretofore or which may hereafter be furnished by the undersigned to or for the above described premises by virtue of said contract.

(F) _____ (SEAL)
(Name of sole ownership, corporation or partnership)

(Affix Corporation Seal here)

_____ (SEAL)
(Signature of Authorized Representative)

TITLE: _____

INSTRUCTIONS FOR FINAL WAIVER

(A) Person or Firm with whom you agreed to furnish either labor, or services, or materials, or both.
(B) Fill in nature and extent of work; strike the word labor or the word materials if not in you contract.
(C) If you have more than one contract on the same premises, describe the contract by number if available, date and extent of work.
(D) Furnish an accurate enough description of the improvement and location of the premises so that it can be distinguished from any other property.
(E) Amount shown should be the amount actually received and equal to total amount of contract as adjusted.
(F) If waiver is for a corporation, corporate name should be used, corporate seal affixed and title of officer signing waiver should be set forth; if waiver is for a partnership, the partnership name should be used, partner should sign and designate himself as partner.

0013 – MWBE Forms

State of North Carolina AFFIDAVIT A - List of the Good Faith Effort

COUNTY OF DURHAM

Affidavit of _____

(Name of Bidder)

I have made a good faith effort to comply under the following areas checked:

(A minimum of 5 areas must be checked in order to have achieved a "good faith effort")

☐ 1-Contacted minority businesses that reasonably could have expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.

☐ 2-Made the construction plans, specifications and requirements available for review by prospective minority businesses or providing these documents to them at least 10 days before the bids are due.

☐ 3-Broken down or combined elements of work into economically feasible units to facilitate minority participation.

☐ 4-Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority business.

☐ 5-Attended prebid meetings scheduled by the public owner.

☐ 6-Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.

☐ 7-Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.

☐ 8-Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.

☐ 9-Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.

☐ 10-Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cashflow demands.

In accordance with GS 143-128.2(d) the undersigned will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon execution of a contract with the Owner. Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____Name of Authorized Officer _____

Signature: _____

Title: _____

SEAL

State of North Carolina, County of _____

Subscribed and sworn to before me this _____day of _____20___

Notary Public_____

My commission expires_____

State of North Carolina AFFIDAVIT B - Intent to Perform Contract with Own Workforce

COUNTY OF DURHAM

Affidavit of _____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the_____contract.
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date:_____Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of North Carolina, County of _____
Subscribed and sworn to before me this _____day of _____20___
Notary Public_____
My commission expires_____

ATTACH TO BID - IF YOU MEET THE MWBE GOAL

State of North Carolina AFFIDAVIT C- Portion of the Work to be Performed by Minority Firms

COUNTY OF DURHAM

Durham County Goals for MWBE Participation in the Procurement of Goods, Services and Construction

Categories	**Construction**	**Architect/ Engineer**	**Services**	**Goods**	**MWBE Availability %** *(Median Availability)*
Black American	14.6	9.8	10.9	2.8	**10.4%**
Asian American	1.3	3.0	1.1	.43	**1.3%**
Hispanic American	4.2	1.8	1.1	.43	**1.5%**
American Indian	.65	.75	1.0	.5	**.70%**
White Female	13.8	11.0	9.5	7.1	**10.3%**
				Overall MWBE Participation Goal =	**25.0%**

Affidavit of _____ I do hereby certify that on the
(Name of Bidder)

_____
(Project Name)

Project ID No. _____Amount of Bid $_____

I will expend a minimum of _____% of the total dollar amount of the contract with minority businesses enterprises. Work will be subcontracted to the following firms listed below. Attach additional sheets if needed.

Name and Phone Number	*Minority Category	Work Description	Dollar Value	Percentage of Goal

***Minority categories:** Black, African American (**B),** Hispanic (**H**), Asian American (**A**), American Indian (I), Female (**F**)

Pursuant to GS 143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____Name of Authorized Officer: _____

Signature: _____

Title: _____

SEAL

State of North Carolina, County of _____
Subscribed and sworn to before me this _____day of _____20___
Notary Public_____
My commission expires_____

DO NOT SUBMIT WITH THE BID DO NOT SUBMIT WITH THE BID DO NOT SUBMIT WITH THE BID

(NOTE: This form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If you do not meet the MWBE Goal, the Bidder shall provide the following documentation of his Good Faith Efforts within **72 hours** after notification of being the low bidder.

State of North Carolina AFFIDAVIT D - Good Faith Efforts
COUNTY OF DURHAM

Durham County Goals for MWBE Participation in the Procurement of goods, Services, and Construction

Categories	Construction	Architect/ Engineer	Services	Goods	MWBE Availability % *(Median Availability)*
Black American	14.6	9.8	10.9	2.8	**10.4%**
Asian American	1.3	3.0	1.1	.43	**1.3%**
Hispanic American	4.2	1.8	1.1	.43	**1.5%**
American Indian	.65	.75	1.0	.5	**.70%**
White Female	13.8	11.0	9.5	7.1	**10.3%**
				Overall MWBE Participation Goal =	**25.0%**

Affidavit of _____
(Name of Bidder)

I do certify the attached documentation as true and accurate representation of my good faith efforts.

I will expend a minimum of _____% of the total dollar amount of the contract with minority businesses enterprises. Work will be subcontracted to the following firms listed below. Attach additional sheets if needed.

Name and Phone Number	*Minority Category	Work description	Dollar Value	Percentage of Goal

***Minority categories:** Black, African American (**B),** Hispanic (**H**), Asian American (**A**), American Indian (I), Female (**F**)

Documentation of the Bidder's good faith efforts to meet the goals set forth in the provisions. Examples of documentation include, but are not limited to, the following evidence:

A. Copies of solicitation for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received
B. Copies of quotes or responses received from each firm responding to the solicitation.
C. A telephone log of follow-up calls to each firm sent a solicitation.
D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.
E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.
F. Copy of pre-bid roster.
G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.
H. Letter detailing reasons for rejection of minority business due to lack of qualification.

I. Letter documenting proposed assistance offered to minority business in need to equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____

SEAL

State of North Carolina, County of _____
Subscribed and sworn to before me this _____day of _____20___
Notary Public_____
My commission expires_____

APPENDIX E

MWBE DOCUMENTATION FOR CONTRACT PAYMENTS

Prime Contractor/Architect: _____

Address & Phone: _____

Project Name: _____

Pay Application #:_____ Period: _____

The following is a list of payments to be made to minority business contractors on this project for the above-mentioned period.

Firm Name	*Minority Category	Total Contract Amount	Amount Paid this Period	Total Payment Amount to date	Percentage of Work Completed	Scheduled Start Date	Scheduled End Date

***Minority categories:** Black, African American (**B),** Hispanic (**H**), Asian American (**A**), American Indian (I), Female (**F**)

Date: _____ Approved/Certified By:_____

Name

_____

Title

_____

Signature

***THIS DOCUMENT MUST BE SUBMITTED WITH EACH PAY REQUEST**

0014 – Vendor Application/W-9 Form

VENDOR APPLICATION

IT IS CRITICAL TO THE COUNTY THAT YOU COMPLETE ALL DATA - PLEASE PRINT OR TYPE
(A W-9 FORM IS REQUIRED AND MUST BE SUBMITTED WITH THIS FORM)

1. Vendor Name: _____

   Do you require a 1099? Yes ☐ No ☐

2. Mailing address for payments:

   _____

   _____

3. Mailing address for purchase orders, proposals and bids:

   _____

   _____

4. Contact Person _____ Phone #: _____

   Email: _____ Fax #: _____

5. In what City and State is your firm licensed? _____

   If licensed in NC, indicate County (for tax purposes) _____

   Individual Partnership ☐ Corporation ☐ Governmental Agency ☐ Other ☐

6. Is your firm a large business? Yes ☐ No ☐

7. Is your firm a small business? Yes ☐ No ☐

8. Is your firm 51 percent or more owned and operated by a woman? Yes ☐ No ☐

   If yes, with what governmental agencies are you certified? _____

9. Is your firm 51 percent or more owned and operated by a minority? Yes ☐ No ☐

10. If yes, with what governmental agencies are you certified? _____

11. Identify appropriate minority group:

    Black American ☐ Native American ☐ Hispanic ☐ Asian/Pacific ☐ Asian Indian ☐

12. Is your firm incorporated? Yes ☐ No ☐

13. Is your firm a not-for-profit concern? Yes ☐ No ☐

14. Is your firm a handicapped business concern? Yes ☐ No ☐

15. Give a brief description of goods or services your firm provides:

    _____

    _____

Signature: _____ Title: _____

Print name: _____ Date: _____

If you have any questions concerning this form, email Durham County Purchasing Division at purchasinggroup@dconc.gov

---

NOTICE TO THE BIDDERS/PROPOSERS

Please return this Vendor Application and W-9 along with your Bid Proposal packet.

PURCHASING TO COMPLETE *(when received from the department)*

Listed as Debarred or Suspended Vendors?

https://www.sam.gov ☐ Yes ☐ No https://www.doa.nc.gov/divisions/purchase-contract/debarred-vendors ☐ Yes ☐ No

Verified by: Date:

Form **W-9**
(Rev. March 2024)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Go to *www.irs.gov/FormW9* for instructions and the latest information.

Give form to the requester. Do not send to the IRS.

Before you begin. For guidance related to the purpose of Form W-9, see *Purpose of Form*, below.

Print or type. See ***Specific Instructions*** on page 3.

1 Name of entity/individual. An entry is required. (For a sole proprietor or disregarded entity, enter the owner's name on line 1, and enter the business/disregarded entity's name on line 2.)

2 Business name/disregarded entity name, if different from above.

3a Check the appropriate box for federal tax classification of the entity/individual whose name is entered on line 1. Check only **one** of the following seven boxes.

☐ Individual/sole proprietor ☐ C corporation ☐ S corporation ☐ Partnership ☐ Trust/estate

☐ LLC. Enter the tax classification (C = C corporation, S = S corporation, P = Partnership) . . . . .

Note: Check the "LLC" box above and, in the entry space, enter the appropriate code (C, S, or P) for the tax classification of the LLC, unless it is a disregarded entity. A disregarded entity should instead check the appropriate box for the tax classification of its owner.

☐ Other (see instructions)

3b If on line 3a you checked "Partnership" or "Trust/estate," or checked "LLC" and entered "P" as its tax classification, and you are providing this form to a partnership, trust, or estate in which you have an ownership interest, check this box if you have any foreign partners, owners, or beneficiaries. See instructions . . . . . ☐

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any)

Exemption from Foreign Account Tax Compliance Act (FATCA) reporting code (if any)

(Applies to accounts maintained outside the United States.)

5 Address (number, street, and apt. or suite no.). See instructions.

6 City, state, and ZIP code

Requester's name and address (optional)
Durham County Government
201 East Main Street, Finance
Durham, North Carolina 27701

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. See also *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number

			–		–				

or

Employer identification number

		–							

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and, generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here	**Signature of U.S. person**	**Date**

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to *www.irs.gov/FormW9*.

What's New

Line 3a has been modified to clarify how a disregarded entity completes this line. An LLC that is a disregarded entity should check the appropriate box for the tax classification of its owner. Otherwise, it should check the "LLC" box and enter its appropriate tax classification.

New line 3b has been added to this form. A flow-through entity is required to complete this line to indicate that it has direct or indirect foreign partners, owners, or beneficiaries when it provides the Form W-9 to another flow-through entity in which it has an ownership interest. This change is intended to provide a flow-through entity with information regarding the status of its indirect foreign partners, owners, or beneficiaries, so that it can satisfy any applicable reporting requirements. For example, a partnership that has any indirect foreign partners may be required to complete Schedules K-2 and K-3. See the Partnership Instructions for Schedules K-2 and K-3 (Form 1065).

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS is giving you this form because they

must obtain your correct taxpayer identification number (TIN), which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid).
- Form 1099-DIV (dividends, including those from stocks or mutual funds).
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds).
- Form 1099-NEC (nonemployee compensation).
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers).
- Form 1099-S (proceeds from real estate transactions).
- Form 1099-K (merchant card and third-party network transactions).
- Form 1098 (home mortgage interest), 1098-E (student loan interest), and 1098-T (tuition).
- Form 1099-C (canceled debt).
- Form 1099-A (acquisition or abandonment of secured property).

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

Caution: If you don't return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See *What is backup withholding*, later.

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued);

2. Certify that you are not subject to backup withholding; or

3. Claim exemption from backup withholding if you are a U.S. exempt payee; and

4. Certify to your non-foreign status for purposes of withholding under chapter 3 or 4 of the Code (if applicable); and

5. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting is correct. See *What Is FATCA Reporting*, later, for further information.

Note: If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

Establishing U.S. status for purposes of chapter 3 and chapter 4 withholding. Payments made to foreign persons, including certain distributions, allocations of income, or transfers of sales proceeds, may be subject to withholding under chapter 3 or chapter 4 of the Code (sections 1441–1474). Under those rules, if a Form W-9 or other certification of non-foreign status has not been received, a withholding agent, transferee, or partnership (payor) generally applies presumption rules that may require the payor to withhold applicable tax from the recipient, owner, transferor, or partner (payee). See Pub. 515, Withholding of Tax on Nonresident Aliens and Foreign Entities.

The following persons must provide Form W-9 to the payor for purposes of establishing its non-foreign status.

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the disregarded entity.
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the grantor trust.
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust and not the beneficiaries of the trust.

See Pub. 515 for more information on providing a Form W-9 or a certification of non-foreign status to avoid withholding.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person (under Regulations section 1.1441-1(b)(2)(iv) or other applicable section for chapter 3 or 4 purposes), do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Pub. 515). If you are a qualified foreign pension fund under Regulations section 1.897(l)-1(d), or a partnership that is wholly owned by qualified foreign pension funds, that is treated as a non-foreign person for purposes of section 1445 withholding, do not use Form W-9. Instead, use Form W-8EXP (or other certification of non-foreign status).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a saving clause. Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items.

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.

2. The treaty article addressing the income.

3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.

4. The type and amount of income that qualifies for the exemption from tax.

5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if their stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first Protocol) and is relying on this exception to claim an exemption from tax on their scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 24% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include, but are not limited to, interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third-party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester;

2. You do not certify your TIN when required (see the instructions for Part II for details);

3. The IRS tells the requester that you furnished an incorrect TIN;

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only); or

5. You do not certify to the requester that you are not subject to backup withholding, as described in item 4 under *"By signing the filled-out form"* above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code*, later, and the separate Instructions for the Requester of Form W-9 for more information.

See also *Establishing U.S. status for purposes of chapter 3 and chapter 4 withholding*, earlier.

What Is FATCA Reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all U.S. account holders that are specified U.S. persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code*, later, and the Instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you are no longer tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account, for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account (other than an account maintained by a foreign financial institution (FFI)), list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9. If you are providing Form W-9 to an FFI to document a joint account, each holder of the account that is a U.S. person must provide a Form W-9.

• **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

Note for ITIN applicant: Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040 you filed with your application.

• **Sole proprietor.** Enter your individual name as shown on your Form 1040 on line 1. Enter your business, trade, or "doing business as" (DBA) name on line 2.

• **Partnership, C corporation, S corporation, or LLC, other than a disregarded entity.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

• **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. Enter any business, trade, or DBA name on line 2.

• **Disregarded entity.** In general, a business entity that has a single owner, including an LLC, and is not a corporation, is disregarded as an entity separate from its owner (a disregarded entity). See Regulations section 301.7701-2(c)(2). A disregarded entity should check the appropriate box for the tax classification of its owner. Enter the owner's name on line 1. The name of the owner entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2. If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, enter it on line 2.

Line 3a

Check the appropriate box on line 3a for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box on line 3a.

IF the entity/individual on line 1 is a(n) . . .	THEN check the box for . . .
• Corporation	Corporation.
• Individual or • Sole proprietorship	Individual/sole proprietor.
• LLC classified as a partnership for U.S. federal tax purposes or • LLC that has filed Form 8832 or 2553 electing to be taxed as a corporation	Limited liability company and enter the appropriate tax classification: P = Partnership, C = C corporation, or S = S corporation.
• Partnership	Partnership.
• Trust/estate	Trust/estate.

Line 3b

Check this box if you are a partnership (including an LLC classified as a partnership for U.S. federal tax purposes), trust, or estate that has any foreign partners, owners, or beneficiaries, and you are providing this form to a partnership, trust, or estate, in which you have an ownership interest. You must check the box on line 3b if you receive a Form W-8 (or documentary evidence) from any partner, owner, or beneficiary establishing foreign status or if you receive a Form W-9 from any partner, owner, or beneficiary that has checked the box on line 3b.

Note: A partnership that provides a Form W-9 and checks box 3b may be required to complete Schedules K-2 and K-3 (Form 1065). For more information, see the Partnership Instructions for Schedules K-2 and K-3 (Form 1065).

If you are required to complete line 3b but fail to do so, you may not receive the information necessary to file a correct information return with the IRS or furnish a correct payee statement to your partners or beneficiaries. See, for example, sections 6698, 6722, and 6724 for penalties that may apply.

Line 4 Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space on line 4 any code(s) that may apply to you.

Exempt payee code.

• Generally, individuals (including sole proprietors) are not exempt from backup withholding.

• Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.

• Corporations are not exempt from backup withholding for payments made in settlement of payment card or third-party network transactions.

• Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space on line 4.

1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2).

2—The United States or any of its agencies or instrumentalities.

3—A state, the District of Columbia, a U.S. commonwealth or territory, or any of their political subdivisions or instrumentalities.

4—A foreign government or any of its political subdivisions, agencies, or instrumentalities.

5—A corporation.

6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or territory.

7—A futures commission merchant registered with the Commodity Futures Trading Commission.

8—A real estate investment trust.

9—An entity registered at all times during the tax year under the Investment Company Act of 1940.

10—A common trust fund operated by a bank under section 584(a).

11—A financial institution as defined under section 581.

12—A middleman known in the investment community as a nominee or custodian.

13—A trust exempt from tax under section 664 or described in section 4947.

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
• Interest and dividend payments	All exempt payees except for 7.
• Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
• Barter exchange transactions and patronage dividends	Exempt payees 1 through 4.
• Payments over $600 required to be reported and direct sales over $5,000[1]	Generally, exempt payees 1 through 5.[2]
• Payments made in settlement of payment card or third-party network transactions	Exempt payees 1 through 4.

[1] See Form 1099-MISC, Miscellaneous Information, and its instructions.

[2] However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) entered on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37).

B—The United States or any of its agencies or instrumentalities.

C—A state, the District of Columbia, a U.S. commonwealth or territory, or any of their political subdivisions or instrumentalities.

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i).

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i).

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state.

G—A real estate investment trust.

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940.

I—A common trust fund as defined in section 584(a).

J—A bank as defined in section 581.

K—A broker.

L—A trust exempt from tax under section 664 or described in section 4947(a)(1).

M—A tax-exempt trust under a section 403(b) plan or section 457(g) plan.

Note: You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns. If this address differs from the one the requester already has on file, enter "NEW" at the top. If a new address is provided, there is still a chance the old address will be used until the payor changes your address in their records.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have, and are not eligible to get, an SSN, your TIN is your IRS ITIN. Enter it in the entry space for the Social security number. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN.

If you are a single-member LLC that is disregarded as an entity separate from its owner, enter the owner's SSN (or EIN, if the owner has one). If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note: See *What Name and Number To Give the Requester*, later, for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at *www.SSA.gov*. You may also get this form by calling 800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/EIN*. Go to *www.irs.gov/Forms* to view, download, or print Form W-7 and/or Form SS-4. Or, you can go to *www.irs.gov/OrderForms* to place an order and have Form W-7 and/or Form SS-4 mailed to you within 15 business days.

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and enter "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, you will generally have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note: Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon. See also *Establishing U.S. status for purposes of chapter 3 and chapter 4 withholding*, earlier, for when you may instead be subject to withholding under chapter 3 or 4 of the Code.

Caution: A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if item 1, 4, or 5 below indicates otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code*, earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third-party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), ABLE accounts (under section 529A), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account) other than an account maintained by an FFI	The actual owner of the account or, if combined funds, the first individual on the account[1]
3. Two or more U.S. persons (joint account maintained by an FFI)	Each holder of the account
4. Custodial account of a minor (Uniform Gift to Minors Act)	The minor[2]
5. a. The usual revocable savings trust (grantor is also trustee)	The grantor-trustee[1]
b. So-called trust account that is not a legal or valid trust under state law	The actual owner[1]
6. Sole proprietorship or disregarded entity owned by an individual	The owner[3]
7. Grantor trust filing under Optional Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A))**	The grantor*
8. Disregarded entity not owned by an individual	The owner
9. A valid trust, estate, or pension trust	Legal entity[4]
10. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
11. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
12. Partnership or multi-member LLC	The partnership
13. A broker or registered nominee	The broker or nominee
14. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
15. Grantor trust filing Form 1041 or under the Optional Filing Method 2, requiring Form 1099 (see Regulations section 1.671-4(b)(2)(i)(B))**	The trust

[1] List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

[2] Circle the minor's name and furnish the minor's SSN.

[3] You must show your individual name on line 1, and enter your business or DBA name, if any, on line 2. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

[4] List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.)

* **Note:** The grantor must also provide a Form W-9 to the trustee of the trust.

** For more information on optional filing methods for grantor trusts, see the Instructions for Form 1041.

Note: If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records From Identity Theft

Identity theft occurs when someone uses your personal information, such as your name, SSN, or other identifying information, without your permission to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax return preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity, or a questionable credit report, contact the IRS Identity Theft Hotline at 800-908-4490 or submit Form 14039.

For more information, see Pub. 5027, Identity Theft Information for Taxpayers.

Victims of identity theft who are experiencing economic harm or a systemic problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 877-777-4778 or TTY/TDD 800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to *phishing@irs.gov*. You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 800-366-4484. You can forward suspicious emails to the Federal Trade Commission at *spam@uce.gov* or report them at *www.ftc.gov/complaint*. You can contact the FTC at *www.ftc.gov/idtheft* or 877-IDTHEFT (877-438-4338). If you have been the victim of identity theft, see *www.IdentityTheft.gov* and Pub. 5027.

Go to *www.irs.gov/IdentityTheft* to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and territories for use in administering their laws. The information may also be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payors must generally withhold a percentage of taxable interest, dividends, and certain other payments to a payee who does not give a TIN to the payor. Certain penalties may also apply for providing false or fraudulent information.

0015 – No Bid Reply Form

NO BID REPLY FORM

TO: Durham County
Purchasing Division
201 East Main Street, 7th Floor
Durham, NC 27701

IFB No. IFB No. 25-013R2

BID TITL: Generator for Northern Convenience Site

To assist us in obtaining good competition on our Invitation for Bids, we ask that each firm that has received an invitation, but does not wish to submit a Bid, state their reason(s) below and return to this office. This information will not preclude receipt of future invitations unless you request removal from the Bidders' List by so indicating below, or do not return this form or bona fide Bid.

Unfortunately, we must offer a "No Bid" at this time because:

_____ 1. We do not wish to participate in the bid process.

_____ 2. We do not wish to submit a Bid under the terms and conditions of the Invitation for Bids document. Our objections are:

_____

_____

_____ 3. We do not feel we can be competitive.

_____ 4. We cannot submit a Bid because of the marketing or franchising policies of the manufacturing company.

_____ 5. We do not wish to sell to the Durham County. Our objections are:

_____

_____

_____ 6. We do not sell the items/services on which Bids are requested.

_____ 7. Other: _____

_____

_____ _____
FIRM NAME DATE

_____ _____
SIGNATURE PHONE

_____ We wish to remain on the Bidders' List.

_____ We wish to be deleted from the Bidders' List.

0016 – Contract for Construction Between Owner and Contractor

S A M P L E

NORTH CAROLINA
DURHAM COUNTY

CONTRACT for CONSTRUCTION
BETWEEN OWNER AND CONTRACTOR

This Contract for Construction is made, and entered into this the ____ day of _____, 20____, by and between the **COUNTY OF DURHAM**, a political subdivision of the State of North Carolina, (hereinafter "**OWNER**"), and _____, EID# _____ (hereinafter **"CONTRACTOR"**), whose principal place of business is: _____.

The Project Name and Location: _____
_____
_____

The Designer is: _____
_____

1. CONTRACT DOCUMENTS. The "Contract Documents" consist of this Contract for Construction, General Conditions, Bid Proposal Package No.____ entitled _____, CONTRACTOR Bid Proposal dated _____, Addenda issued prior to execution of this Agreement and listed below, and any Modifications executed by the parties after execution of this Contract. The Contract Documents form the Contract and are fully a part of the Contract as if attached to this Contract or repeated herein. The Contract represents the entire and integrated agreement between the OWNER and CONTRACTOR hereto and supersedes any and all prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents and other than Modifications, appears in Article 15, herein.

   OWNER and CONTRACTOR agree that should the CONTRACTOR utilize the services of a subcontractor for any Work under this Contract, the subcontractor shall be required to comply with all terms and conditions of this Contract and any and all Contract Documents entered into between the OWNER and CONTRACTOR and any of its CONTRACTORs or subcontractors shall so require of their subcontractors.

2. WORK. CONTRACTOR shall execute all of the Work described collectively in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others.

3. DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION.

   3.1 This Contract shall commence on the date first written above (hereinafter "Commencement Date"). The CONTRACTOR shall notify the OWNER in writing not less than five days before commencing the Work.

   3.2 The CONTRACTOR shall achieve Substantial Completion of the entire Work no later than the time established in the Contract Documents; subject to adjustments of the Contract Time as provided in the Contract Documents. In view of the difficulty of estimating damages to the OWNER by reason of the failure of the CONTRACTOR to complete the work herein proposed within the time limit herein proposed, or within such further time as same may be extended, as provided for, proposed, OWNER shall be and hereby is authorized to deduct and retain out of the moneys which may be due or become due to CONTRACTOR the sum of One Thousand Dollars ($1,000.00) per day for each and every calendar day that the work may be incomplete beyond the time limit fixed for its

completion, or as same may have been extended, which sum per day is hereby agreed upon, fixed and determined by the parties hereto as the ascertained and liquidated damages that the OWNER will suffer by reason of such default. The above sum shall be held to include the additional expense to the OWNER for loss of interest or investment, for the employment of architects, engineers, inspectors, and other employees, together with their expenses, and all other damages to the OWNER by reason of such delay.

4. CONTRACT SUM AND PAYMENT

4.1 CONTRACTOR shall receive from OWNER a sum not to exceed _____ Dollars ($_____), as full compensation for the provision of construction services provided under this Contract, subject to additions and deductions as provided in the Contract Documents. OWNER agrees to pay for services, satisfactorily performed, in accordance with the Contract Documents. Unless otherwise specified, CONTRACTOR shall submit an Application for Payment in the manner described in Article 9, of the General Conditions. Payment will be processed promptly upon receipt and approval of the Application by OWNER.

4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the OWNER:

_____
_____

4.3 Unit prices, if any, are as follows:

_____
_____

5. PROGRESS PAYMENTS. Based upon Applications for Payment submitted to the Designer by the CONTRACTOR and Certificates for Payment issued by the Designer, the OWNER shall make progress payments on account of the Contract Sum to the CONTRACTOR as provided in section 9.3 of the General Conditions.

6. FINAL PAYMENT. Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the OWNER to the CONTRACTOR when (1) the Contract has been fully performed by the CONTRACTOR and all requirements imposed by Paragraphs 9.3 and 9.11 of the General Conditions have been satisfied except for those requirements set forth in Paragraphs 11.2 and 11.3 of the General Conditions and any other requirements which necessarily survive final payment; and (2) a final Certificate for Payment has been issued by the Designer; such final payment shall be made by the OWNER not more than 30 days after the issuance of the Designer's final Certificate for Payment.

7. INDEMNIFICATION. To the fullest extent permitted by laws and regulations, CONTRACTOR shall indemnify and hold harmless the OWNER and its officials, agents, and employees from and against all claims, damages, losses, and expenses, direct, indirect, or consequential (including but not limited to fees and charges of engineers or architects, attorneys, and other professionals and costs related to court action or mediation) arising out of or resulting from CONTRACTOR's performance of this Contract or the actions of the CONTRACTOR or its officials, employees, or CONTRACTORs under this Contract or under contracts entered into by the CONTRACTOR in connection with this Contract. This indemnification shall survive the termination of this Contract.

In claims against any person or entity indemnified under this provision by an employee of the CONTRACTOR, a subcontractor, an employee of a subcontractor, or an agent of the CONTRACTOR or a subcontractor, the indemnification obligation under this provision shall not be limited by a

limitation on amount or type of damages, compensation or benefits payable by or for the CONTRACTOR or a subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

8. NOTICES. All notices which may be required by this contract or any rule of law shall be effective when received by certified mail sent to the following addresses:

COUNTY OF DURHAM	CONTRACTOR
PURCHASING DEPARTMENT	_____
7TH FLOOR, 201 EAST MAIN STREET	_____
DURHAM, NORTH CAROLINA, 27701	_____

9. NON-DISCRIMINATION. CONTRACTOR shall not discriminate against any employee or applicant for employment because of age, sex, race, creed, national origin, or disability. CONTRACTOR shall take affirmative action to ensure that applicants are employed and that employees are treated fairly and legally during employment with regard to their age, sex, race, creed, national origin, or disability. In the event CONTRACTOR is determined by the final order of an appropriate agency or court to be in violation of any non-discrimination provision of federal, state or local law or this provision, this Contract may be canceled, terminated or suspended in whole or in part by OWNER, and CONTRACTOR may be declared ineligible for further OWNER contracts.

10. EMPLOYMENT ADVERTISING REQUIREMENTS. CONTRACTOR shall post local job openings, in connection with this contract, with the City of Durham's Office of Economic and Workforce Development, the North Carolina Department of Commerce-Division of Employment Services (formerly ESC, Employment Security Commission) and with the Durham County Department of Social Services throughout the term of this Agreement; provided that the foregoing requirement does not limit CONTRACTOR'S ability to advertise and/or otherwise post job openings with other organizations or media outlets.

11. TERMINATION OR SUSPENSION. This Contract may be terminated by the OWNER or the CONTRACTOR as provided in Article 13 of the General Conditions. The Work may be suspended by the OWNER as provided in Paragraph 13.3 of the General Conditions.

12. INSURANCE. CONTRACTOR shall procure and maintain for the duration of the contract the following insurance coverage from an insurance company(s) possessing a rating of A-VII or higher from the A.M. Best Company and licensed to do business in North Carolina. All of the policies required of the CONTRACTOR shall contain a waiver of subrogation provision to waive all rights of recovery under subrogation or otherwise against the COUNTY. In the event CONTRACTOR'S Insurance Policy or Certificate of Insurance conflicts with the aforesaid language concerning "waiver of subrogation" this contract shall govern. CONTRACTOR shall advise the COUNTY of any cancellation, non-renewal, or material change in any policy within ten (10) days of notification of such action and provide updated certificates of insurance evidencing renewals within fifteen (15) days of expiration. CONTRACTOR'S insurance shall be primary and any insurance or self-funded liability programs maintained by the COUNTY shall not contribute with respect to the CONTRACTOR'S insurance. COUNTY shall not be listed as an additional insured on any Insurance Policy or Certificate of Insurance of the CONTRACTOR. In the event CONTRACTOR'S Insurance Policy or Certificate of Insurance conflicts with the aforesaid language concerning "additional insured" this contract shall govern.

12.1 Commercial General Liability: Insurance Services Office (ISO) Form CG 00 01 on an "occurrence" basis, including products and completed operations, property damage, bodily injury, and personal & advertising injury with limits no less than **$5,000,000** per occurrence. If a general

aggregate limit applies, either the general aggregate limit shall apply separately to this project/location (ISO CG 25 03 or 25 04) or the general aggregate limit shall be twice the required occurrence limit. Products-completed operations coverage shall be provided for a minimum of six (6) years following the completion of the project.

12.2 Commercial Automobile Liability: ISO Form CA 00 01 covering any auto with limit not less than **$2,000,000** per accident for bodily injury and property damage.

12.3 Worker's Compensation and Employers Liability: as required by The State of North Carolina, with statutory limits, and Employers Liability Insurance with a limit of no less than **$1,000,000** per occurrence.

12.4 Builder's Risk: Shall be a limit equal to the completed value of the project and no coinsurance penalty provisions utilizing an "All Risk" (Special Perils) coverage form.

12.5 Professional Liability (Errors & Omissions): Shall be a limit of not less than **$5,000,000** per occurrence or claim, and **$5,000,000** aggregate with an extended reporting period of not less than six (6) years following the completion of the project.

12.6 Contractor's Pollution Legal Liability: Shall be a limit of no less than **$1,000,000** per occurrence or claim, and $2,000,000 aggregate.

By requiring insurance herein, the COUNTY does not represent that coverage and limits will necessarily be adequate to protect CONTRACTOR, and such coverage and limits shall not be deemed as a limitation on CONTRACTOR's liability under the indemnities granted to the COUNTY in this Contract. CONTRACTOR shall provide the COUNTY a valid certificate of insurance, in advance of the performance of any work, exhibiting coverage required. CONTRACTOR shall require and verify that all subcontractors maintain insurance meeting all the requirements stated herein.

The failure of the COUNTY at any time to enforce the insurance provisions, to demand such certificates of insurance, or to identify a deficiency shall not constitute a waiver of those provisions, nor reduce the obligations of the CONTRACTOR to maintain such insurance or to meet its obligations under the indemnification provisions.

Notwithstanding the foregoing, nothing contained in this section shall be deemed to constitute a waiver of the governmental immunity of the COUNTY, which immunity is hereby reserved to the COUNTY.

13. PERFORMANCE BOND AND PAYMENT BOND. The CONTRACTOR shall furnish bonds covering the faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or required by North Carolina law. Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the CONTRACTOR shall promptly furnish a copy of the bonds or shall permit a copy to be made.

14. ENUMERATION OF CONTRACT DOCUMENTS

14.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated as follows:

1) This executed Contract for Construction between OWNER and CONTRACTOR.

2) The General Conditions of the Contract for Construction. Where reference is made in this Contract to a provision of the General Conditions or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.
3) The Supplementary and other Conditions of the Contract are those contained in the Project Manual dated_____, and are as follows:

Document	Title	Pages

4) The Specifications are those contained in the Project Manual dated as in Paragraph 14.1(.3) above, and are as follows:

Section	Title	Pages

5) The Drawings are as follows, and are dated_____,unless a different date is shown below:

Number _____
Title _____
Date _____

6) The Addenda, if any, are as follows:

Addendum No.	____	Dated:	_____	Addendum No.	____	Dated:	_____
Addendum No.	____	Dated:	_____	Addendum No.	____	Dated:	_____
Addendum No.	____	Dated:	_____	Addendum No.	____	Dated:	_____

7) Other documents, if any, forming part of the Contract Documents are as follows:

Invitation to Bid.
Instruction to Bidders

15. COMPLIANCE WITH LAWS**.** CONTRACTOR shall abide by all statutes, rules, regulations, laws, and executive orders Federal, State and Local as they relate to, but are not limited to, (i) services in general, (ii) payment of employees, subcontractors and agents, (iii) the Fair Labor Standards Act and (iv) the Wage and Hour Division. In the event CONTRACTOR is determined by the final order of a court or appropriate agency to be in violation of any Federal, State or Local statute, rule, regulation, law or executive order or this provision, this Contract may be canceled, terminated or suspended in whole or in part by OWNER and CONTRACTOR may be declared ineligible for further OWNER contracts.

16. HEALTH AND SAFETY. CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs required by OSHA and all other regulatory agencies while providing services under this contract.

17. E-VERIFY. As a condition of payment for services rendered under this agreement, CONTRACTOR shall comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes. Further, if CONTRACTOR provides the services to the OWNER utilizing a subcontractor, CONTRACTOR shall require the subcontractor to comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes as well. CONTRACTOR shall verify, by affidavit, compliance of the terms of this section upon request by the OWNER.

18. SECURITY BACKGROUND CHECKS. The Contractor is responsible for requesting and paying for criminal history checks on all individuals providing services under this contract who will be obtaining County identification badges and allowed unescorted access to County facilities. Background checks can be provided by any vendor, or from a North Carolina State agency, providing that the criminal history check is done nationwide. The Sheriff's Office will conduct background investigations for those Contractor employees who will be working at the Courthouse or Detention Center. A criminal history will not automatically disqualify a Contractor employee from employment on a County contract unless explicitly mandated by law.

    The Contractor will send the results of the background checks to their County point of contact who will provide them to the Durham County Security Manager. The Security Manager will individually assess and determine the degree to which the nature of a person's criminal conduct has a direct and/or specific negative bearing on a person's fitness or ability to perform contract services in Durham County buildings. The Security Manager will consult the Legal Office on any negative determinations. The Security Manager will notify the Contractor's County point of contact of the results of the review. A Contractor can appeal a negative determination by the Security Manager to the County Manager for final disposition. Appeals need to be submitted in writing to the contract point of contact within 30 days of notice of a decision to remove or deny an individual from working the County contract due to adverse information in the background check.

    This information will be updated annually by the Contractor, 90 days prior to the renewal or extension of the contract and submitted to their County point of contact who will provide them to the Durham County Security Manager. Personnel without a currently approved background check will have their access to those buildings restricted.

    Additional background screening may be necessary at specific county buildings. The Contractor shall provide names of all individuals in the Contractor communications log and to the County Representative. This information will be reviewed annually.

    For those Contractor employees who will be working at the Courthouse or Detention Center, the Sheriff's Office will make the security determination. The Contractor will provide the results of their background check to the Major for Support Services who will conduct an additional investigation and then individually assess and determine the degree to which the nature of a person's

    criminal conduct has a direct and/or specific negative bearing on a person's fitness or ability to perform contract services in the Courthouse or Detention Facility. A Contractor can appeal a negative determination to the Chief Deputy for final disposition. Appeals need to be submitted in writing to the Chief Deputy within 30 days of notice of a decision to remove or deny an individual from working the contract due to adverse information in the background check. While an appeal is pending, the employee will not be allowed access to the Courthouse or Detention Facility.
    This information will be updated by the Contractor and submitted to the Sheriff's Office annually, 90 days prior to the renewal or extension of the contract. Personnel without a currently approved background check will have their access to those buildings restricted.

19. DISPUTE RESOLUTION PROCEDURE. To prevent disputes and litigation, it is agreed by the parties that any claim or dispute between the OWNER and the CONTRACTOR, arising from this Agreement or the services and/or materials being provided by the CONTRACTOR, shall be sent to the Durham County Manager who shall appoint a qualified mediator to address the issue. Such request shall be submitted to the County Manager in writing within ten (10) days of the claim or dispute. Upon receipt of a timely written claim, the Manager, or his designee, shall notify the Mediator who will conduct a mediation and notify the CONTRACTOR in writing of the decision within forty five (45) calendar days from the date of the submission of the claim or dispute, unless the Mediator requires additional time to gather information or allow the parties to provide additional information. The Mediator's orders, decisions and decrees shall be non-binding. Mediation, pursuant to this provision, shall be a pre-condition to initiating litigation concerning the dispute. During the pendency of any dispute and after a determination thereof, the parties to the dispute shall act in good faith to mitigate any potential damages including utilization of schedule changes and alternate means of providing the services and/or materials. The costs of the mediation shall be divided equally between the parties to the dispute.

    The mediation session shall be private and shall be held in Durham County, North Carolina. Mediation under this provision shall not be the cause for a delay of services and/or materials being provided which is the focus of the dispute.
    If the disputed issue cannot be resolved in mediation or either party disagrees with the results of the mediation, the parties may seek resolution in the General Court of Justice in the County of Durham and the State of North Carolina. If a party fails to comply in strict accordance with the requirements of this provision, the non-complying party specifically waives all of its rights provided hereunder, including its rights and remedies under State law.

20. NON-ASSIGNMENT. This Contract is not assignable by either party, by operation of law or otherwise.

21. GOVERNING LAW**.** This Contract shall be governed by and in accordance with the laws of the State of North Carolina. All actions relating in any way to this Contract shall be brought in the General Court of Justice in the County of Durham and the State of North Carolina.

22. MODIFICATION. This Contract may be modified only by a written agreement executed by both parties hereto.

23. **REQUIRED PROVISIONS FOR CONTRACTS/AGREEMENTS/GRANTS UTILIZING FEDERAL FUNDS.** Pursuant to the Federal Uniform Guidance Appendix II to 2 CFR Part 200, if Federal Funds are involved in this Contract/Agreement/Grant Agreement, by executing this Contract/Agreement/Grant Agreement, the Contractor/Vendor/Grantee, certifies that it agrees to and is in compliance with the provisions specified in **Exhibit B – Federal Uniform Guidance Contract Provisions Certification.**

24. ENTIRE AGREEMENT. This Contract and the Contract Documents described herein sets forth the entire agreement between the parties and supersedes any and all other agreements on this subject between the parties.

This Agreement is entered into as of the day and year first written above and is executed in at least three original copies of which one is to be delivered to the CONTRACTOR, one to the Designer for use in the administration of the Contract, and the remainder to the OWNER.

OWNER: COUNTY OF DURHAM

By _____
Kimberly J. Sowell, County Manager

This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act.

_____
Durham County Chief Financial Officer

CONTRACTOR

ATTEST: Secretary

By: _____

_____

Print Name/Title: _____

STATE OF NORTH CAROLINA
COUNTY OF _____

I, a Notary Public in and for the aforesaid County and State, do hereby certify that _____ personally appeared before me this day and acknowledged that he is _____ of _____, a North Carolina corporation, and that by authority duly given and as the act of the corporation, the foregoing instrument was signed in its name by its _____, sealed with its corporate seal and attested by_____ as its _____.

Witness my hand and notarial seal this ___ day of _____, 20__.

_____ (SEAL)
Notary Public
My commission expires: _____

0017 – TECHNICAL SPECIFICATIONS

Durham County

Northern Convenience Site Generator

Construction Documents
Project Manual

Issued for Bidding

May 31, 2024

HDR Project No. 10400001

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TABLE OF CONTENTS

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SECTION 26 05 00
ELECTRICAL - BASIC REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Basic requirements for electrical systems.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Procurement and Contracting Requirements.
2. Section 26 05 19 - Wire and Cable - 600 Volt and Below.
3. Section 26 05 33 - Raceways and Boxes.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. Aluminum Association (AA):
   a. ADM, Aluminum Design Manual.
2. American Institute of Steel Construction (AISC):
   a. Steel Construction Manual.
3. American National Standards Institute (ANSI).
4. ASTM International (ASTM):
   a. A36/A36M, Standard Specification for Carbon Structural Steel.
   b. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   c. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
   a. C2, National Electrical Safety Code (NESC).
6. National Fire Protection Association (NFPA):
   a. 70, National Electrical Code (NEC).
7. National Electrical Manufacturers Association (NEMA):
8. Underwriters Laboratories, Inc. (UL).

B. Products to be listed by a Nationally Recognized Testing Laboratory (NRTL) in accordance with applicable product standards.

1. Applicable product standards including, but not limited to, ANSI, FM, IEEE, NEMA and UL.
2. NRTL includes, but is not limited to, CSA Group Testing and Certification (CS), FM Approvals LLC (FM), Intertek Testing Services NA, Inc. (ETL), and Underwriters Laboratories, Inc. (UL).

1.3 DEFINITIONS

A. For the purposes of providing materials and installing electrical work the following definitions shall be used.

1. Outdoor area: Exterior locations where the equipment is normally exposed to the weather and including below grade structures, such as vaults, manholes, handholes and in-ground pump stations.
2. Architecturally finished interior area: Offices, laboratories, conference rooms, restrooms, corridors and other similar occupied spaces.

3. Non-architecturally finished interior area: Pump, chemical, mechanical, electrical rooms and other similar process type rooms.
4. Highly corrosive and corrosive area: Areas identified on the Drawings where there is a varying degree of spillage or splashing of corrosive materials such as water, wastewater or chemical solutions; or chronic exposure to corrosive, caustic or acidic agents, chemicals, chemical fumes or chemical mixtures.
5. Hazardous areas: Class I, II or III areas as defined in NFPA 70.
6. Shop fabricated: Manufactured or assembled equipment for which a UL test procedure has not been established.

1.4 SUBMITTALS

A. Shop Drawings:

1. General requirements:
   a. Provide manufacturer's technical information on products to be used, including product descriptive bulletin.
   b. Include data sheets that include manufacturer's name and product model number.
      1) Clearly identify all optional accessories.
   c. Acknowledgement that products are NRTL listed or are constructed utilizing NRTL recognized components.
   d. Manufacturer's delivery, storage, handling and installation instructions.
   e. Product installation details.
   f. Short Circuit Current Rating (SCCR) nameplate marking per NFPA 70, include any required calculations.
   g. See individual specification sections for any additional requirements.

B. When a Specification Section includes products specified in another Specification Section, each Specification Section shall have the required Shop Drawing transmittal form and all Specification Sections shall be submitted simultaneously.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect nameplates on electrical equipment to prevent defacing.

1.6 AREA DESIGNATIONS

A. Designation of an area will determine the NEMA rating of the electrical equipment enclosures, types of conduits and installation methods to be used in that area.

1. Outdoor areas:
   a. Wet.
   b. Also, corrosive and/or hazardous when specifically designated on the Drawings or in the Specifications.
2. Indoor areas:
   a. Dry.
   b. Also, wet, corrosive and/or hazardous when specifically designated on the Drawings or in the Specifications.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, refer to specific Electrical Specification Sections and specific material paragraphs below for acceptable manufacturers.

B. Provide all components of a similar type by one (1) manufacturer.

2.2 MATERIALS

A. Electrical Equipment Support Pedestals and/or Racks:

1. Manufacturers:
   a. Modular strut:
      1) Unistrut Building Systems.
      2) B-Line by Eaton.
      3) Globe Strut.
      4) Superstrut by Thomas & Betts.
2. Material requirements:
   a. Modular strut:
      1) Galvanized steel: ASTM A123/123M or ASTM A153/A153M.
      2) Stainless steel: AISI Type 316.
      3) Aluminum: AA Type 6063-T6.
   b. Mounting hardware:
      1) Galvanized steel.
      2) Stainless steel.

B. Field touch-up of galvanized surfaces.

1. Zinc-rich primer.
   a. One coat, 3.0 MILS, ZRC by ZRC Products.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install and wire all equipment, including prepurchased equipment, and perform all tests necessary to assure conformance to the Drawings and Specification Sections and ensure that equipment is ready and safe for energization.

B. Install equipment in accordance with the requirements of:

1. NFPA 70.
2. IEEE C2.
3. The manufacturer's instructions.

C. In general, conduit routing is not shown on the Drawings.

1. The Contractor is responsible for routing all conduits including those shown on one-line and control block diagrams and home runs shown on floor plans.
2. Conduit routings and stub-up locations that are shown are approximate; exact routing to be as required for equipment furnished and field conditions.

D. When complete branch circuiting is not shown on the Drawings:

1. A homerun indicating panelboard name and circuit number will be shown and the circuit number will be shown adjacent to the additional devices (e.g., light fixture and receptacles) on the same circuit.
2. The Contractor is to furnish and install all conduit and conductors required for proper operation of the circuit.
3. The indicated home run conduit and conductor size shall be used for the entire branch circuit.
4. See Specification Section 26 05 19 for combining multiple branch circuits in a common conduit.

E. Do not use equipment that exceed dimensions or reduce clearances indicated on the Drawings or as required by the NFPA 70.

F. Install equipment plumb, square and true with construction features and securely fastened.

G. Install electrical equipment, including pull and junction boxes, minimum of 6 IN from process, gas, air and water piping and equipment.

H. Install equipment so it is readily accessible for operation and maintenance, is not blocked or concealed and does not interfere with normal operation and maintenance requirements of other equipment.

I. Device Mounting Schedule:

1. Unless indicated otherwise on the Drawings, mounting heights are as indicated below:
    a. Light switch (to center): 46 IN.
    b. Receptacle in architecturally finished areas (to center): 18 IN.
    c. Receptacle on exterior wall of building (to center): 18 IN.
    d. Receptacle in non-architecturally finished areas (to center): 46 IN.
    e. Telephone outlet in architecturally finished areas (to center): 18 IN.
    f. Telephone outlet for wall-mounted phone (to center): 46 IN.
    g. Safety switch (to center of operating handle): 54 IN.
    h. Separately mounted motor starter (to center of operating handle): 54 IN.
    i. Pushbutton or selector switch control station (to center): 46 IN.
    j. Panelboard (to top): 72 IN.

J. Avoid interference of electrical equipment operation and maintenance with structural members, building features and equipment of other trades.

1. When it is necessary to adjust the intended location of electrical equipment, unless specifically dimensioned or detailed, the Contractor may make adjustments of up to 6 IN in equipment location with the Engineer's approval.

K. Provide electrical equipment support system per the following area designations:

1. Dry areas:
    a. Galvanized system consisting of galvanized steel channels and fittings, nuts and hardware.
    b. Field touch-up cut ends and scratches of galvanized components with the specified primer during the installation, before rust appears.
2. Wet areas:
    a. Galvanized system consisting of galvanized steel channels and fittings, nuts and hardware.
    b. Field touch-up cut ends and scratches of galvanized components with the specified primer during the installation, before rust appears.
3. Corrosive areas:
    a. Stainless steel system consisting of stainless steel channels and fittings, nuts and hardware.

L. Provide all necessary anchoring devices and supports rated for the equipment load based on dimensions and weights verified from approved submittals, or as recommended by the manufacturer.

1. Do not cut, or weld to, building structural members.
2. Do not mount safety switches or other equipment to equipment enclosures, unless enclosure mounting surface is properly braced to accept mounting of external equipment.

M. Provide corrosion resistant spacers to maintain 1/4 IN separation between metallic equipment and/or metallic equipment supports and mounting surface in wet areas, on below grade walls and on walls of liquid containment or processing areas such as Basins, Clarifiers, Digesters, Reservoirs, etc.

N. Do not place equipment fabricated from aluminum in direct contact with earth or concrete.

O. Screen or seal all openings into equipment mounted outdoors to prevent the entrance of rodents and insects.

P. Do not use materials that may cause the walls or roof of a building to discolor or rust.

Q. Provide field markings and/or documentation of available short-circuit current (available fault current) and related information for equipment as required by the NFPA 70 and other applicable codes.

R. Provide equipment or control panels with Short Circuit Current Rating (SCCR) labeling as required by NFPA 70 and other applicable codes.

1. Determine the SCCR rating by one of the following methods:
    a. Method 1: SCCR rating meets or exceeds the available fault current of the source equipment when indicated on the Drawings.
    b. Method 2: SCCR rating meets or exceeds the source equipment's Amp Interrupting Current (AIC) rating as indicated on the Drawings.
    c. Method 3: SCCR rating meets or exceeds the calculated available short circuit current at the control panel.
2. The source equipment is the switchboard, panelboard, motor control center or similar equipment where the equipment or control panel circuit originates.
3. For Method 3, provide calculations justifying the SCCR rating. Utilize source equipment available fault current or AIC rating as indicated on the Drawings.

3.2 FIELD QUALITY CONTROL

A. Verify exact rough-in location and dimensions for connection to electrified equipment, provided by others.

B. Replace equipment and systems found inoperative or defective and re-test.

C. The protective coating integrity of support structures and equipment enclosures shall be maintained.

1. Repair galvanized components utilizing a zinc rich paint.
2. Repair painted components utilizing touch up paint provided by or approved by the manufacturer.
3. Repair PVC coated components utilizing a patching compound, of the same material as the coating, provided by the manufacturer of the component.
4. Repair surfaces which will be inaccessible after installation prior to installation.
5. See Specification Section 26 05 33 for requirements for conduits and associated accessories.

D. Replace nameplates damaged during installation.

END OF SECTION

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SECTION 26 05 19

WIRE AND CABLE - 600 VOLT AND BELOW

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Material and installation requirements for:
    a. Building wire.
    b. Power cable.
    c. Control cable.
    d. Wire connectors.
    e. Insulating tape.
    f. Pulling lubricant.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Procurement and Contracting Requirements.
2. Section 26 05 00 - Electrical - Basic Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. Insulated Cable Engineers Association (ICEA):
    a. S-58-679, Standard for Control Cable Conductor Identification.
2. National Electrical Manufacturers Association (NEMA):
    a. ICS 4, Industrial Control and Systems: Terminal Blocks.
3. National Electrical Manufacturers Association/Insulated Cable Engineers Association (NEMA/ICEA):
    a. WC 57/S-73-532, Standard for Control Cables.
    b. WC 70/S-95-658, Non-Shielded Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy.
4. National Fire Protection Association (NFPA):
    a. 70, National Electrical Code (NEC).
    b. 262, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.
5. Telecommunications Industry Association/Electronic Industries Alliance/American National Standards Institute (TIA/EIA/ANSI):
    a. 568, Commercial Building Telecommunications Cabling Standard.
6. Underwriters Laboratories, Inc. (UL):
    a. 44, Standard for Safety Thermoset-Insulated Wires and Cables.
    b. 83, Standard for Safety Thermoplastic-Insulated Wires and Cables.
    c. 467, Standard for Safety Grounding and Bonding Equipment.
    d. 486A, Standard for Safety Wire Connectors and Soldering Lugs for use with Copper Conductors.
    e. 486C, Standard for Safety Splicing Wire Connections.
    f. 510, Standard for Safety Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
    g. 1277, Standard for Safety Electrical Power and Control Tray Cables with Optional Optical-Fiber Members.

h. 1581, Standard for Safety Reference Standard for Electrical Wires, Cables, and Flexible Cords.

i. 2250, Standard for Safety Instrumentation Tray Cable.

1.3 DEFINITIONS

A. Cable: Multi-conductor, insulated, with outer sheath containing either building wire or instrumentation wire.

B. Instrumentation Cable:

1. Multiple conductor, insulated, twisted or untwisted, with outer sheath.
2. The following are specific types of instrumentation cables:
   a. Analog signal cable:
      1) Used for the transmission of low current (e.g., 4-20mA DC) or low voltage (e.g., 0-10 VDC) signals, using No. 16 AWG and smaller conductors.
      2) Commonly used types are defined in the following:
         a) TSP: Twisted shielded pair.
         b) TST: Twisted shielded triad.
   b. Digital signal cable: Used for the transmission of digital signals between computers, PLC's, RTU's, etc.
3. Thermocouple extension wire: Used to extend thermocouple wire.

C. Power Cable: Multi-conductor, insulated, with outer sheath containing building wire, No. 8 AWG and larger.

D. Control Cable: Multi-conductor, insulated, with outer sheath containing building wires, No. 14, No. 12 or No. 10 AWG.

E. Building Wire: Single conductor, insulated, with or without outer jacket depending upon type.

1.4 SUBMITTALS

A. Shop Drawings:

1. Product technical data:
   a. Provide submittal data for all products specified in PART 2 of this Specification Section except:
      1) Wire connectors.
      2) Insulating tape.
      3) Cable lubricant.
   b. See Specification Section 26 05 00 for additional requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. See Specification Section 26 05 00.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Building wire, power and control cable :
   a. Aetna Insulated Wire.
   b. Alphawire.
   c. Cerrowire.
   d. Encore Wire Corporation.
   e. General Cable.

f. Okonite Company.
g. Southwire Company.

2. Instrumentation cable:
   a. Analog cable:
      1) Alphawire.
      2) Belden Inc.
      3) General Cable.
3. Wire connectors:
   a. Burndy Corporation.
   b. Buchanan.
   c. Ideal.
   d. Ilsco.
   e. 3M Co.
   f. Teledyne Penn Union.
   g. Thomas and Betts.
   h. Phoenix Contact.
4. Insulating and color coding tape:
   a. 3M Co.
   b. Plymouth Bishop Tapes.
   c. Red Seal Electric Co.

2.2 MANUFACTURED UNITS

A. Building Wire:

1. Conductor shall be copper with 600 V rated insulation.
2. Conductors shall be stranded, except for conductors used in lighting and receptacle circuits which may be stranded or solid.
3. Surface mark with manufacturer's name or trademark, conductor size, insulation type and UL label.
4. Conform to NEMA/ICEA WC 70/S-95-658 and UL 83 for type THHN/THWN and THHN/THWN-2 insulation.
5. Conform to NEMA/ICEA WC 70/S-95-658 and UL 44 for type XHHW-2 insulation.

B. Power Cable:

1. Conductor shall be copper with 600 V rated insulation.
2. Surface mark with manufacturer's name or trademark, conductor size, insulation type and UL label.
3. Conform to NEMA/ICEA WC 70/S-95-658 and UL 83 and UL 1277 for type THHN/THWN insulation with an overall PVC jacket.
4. Conform to NEMA/ICEA WC 70/S-95-658 and UL 44 and UL 1277 for type XHHW-2 insulation with an overall PVC jacket.
5. Number of conductors as required, including a bare ground conductor.
6. Individual conductor color coding:
   a. ICEA S-58-679, Method 4.
   b. See PART 3 of this Specification Section for additional requirements.
7. Conform to NFPA 70 Type TC.

C. Control Cable:

1. Conductor shall be copper with 600 V rated insulation.

2. Surface mark with manufacturer's name or trademark, conductor size, insulation type and UL label.
3. Conform to NEMA/ICEA WC 57/S-73-532 and UL 83 and UL 1277 for type THHN/THWN insulation with an overall PVC jacket.
4. Conform to NEMA/ICEA WC 57/S-73-532 and UL 44 and UL 1277 for type XHHW-2 insulation with an overall PVC jacket.
5. Number of conductors as required, provided with or without bare ground conductor of the same AWG size.
    a. When a bare ground conductor is not provided, an additional insulated conductor shall be provided and used as the ground conductor (e.g., 6/c No. 14 w/g and 7/c No. 14 are equal).
6. Individual conductor color coding:
    a. ICEA S-58-679, Method 1, Table E-2.
    b. See PART 3 of this Specification Section for additional requirements.
7. Conform to NFPA 70 Type TC.

D. Electrical Equipment Control Wire:

1. Conductor shall be copper with 600 V rated insulation.
2. Conductors shall be stranded.
3. Surface mark with manufacturer's name or trademark, conductor size, insulation type and UL label.
4. Conform to UL 44 for Type SIS insulation.
5. Conform to UL 83 for Type MTW insulation.

E. Wire Connectors:

1. Twist/screw on type:
    a. Insulated pressure or spring type solderless connector.
    b. 600 V rated.
    c. Ground conductors: Conform to UL 486C and/or UL 467 when required by local codes.
    d. Phase and neutral conductors: Conform to UL 486C.
2. Compression and mechanical screw type:
    a. 600 V rated.
    b. Ground conductors: Conform to UL 467.
    c. Phase and neutral conductors: Conform to UL 486A.
3. Terminal block type:
    a. High density, screw-post barrier-type with white center marker strip.
    b. 600 V and ampere rating as required, for power circuits.
    c. 600 V, 20 ampere rated for control circuits.
    d. 300 V, 15 ampere rated for instrumentation circuits.
    e. Conform to NEMA ICS 4 and UL 486A.

F. Insulating and Color Coding Tape:

1. Pressure sensitive vinyl.
2. Premium grade.
3. Heat, cold, moisture, and sunlight resistant.
4. Thickness, depending on use conditions: 7, 8.5, or 10 MIL.
5. For cold weather or outdoor location, tape must also be all-weather.
6. Color:
    a. Insulating tape: Black.

b. Color coding tape: Fade-resistant color as specified herein.

7. Comply with UL 510.

G. Pulling Lubricant: Cable manufacturer's standard containing no petroleum or other products which will deteriorate insulation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Permitted Usage of Insulation Types:

1. Type XHHW-2:
   a. Building wire and power and control cable in architectural and non-architectural finished areas.
   b. Building wire and power and control cable in conduit in outdoor areas and below grade.
   c. Building wire and power and control cable in cable tray in outdoor areas.
2. Type THHN/THWN and THHN/THWN-2:
   a. Building wire and power and control cable No. 8 AWG and smaller in architectural and non-architectural finished areas.
3. Type SIS and MTW:
   a. For the wiring of control equipment within control panels and field wiring of control equipment within switchgear, switchboards, motor control centers.

B. Conductor Size Limitations:

1. Feeder and branch power conductors shall not be smaller than No. 12 AWG unless otherwise indicated on the Drawings.
2. Control conductors shall not be smaller than No. 14 AWG unless otherwise indicated on the Drawings.
3. Instrumentation conductors shall not be smaller than No. 18 AWG unless otherwise indicated on the Drawings.

C. Color Code All Wiring as Follows:

1. Building wire:

	240 V, 208 V, 240/120 V, 208/120 V	480 V, 480/277 V
Phase 1	Black	Brown
Phase 2	Red *	Orange
Phase 3	Blue	Yellow
Neutral	White	White or Gray
Ground	Green	Green

* Orange when it is a high leg of a 120/240 V Delta system.

   a. Conductors No. 6 AWG and smaller: Insulated phase, neutral and ground conductors shall be identified by a continuous colored outer finish along its entire length.
   b. Conductors larger than No. 6 AWG:
      1) Insulated phase and neutral conductors shall be identified by one of the following methods:
         a) Continuous colored outer finish along its entire length.
         b) 3 IN of colored tape applied at the termination.
      2) Insulated grounding conductor shall be identified by one of the following methods:
         a) Continuous green outer finish along its entire length.

b) Stripping the insulation from the entire exposed length.

c) Using green tape to cover the entire exposed length.

3) The color coding shall be applied at all accessible locations, including but not limited to: Junction and pull boxes, wireways, manholes and handholes.

2. Power cables ICEA S-58-679, Method 4 with:
   a. Phase and neutral conductors identified with 3 IN of colored tape, per the Table herein, applied at the terminations.
   b. Ground conductor: Bare.
3. Control cables ICEA S-58-679, Method 1, Table E-2:
   a. When a bare ground is not provided, one of the colored insulated conductors shall be re-identified by stripping the insulation from the entire exposed length or using green tape to cover the entire exposed length.
   b. When used in power applications the colored insulated conductors used as phase and neutral conductors may have to be re-identified with 3 IN of colored tape, per the Table herein, applied at the terminations.

D. Install all wiring in raceway unless otherwise indicated on the Drawings.

E. Feeder, branch, control and instrumentation circuits shall not be combined in a raceway, cable tray, junction or pull box, except as permitted in the following:

1. Where specifically indicated on the Drawings.
2. Where field conditions dictate and written permission is obtained from the Engineer.
3. Control circuits shall be isolated from feeder and branch power and instrumentation circuits but combining of control circuits is permitted.
   a. The combinations shall comply with the following:
      1) 12 VDC, 24 VDC and 48 VDC may be combined.
      2) 125 VDC shall be isolated from all other AC and DC circuits.
      3) AC control circuits shall be isolated from all DC circuits.
4. Instrumentation circuits shall be isolated from feeder and branch power and control circuits but combining of instrumentation circuits is permitted.
   a. The combinations shall comply with the following:
      1) Analog signal circuits may be combined.
      2) Digital signal circuits may be combined but isolated from analog signal circuits.
5. Multiple branch circuits for similar loads may be combined in a common raceway, such as multiple lighting circuits or multiple receptacle circuits or other 120Vac circuits. Do not combine lighting and receptacle circuits.
   a. Do not combine control device circuits with lighting or receptacle circuits.
   b. Contractor is responsible for making the required adjustments in conductor and raceway size, in accordance with all requirements of the NFPA 70, including but not limited to:
      1) Up sizing conductor size for required ampacity de-ratings for the number of current carrying conductors in the raceway.
      2) The neutral conductors may not be shared.
      3) Up sizing raceway size for the size and quantity of conductors.

F. Ground the drain wire of shielded instrumentation cables at one end only.

1. The preferred grounding location is at the load (e.g., control panel), not at the source (e.g., field mounted instrument).

G. Splices and terminations for the following circuit types shall be made in the indicated enclosure type using the indicated method.

1. Feeder and branch power circuits:

a. Device outlet boxes:
    1) Twist/screw on type connectors.
b. Junction and pull boxes and wireways:
    1) Twist/screw on type connectors for use on No. 8 and smaller wire.
    2) Compression, mechanical screw or terminal block or terminal strip type connectors for use on No. 6 AWG and larger wire.
c. Motor terminal boxes:
    1) Twist/screw on type connectors for use on No. 10 AWG and smaller wire.
    2) Insulated mechanical screw type connectors for use on No. 8 AWG and larger wire.
d. Manholes or handholes:
    1) Twist/screw on type connectors pre-filled with epoxy for use on No. 8 AWG and smaller wire.
    2) Watertight compression or mechanical screw type connectors for use on No. 6 AWG and larger wire.

2. Control circuits:
    a. Junction and pull boxes: Terminal block type connector.
    b. Manholes or handholes: Twist/screw on type connectors pre-filled with epoxy.
    c. Control panels and motor control centers: Terminal block or strips provided within the equipment or field installed within the equipment by the Contractor.
3. Instrumentation circuits can be spliced where field conditions dictate and written permission is obtained from the Engineer.
    a. Maintain electrical continuity of the shield when splicing twisted shielded conductors.
    b. Junction and pull boxes: Terminal block type connector.
    c. Control panels and motor control centers: Terminal block or strip provided within the equipment or field installed within the equipment by the Contractor.
4. Non-insulated compression and mechanical screw type connectors shall be insulated with tape or hot or cold shrink type insulation to the insulation level of the conductors.

H. Insulating Tape Usage:
    1. For insulating connections of No. 8 AWG wire and smaller: 7 MIL vinyl tape.
    2. For insulating splices and taps of No. 6 AWG wire or larger: 10 MIL vinyl tape.
    3. For insulating connections made in cold weather or in outdoor locations: 8.5 MIL, all weather vinyl tape.

I. Color Coding Tape Usage: For color coding of conductors.

END OF SECTION

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SECTION 26 05 26
GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Material and installation requirements for grounding and bonding system(s).

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. ASTM International (ASTM):
   a. B8, Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.
2. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
   a. 837, Standard for Qualifying Permanent Connections Used in Substation Grounding.
3. National Fire Protection Association (NFPA):
   a. 70, National Electrical Code (NEC).
4. Underwriters Laboratories, Inc. (UL):
   a. 467, Grounding and Bonding Equipment.

B. Assure ground continuity is continuous throughout the entire Project.

1.3 SUBMITTALS

A. Shop Drawings:

1. Product technical data.
   a. Provide submittal data for all products specified in PART 2 of this Specification Section except:
      1) Grounding clamps, terminals and connectors.
      2) Exothermic welding system.
   b. See Specification Section 26 05 00 for additional requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Ground rods and bars and grounding clamps, connectors and terminals:
   a. ERICO by Pentair.
   b. Harger Lightning & Grounding.
   c. Heary Bros. Lightning Protection Co. Inc..
   d. Burndy by Hubbell.
   e. Robbins Lightning, Inc.
   f. Blackburn by Thomas & Betts.
   g. Thompson Lightning Protection, Inc.
2. Exothermic weld connections:
   a. ERICO by Pentair - Cadweld.
   b. Harger Lightning & Grounding - Ultraweld.
   c. Burndy by Hubbell - Thermoweld.

d. FurseWELD by Thomas & Betts.

2.2 COMPONENTS

A. Wire and Cable:

1. Bare conductors: Soft drawn stranded copper meeting ASTM B8.
2. Insulated conductors: Color coded green, per Specification Section 26 05 19.

B. Conduit: As specified in Specification Section 26 05 33.

C. Ground Bars:

1. Solid copper:
   a. 1/4 IN thick.
   b. 2 or 4 IN wide.
   c. 24 IN long minimum in main service entrance electrical rooms, 12 IN long elsewhere.
2. Predrilled grounding lug mounting holes.
3. Stainless steel or galvanized steel mounting brackets.
4. Insulated standoffs.

D. Ground Rods:

1. 3/4 IN x 10 FT.
2. Copper-clad:
   a. 10 MIL minimum uniform coating of electrolytic copper molecularly bonded to a rigid steel core.
   b. Corrosion resistant bond between the copper and steel.
   c. Hard drawn for a scar-resistant surface.

E. Grounding Clamps, Connectors and Terminals:

1. Mechanical type:
   a. Standards: UL 467.
   b. High copper alloy content.
2. Compression type for interior locations:
   a. Standards: UL 467.
   b. High copper alloy content.
   c. Non-reversible.
   d. Terminals for connection to bus bars shall have two bolt holes.
3. Compression type suitable for direct burial in earth or concrete:
   a. Standards: UL 467, IEEE 837.
   b. High copper alloy content.
   c. Non-reversible.
   d. Factory filled with oxide inhibiting compound.

F. Exothermic Weld Connections:

1. Copper oxide reduction by aluminum process.
2. Molds properly sized for each application.

G. Prefabricated Composite Material Test Stations:

1. Body and cover: Fiberglass reinforced polymer concrete conforming to all test provisions of SCTE 77.
2. Minimum load ratings: SCTE 77 Tier 15.
3. Open bottom.
4. Stackable design as required for 3 FT depth.

5. Cover:
    a. Engraved legend of "GROUND".
    b. Lay-in non-bolt down.
6. Size: 12 IN round or 12 IN square.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Install products in accordance with manufacturer's instructions.
2. Size grounding conductors and bonding jumpers in accordance with NFPA 70, Article 250, except where larger sizes are indicated on the Drawings.
3. Remove paint, rust, or other non-conducting material from contact surfaces before making ground connections. After connection, apply manufacturers approved touch-up paint to protect metallic surface from corrosion.
4. Do not splice grounding electrode conductors except at ground rods.
5. Install ground rods and grounding electrode conductors in undisturbed, firm soil.
    a. Provide excavation required for installation of ground rods and conductors.
    b. Use driving studs or other suitable means to prevent damage to threaded ends of sectional rods.
    c. Unless otherwise specified, connect conductors to ground rods with compression type connectors or exothermic weld.
    d. Provide sufficient slack in conductor to prevent conductor breakage during backfill or due to ground movement.
    e. Backfill excavation completely, thoroughly tamping to provide good contact between backfill materials and ground rods and conductors.
6. Do not use exothermic welding if it will damage the structure the grounding conductor is being welded to.

B. Grounding Electrode System:

1. Provide a grounding electrode system in accordance with NFPA 70, Article 250 and as indicated on the Drawings.
    a. All grounding electrode conductors terminate on a main ground bar located adjacent to the service entrance equipment.
2. Grounding electrode conductor terminations:
    a. Ground bars mounted on wall: Use a two-hole compression type conductor terminal and bolt it to the ground bar with two bolts.
    b. Ground bars in electrical equipment: Use compression type conductor terminal and bolt it to the ground bar or manufacture's provided mechanical type termination device.
    c. Piping systems: Use mechanical type connections.
    d. Building steel, below grade and encased in concrete: Use compression type connector or exothermic weld.
    e. Building steel, above grade: Use a two-hole compression type conductor terminal and bolt to the steel with two bolts or exothermic weld.
    f. Ground rod: Compression type or exothermic weld, unless otherwise specified.
3. Ground ring grounding system:
    a. Ground ring consists of ground rods and a conductor looped around the structure.
    b. Placed at a minimum of 10 FT from the structure foundation and 2 FT-6 IN below grade.
    c. Provide a minimum of four ground rods placed at the corners of the structure and additional rods so that the maximum distance between ground rods does not exceed 50 FT.

d. Building/Structure grounding:
    1) Bond building/structure metal support columns to the ground ring at all corners of the structure.
e. Grounding conductor: Bare conductor, size as indicated on the Drawings.
f. Ground rod test stations:
    1) Provided where indicated on the Drawings.
    2) Grounding conductors connected to ground rod with removable ground clamps.

4. Triad grounding system:
    a. Triad consists of three ground rods arranged in a triangle separated by 10 FT and a conductor interconnecting each ground rod.
    b. Place first ground rod a minimum of 10 FT from the structure foundation and 2 FT-6 IN below grade.
    c. Grounding conductor: Bare conductor, size as indicated on the Drawings.

C. Supplemental Grounding Electrode:

1. Provide the following grounding in addition to the equipment ground conductor supplied with the feeder conductors whether or not shown on the Drawings.
    a. See Grounding Electrode System paragraph for conductor termination requirements.
2. Metal light poles:
    a. Connect metal pole and pole base reinforcing steel to a ground rod.
    b. Grounding conductor: Bare #6 AWG minimum.
3. Equipment support rack and pedestals mounted outdoors:
    a. Connect metallic structure to a ground rod.
    b. Grounding conductor: #6 AWG minimum.

D. Transformer Separately Derived Grounding System:

1. Install the System Bonding Jumper at the transformer. At the first disconnect, ensure the neutral is isolated from ground.
2. Structures with a single electrical room/area:
    a. Connect grounding electrode conductor to the Grounding Electrode System main ground bar.
3. See Grounding Electrode System paragraph for conductor termination requirements.

E. Raceway Bonding/Grounding:

1. Install all metallic raceway so that it is electrically continuous.
2. Provide an equipment grounding conductor in all raceways with insulation identical to the phase conductors, unless otherwise indicated on the Drawings.
3. NFPA 70 required grounding bushings shall be of the insulating type.
4. Provide double locknuts at all panels.
5. Bond all conduits, at entrance and exit of equipment, to the equipment ground bus or lug.
6. Provide bonding jumpers if conduits are installed in concentric knockouts.
7. Make all metallic raceway fittings and grounding clamps tight to ensure equipment grounding system will operate continuously at ground potential to provide low impedance current path for proper operation of overcurrent devices during possible ground fault conditions.

F. Equipment Grounding:

1. Ground all utilization equipment with an equipment grounding conductor.

G. Manhole and Handhole Grounding:

1. Provide a ground rod and ground bar, when indicated or as needed, in each manhole and handhole with exposed metal parts.
    a. Expose a minimum of 4 IN of the rod above the floor for field connections to the rod.
2. Connect all exposed metal parts (e.g., conduits and cable racks) to the ground rod.

3.2 FIELD QUALITY CONTROL

A. Leave grounding system uncovered until observed by Owner.

B. Provide a continuity test on the components of the grounding electrode system.

C. Complete grounding system: Resistance of 5 ohms or less.

D. Test resistance of installed ground system after backfilling and before connection to any other grounded system including underground piping, utility services or other building ground systems.

1. Test ground grid resistance by fall-of-potential method.
2. Perform test at the ground rod test station.

END OF SECTION

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SECTION 26 05 33
RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Material and installation requirements for:
    a. Conduits.
    b. Conduit fittings.
    c. Conduit supports.
    d. Wireways.
    e. Outlet boxes.
    f. Pull and junction boxes.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Procurement and Contracting Requirements.
2. Section 26 05 00 - Electrical - Basic Requirements.
3. Section 26 05 43 - Electrical - Exterior Underground.
4. Section 26 27 26 - Wiring Devices.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. Aluminum Association (AA).
2. American Iron and Steel Institute (AISI).
3. ASTM International (ASTM):
    a. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
    b. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
    c. D2564, Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
4. National Electrical Manufacturers Association (NEMA):
    a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
    b. RN 1, Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
    c. TC 2, Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
    d. TC 3, Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing.
    e. TC 14.BG, Belowground Reinforced Thermosetting Resin Conduit and Fittings.
5. National Electrical Manufacturers Association/American National Standards Institute (NEMA/ANSI):
    a. C80.1, Electric Rigid Steel Conduit (ERSC).
    b. C80.3, Steel Electrical Metallic Tubing (EMT).
    c. C80.5, Electrical Aluminum Rigid Conduit (ERAC).
    d. OS 1, Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
6. National Fire Protection Association (NFPA):
    a. 70, National Electrical Code (NEC).
7. Underwriters Laboratories, Inc. (UL):

a. 1, Standard for Flexible Metal Conduit.
b. 6, Electrical Rigid Metal Conduit - Steel.
c. 50, Enclosures for Electrical Equipment, Non-Environmental Considerations.
d. 360, Standard for Liquid-Tight Flexible Metal Conduit.
e. 467, Grounding and Bonding Equipment.
f. 514A, Metallic Outlet Boxes.
g. 514B, Conduit, Tubing, and Cable Fittings.
h. 651, Standard for Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings.
i. 797, Electrical Metallic Tubing - Steel.
j. 870, Standard for Wireways, Auxiliary Gutters, and Associated Fittings.
k.

1.3 SUBMITTALS

A. Shop Drawings:
1. Product technical data:
a. Provide submittal data for all products specified in PART 2 of this Specification Section except:
1) Conduit fittings.
2) Support systems.
b. See Specification Section 26 05 00 for additional requirements.
2. Fabrication and/or layout drawings:
a. Identify dimensional size of pull and junction boxes to be used.

1.4 DELIVERY, STORAGE, AND HANDLING

A. See Specification Section 26 05 00.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
1. Rigid metal conduits and electrical metallic tubing:
a. Allied Tube and Conduit.
b. Western Tube and Conduit Corporation.
c. Wheatland Tube.
d. Patriot Aluminum Products, LLC.
2. PVC coated rigid metal conduits:
a. Ocal by Thomas & Betts.
b. Robroy Industries.
3. Rigid nonmetallic conduit:
a. Prime Conduit.
b. Cantex, Inc.
c. Osburn Associates, Inc.
d. Champion Fiberglass, Inc.
e. United Fiberglass of America, Inc.
4. Flexible conduit:
a. AFC Cable Systems.
b. Anamet, Inc.

c. Electri-Flex Company.
d. International Metal Hose Company.
e. Southwire Company, LLC.

5. Wireway:
   a. Hoffman Engineering.
   b. Wiegmann by Hubbell.
   c. Square D by Schneider Electric.
6. Conduit fittings and accessories:
   a. Appleton by Emerson Electric Co.
   b. Carlon by Thomas & Betts.
   c. Cantex, Inc.
   d. Crouse-Hinds by Eaton.
   e. Killark by Hubbell.
   f. Osburn Associates, Inc.
   g. O-Z/Gedney by Emerson Electric Co.
   h. Raco by Hubbell.
   i. Steel City by Thomas & Betts.
   j. Thomas & Betts.
7. Support systems:
   a. Unistrut by Atkore International, Inc.
   b. B-Line by Eaton.
   c. Kindorf by Thomas & Betts.
   d. Minerallac Company.
   e. CADDY by Pentair.
   f. Superstrut by Thomas & Betts.
8. Outlet, pull and junction boxes:
   a. Appleton by Emerson Electric Co.
   b. Crouse-Hinds by Eaton
   c. Killark by Hubbell.
   d. O-Z/Gedney by Emerson Electric Co.
   e. Steel City by Thomas & Betts.
   f. Raco by Hubbell
   g. Bell by Hubbell.
   h. Hoffman Engineering.
   i. Wiegmann by Hubbell.
   j. B-Line by Eaton.
   k. Adalet.
   l. RITTAL North America LLC.
   m. Stahlin by Robroy Enclosures.

2.2 RIGID METAL CONDUITS

A. Rigid Galvanized Steel Conduit (RGS):

1. Mild steel with continuous welded seam.
2. Metallic zinc applied by hot-dip galvanizing or electro-galvanizing.
3. Threads galvanized after cutting.
4. Internal coating: Baked lacquer, varnish or enamel for a smooth surface.

5. Standards: NFPA 70 Type RMC, NEMA/ANSI C80.1, UL 6.

2.3 ELECTRICAL METALLIC TUBING (EMT)

A. Mild steel with continuous welded seam.

B. Metallic zinc applied by hot-dip galvanizing or electro-galvanizing.

C. Internal coating: Baked lacquer, varnish, or enamel for a smooth surface.

D. Standards: NFPA 70 Type EMT, NEMA/ANSI C80.3, UL 797.

2.4 RIGID NONMETALLIC CONDUIT

A. Schedules 40 (PVC-40) and 80 (PVC-80):

1. Polyvinyl-chloride (PVC) plastic compound which includes inert modifiers to improve weatherability and heat distribution.
2. Rated for direct sunlight exposure.
3. Fire retardant and low smoke emission.
4. Shall be suitable for use with 90 DEGC wire and shall be marked "maximum 90 DEGC".
5. Standards: NFPA 70 Type PVC, NEMA TC 2, UL 651.

2.5 FLEXIBLE CONDUIT

A. Flexible Galvanized Steel Conduit (FLEX):

1. Formed of continuous, spiral wound, hot-dip galvanized steel strip with successive convolutions securely interlocked.
2. Standard: NFPA 70 Type FMC, UL 1.

B. PVC-Coated Flexible Galvanized Steel (liquid-tight) Conduit (FLEX-LT):

1. Core formed of continuous, spiral wound, hot-dip galvanized steel strip with successive convolutions securely interlocked.
2. Extruded PVC outer jacket positively locked to the steel core.
3. Liquid and vaportight.
4. Standard: NFPA 70 Type LFMC, UL 360.

2.6 WIREWAY

A. General:

1. Suitable for lay-in conductors.
2. Designed for continuous grounding.
3. Covers:
   a. Hinged or removable in accessible areas.
   b. Non-removable when passing through partitions.
4. Finish: Rust inhibiting primer and manufacturer's standard paint inside and out except for stainless steel type.
5. Standards: UL 870, NEMA 250.

B. General Purpose (NEMA 1 rated) Wireway:

1. 14 or 16 gage steel without knockouts.
2. Cover: Solid, non-gasketed and held in place by captive screws.

C. Raintight (NEMA 3R) Wiring Trough:

1. 14 or 16 GA galvanized steel without knockouts.
2. Cover: Non-gasketed and held in place by captive screws.

2.7 CONDUIT FITTINGS AND ACCESSORIES

A. Fittings for Use with RGS:

1. General:
   a. In hazardous locations listed for use in Class I, Groups C and D locations.
2. Locknuts:
   a. Threaded steel or malleable iron.
   b. Gasketed or non-gasketed.
   c. Grounding or non-grounding type.
3. Bushings:
   a. Threaded, insulated metallic.
   b. Grounding or non-grounding type.
4. Hubs: Threaded, insulated and gasketed metallic for raintight connection.
5. Couplings:
   a. Threaded straight type: Same material and finish as the conduit with which they are used on.
   b. Threadless type: Gland compression or self-threading type, concrete tight.
6. Unions: Threaded galvanized steel or zinc plated malleable iron.
7. Conduit bodies (ells and tees):
   a. Body: Zinc plated cast iron or cast copper free aluminum with threaded hubs.
   b. Standard and mogul size.
   c. Cover:
      1) Clip-on type with stainless steel screws.
      2) Gasketed or non-gasketed galvanized steel, zinc plated cast iron or cast copper free aluminum.
8. Conduit bodies (round):
   a. Body: Zinc plated cast iron or cast copper free aluminum with threaded hubs.
   b. Cover: Threaded screw on type, gasketed, galvanized steel, zinc plated cast iron or cast copper free aluminum.
9. Sealing fittings:
   a. Body: Zinc plated cast iron or cast copper free aluminum with threaded hubs.
   b. Standard and mogul size.
   c. With or without drain and breather.
   d. Fiber and sealing compound: UL listed for use with the sealing fitting.
10. Hazardous location flexible coupling (HAZ-FLEX):
    a. Liquid tight and arc resistant.
    b. Electrically conductive so no bonding jumper is required.
    c. Dry and wet areas:
       1) Bronze braided covering over flexible brass core.
       2) Bronze end fittings.
       3) Zinc-plated steel or malleable iron unions and nipples.
    d. Corrosive areas:
       1) Stainless steel braided covering over flexible stainless steel core.
       2) Stainless steel end fittings.
       3) Aluminum unions and nipples.
11. Service entrance head:
    a. Malleable iron, galvanized steel or copper free aluminum.

b. Insulated knockout cover for use with a variety of sizes and number of conductors.

12. Expansion couplings:
    a. 2 IN nominal straight-line conduit movement in either direction.
    b. Galvanized steel with insulated bushing.
    c. Gasketed for wet locations.
    d. Internally or externally grounded.
13. Expansion/deflection couplings:
    a. 3/4 IN nominal straight-line conduit movement in either direction.
    b. 30 DEG nominal deflection from the normal in all directions.
    c. Metallic hubs, neoprene outer jacket and stainless steel jacket clamps.
    d. Internally or externally grounded.
    e. Watertight, raintight and concrete tight.
14. Standards: UL 467, UL 514B, UL 1203.

B. Fittings for Use with EMT:

1. Connectors:
    a. Straight, angle and offset types furnished with locknuts.
    b. Zinc plated steel.
    c. Insulated gland compression type.
    d. Concrete and raintight.
2. Couplings:
    a. Zinc plated steel.
    b. Gland compression type.
    c. Concrete and raintight.
3. Conduit bodies (ells and tees):
    a. Body: Copper free aluminum with threaded hubs.
    b. Standard and mogul size.
    c. Cover:
        1) Screw down type with steel screws.
        2) Gasketed or non-gasketed galvanized steel or copper free aluminum.
4. Standard: UL 514B.

C. Fittings for Use with FLEX:

1. Connector:
    a. Zinc plated malleable iron.
    b. Squeeze or clamp-type.
2. Standard: UL 514B.

D. Fittings for Use with FLEX-LT:

1. Connector:
    a. Straight or angle type.
    b. Metal construction, insulated and gasketed.
    c. Composed of locknut, grounding ferrule and gland compression nut.
    d. Liquid tight.
2. Standards: UL 467, UL 514B.

E. Fittings for Use with Rigid Nonmetallic PVC Conduit:

1. Coupling, adapters and conduit bodies:

a. Same material, thickness, and construction as the conduits with which they are used.
b. Homogeneous plastic free from visible cracks, holes or foreign inclusions.
c. Bore smooth and free of blisters, nicks or other imperfections which could damage the conductor.

2. Solvent cement for welding fittings shall be supplied by the same manufacturer as the conduit and fittings.
3. Standards: ASTM D2564, NEMA TC 3, UL 651, UL 514B.

F. Weather and Corrosion Protection Tape:

1. PVC based tape, 10 mils thick.
2. Protection against moisture, acids, alkalis, salts and sewage and suitable for direct bury.
3. Used with appropriate pipe primer.

2.8 ALL RACEWAY AND FITTINGS

A. Mark Products:

1. Identify the nominal trade size on the product.
2. Stamp with the name or trademark of the manufacturer.

2.9 OUTLET BOXES

A. Metallic Outlet Boxes:

1. Hot-dip galvanized steel.
2. Conduit knockouts and grounding pigtail.
3. Styles:
   a. 2 IN x 3 IN rectangle.
   b. 4 IN square.
   c. 4 IN octagon.
   d. Masonry/tile.
4. Accessories:
   a. Flat blank cover plates.
   b. Barriers.
   c. Extension, plaster or tile rings.
   d. Box supporting brackets in stud walls.
   e. Adjustable bar hangers.
5. Standards: NEMA/ANSI OS 1, UL 514A.

B. Cast Outlet Boxes:

1. Zinc plated cast iron or die-cast copper free aluminum with manufacturer's standard finish.
2. Threaded hubs and grounding screw.
3. Styles:
   a. "FS" or "FD".
   b. "Bell".
   c. Single or multiple gang and tandem.
   d. "EDS" or "EFS" for hazardous locations.
4. Accessories: 40 MIL PVC exterior coating and 2 MIL urethane interior coating.
5. Standards: UL 514A, UL 1203.

C. See Specification Section 26 27 26 for wiring devices, wallplates and coverplates.

2.10 PULL AND JUNCTION BOXES

A. NEMA 1 Rated:

1. Body and cover: 14 GA minimum, galvanized steel or 14 GA minimum, steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
2. With or without concentric knockouts on four sides.
3. Flat cover fastened with screws.

B. NEMA 3R Rated:

1. Body and cover: 14 GA minimum, steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
2. Drip shield top and seam-free sides, front and back.
3. With or without concentric knockouts on bottom.
4. Slip-on removable cover fastened on bottom edge with screws or continuous hinged cover fastened with screws.

C. NEMA 4X Rated (metallic):

1. Body and cover: 14 GA Type 304 or 316 stainless steel.
2. Seams continuously welded and ground smooth.
3. No knockouts.
4. External mounting flanges.
5. Hinged door and stainless steel screws and clamps.
6. Door with oil-resistant gasket.

D. NEMA 4X Rated (Nonmetallic):

1. Body and cover: Ultraviolet light protected fiberglass-reinforced polyester boxes.
2. No knockouts.
3. External mounting flanges.
4. Hinged door with quick release latches and padlocking hasp.
5. Door with oil resistant gasket.

E. Miscellaneous Accessories:

1. Rigid handles for covers larger than 9 SQFT or heavier than 25 LBS.
2. Split covers when heavier than 25 LBS.
3. Weldnuts for mounting optional panels and terminal kits.
4. Terminal blocks: Screw-post barrier-type, rated 600 volt and 20 ampere minimum.

F. Standards: NEMA 250, UL 50.

2.11 SUPPORT SYSTEMS

A. Multi-conduit Surface or Trapeze Type Support and Pull or Junction Box Supports:

1. Material requirements.
   a. Galvanized steel: ASTM A123/A123M or ASTM A153/A153M.
   b. Stainless steel: AISI Type 316.

B. Single Conduit and Outlet Box Support Fasteners:

1. Material requirements:
   a. Zinc plated steel.
   b. Stainless steel.
   c. Malleable iron.

PART 3 - EXECUTION

3.1 RACEWAY INSTALLATION - GENERAL

A. Shall be in accordance with the requirements of:

1. NFPA 70.
2. Manufacturer instructions.

B. Size of Raceways:

1. Raceway sizes are shown on the Drawings, if not shown on the Drawings, then size in accordance with NFPA 70.
2. Unless specifically indicated otherwise, the minimum raceway size shall be:
   a. Conduit: 3/4 IN.
   b. Wireway: 2-1/2 IN x 2-1/2 IN.

C. Field Bending and Cutting of Conduits:

1. Utilize tools and equipment recommended by the manufacturer of the conduit, designed for the purpose and the conduit material to make all field bends and cuts.
2. Do not reduce the internal diameter of the conduit when making conduit bends.
3. Prepare tools and equipment to prevent damage to the PVC coating.
4. Degrease threads after threading and apply a zinc rich paint.
5. Debur interior and exterior after cutting.

D. Male threads of conduit systems shall be coated with an electrically conductive anti-seize compound.

E. The protective coating integrity of conduits, fittings, outlet, pull and junction boxes and accessories shall be maintained.

1. Repair galvanized components utilizing a zinc rich paint.
2. Repair painted components utilizing touch up paint provided by or approved by the manufacturer.
3. Repair PVC coated components utilizing a patching compound, of the same material as the coating, provided by the manufacturer of the conduit; or a self-adhesive, highly conformable, cross-linked silicone composition strip, followed by a protective coating of vinyl tape.
   a. Total nominal thickness: 40 MIL.
4. Repair surfaces which will be inaccessible after installation prior to installation.

F. Remove moisture and debris from conduit before wire is pulled into place.

1. Pull mandrel with diameter nominally 1/4 IN smaller than the interior of the conduit, to remove obstructions.
2. Swab conduit by pulling a clean, tight-fitting rag through the conduit.
3. Tightly plug ends of conduit with tapered wood plugs or plastic inserts until wire is pulled.

G. Only nylon or polyethylene rope shall be used to pull wire and cable in conduit systems.

H. Where portions of a raceway are subject to different temperatures and where condensation is known to be a problem, as in cold storage areas of buildings or where passing from the interior to the exterior of a building, the raceway shall be sealed to prevent circulation of warm air to colder section of the raceway.

I. Fill openings in walls, floors, and ceilings and finish flush with surface.

3.2 RACEWAY ROUTING

A. Raceways shall be routed in the field unless otherwise indicated.

1. Conduit and fittings shall be installed, as required, for a complete system that has a neat appearance and is in compliance with all applicable codes.
2. Run in straight lines parallel to or at right angles to building lines.
3. Do not route conduits:
   a. Through areas of high ambient temperature or radiant heat.

b. In suspended concrete slabs.

4. Conduit shall not interfere with, or prevent access to, piping, valves, ductwork, or other equipment for operation, maintenance and repair.
5. Provide pull boxes or conduit bodies as needed so that there is a maximum of 360 DEG of bends in the conduit run or in long straight runs to limit pulling tensions.

B. All conduits within a structure shall be installed exposed except as follows:

1. As indicated on the Drawings.
2. Concealed above gypsum wall board or acoustical tile suspended ceilings.
3. Conduits in architecturally finished areas shall be concealed.
4. Embedded in floor slabs or buried under floor slabs where shown on the Contract Drawings or with the Engineer's permission.

C. Maintain minimum spacing between parallel conduit and piping runs in accordance with the following when the runs are greater than 30 FT:

1. Between instrumentation and telecommunication: 1 IN.
2. Between instrumentation and 125 V, 48 V and 24 VDC, 2 IN.
3. Between instrumentation and 600 V and less AC power or control: 6 IN.
4. Between telecommunication and 125 V, 48 V and 24 VDC, 2 IN.
5. Between telecommunication and 600 V and less AC power or control: 6 IN.
6. Between 125 V, 48 V and 24 VDC and 600 V and less AC power or control: 2 IN.
7. Between 125 V, 48 V and 24 VDC and greater than 600 VAC power: 2 IN.
8. Between process, gas, air and water pipes: 6 IN.

D. Conduits shall be installed to eliminate moisture pockets.

1. Where water cannot drain to openings, provide drain fittings in the low spots of the conduit run.

E. Conduit shall not be routed on the exterior of structures except as specifically indicated on the Drawings.

F. Where sufficient room exists within the housing of roof-mounted equipment, the conduit shall be stubbed up inside the housing.

G. Provide all required openings in walls, floors, and ceilings for conduit penetration.

3.3 RACEWAY APPLICATIONS

A. Permitted Raceway Types Per Wire or Cable Types:

1. Power wire or cables: All raceway types.
2. Control wire or cables: All raceway types.
3. Instrumentation cables: Metallic raceway except nonmetallic may be used underground.
4. Telecommunication cables: All raceway types.

B. Permitted Raceway Types Per Area Designations:

1. Dry areas:
   a. RGS.
2. Wet areas:
   a. RGS.
   b. PVC-RGS.

C. Permitted Raceway Types Per Routing Locations:

1. In stud framed walls:
   a. EMT.

2. In concrete block or brick walls:
    a. PVC-40.
3. Above acoustical tile ceilings:
    a. EMT.
    b. NEMA 1 rated wireway.
4. Embedded in poured concrete walls and floors:
    a. PVC-40.
    b. RGS wrapped with factory applied weather and corrosion protection tape when emerging from concrete into areas designated as dry, wet, corrosive or highly corrosive.
5. Beneath floor slab-on-grade:
    a. PVC-40.
6. Through floor penetrations:
    a. RGS wrapped with factory applied weather and corrosion protection tape when emerging from concrete into areas designated as dry, wet, corrosive or highly corrosive.
    b. Fiberglass (above grade rated) in areas designated as wet, corrosive or highly corrosive.
    c. PVC-RGS in areas designated as wet, corrosive or highly corrosive.
7. Direct buried conduits and ductbanks:
    a. PVC-40.
    b. 90 DEG elbows for transitions to above grade:
        1) RGS wrapped with factory applied weather and corrosion protection tape.
        2) PVC-RGS.
        3) Fiberglass (above grade rated).
    c. Long sweeping bends greater than 15 DEG:
        1) RGS wrapped with factory applied weather and corrosion protection tape.
8. Concrete encased ductbanks:
    a. PVC-40.
    b. Coilable HDPE Conduit.
    c. Long sweeping bends greater than 15 DEG:
        1) RGS for sizes 2 IN and larger.

D. FLEX conduits shall be installed for connections to light fixtures, HVAC equipment and other similar devices above the ceilings.
    1. The maximum length shall not exceed:
        a. 6 FT to light fixtures.
        b. 3 FT to all other equipment.

E. FLEX-LT conduits shall be install as the final conduit connection to light fixtures, dry type transformers, motors, electrically operated valves, instrumentation primary elements, and other electrical equipment that is liable to vibrate.
    1. The maximum length shall not exceed:
        a. 6 FT to light fixtures.
        b. 3 FT to motors.
        c. 2 FT to all other equipment.

F. NEMA 1 Rated Wireway:
    1. Surface mounted in electrical rooms.
    2. Surface mounted above removable ceilings tiles of an architecturally finished area.

G. NEMA 3R Wiring Trough:

1. Surface mounted in exterior locations.

H. NEMA 4X Rated Wireway:

1. Surface mounted in areas designated as wet and or corrosive.

I. Underground Conduit: See Specification Section 26 05 43.

3.4 CONDUIT FITTINGS AND ACCESSORIES

A. Rigid nonmetallic conduit and fittings shall be joined utilizing solvent cement.

1. Immediately after installation of conduit and fitting, the fitting or conduit shall be rotated 1/4 turn to provide uniform contact.

B. Install Expansion Fittings:

1. Where conduits are exposed to the sun and conduit run is greater than 200 FT.
2. Elsewhere as identified on the Drawings.

C. Install Expansion/Deflection Fittings:

1. Where conduits enter a structure.
   a. Except electrical manholes and handholes.
   b. Except where the ductbank is tied to the structure with rebar.
2. Where conduits span structural expansions joints.
3. Elsewhere as identified on the Drawings.

D. Threaded connections shall be made wrench-tight.

E. Conduit joints shall be watertight:

1. Where subjected to possible submersion.
2. In areas classified as wet.
3. Underground.

F. Terminate Conduits:

1. In metallic outlet boxes:
   a. RGS:
      1) Conduit hub and locknut.
      2) Insulated bushing and two locknuts.
      3) Use grounding type locknut or bushing when required by NFPA 70.
   b. EMT: Compression type connector and locknut.
2. In NEMA 1 rated enclosures:
   a. RGS:
      1) Conduit hub and locknut.
      2) Insulated bushing and two locknuts.
      3) Use grounding type locknut or bushing when required by NFPA 70.
   b. EMT: Compression type connector and locknut.
3. In NEMA 4 rated enclosures:
   a. Watertight, insulated and gasketed hub and locknut.
4. When stubbed up through the floor into floor mount equipment:
   a. With an insulated grounding bushing on metallic conduits.
   b. With end bells on nonmetallic conduits.

3.5 CONDUIT SUPPORT

A. Permitted multi-conduit surface or trapeze type support system per area designations and conduit types:

1. Dry or wet and/or hazardous areas:
    a. Galvanized system consisting of: Galvanized steel channels and fittings, nuts and hardware and conduit clamps.

B. Permitted single conduit support fasteners per area designations and conduit types:
    1. Architecturally finished areas:
        a. Material: Zinc plated steel, or steel protected with zinc phosphate and oil finish.
        b. Types of fasteners: Spring type hangers and clips, straps, hangers with bolts, clamps with bolts and bolt on beam clamps.
        c. Provide anti-rattle conduit supports when conduits are routed through metal studs.
    2. Dry or wet and/or hazardous areas:
        a. Material: Zinc plated steel, stainless steel and malleable iron.
        b. Types of fasteners: Straps, hangers with bolts, clamps with bolts and bolt on beam clamps.
    3. Conduit type shall be compatible with the support fastener material.
        a. Zinc plated steel, steel protected with zinc phosphate and oil finish and malleable iron fasteners may be used with RGS and EMT.
        b. Nonmetallic fasteners may be used with PVC-40, PVC-80 and fiberglass.

C. Conduit Support General Requirements:
    1. Maximum spacing between conduit supports per NFPA 70.
    2. Support conduit from the building structure.
    3. Do not support conduit from process, gas, air or water piping; or from other conduits.
    4. Provide hangers and brackets to limit the maximum uniform load on a single support to 25 LBS or to the maximum uniform load recommended by the manufacturer if the support is rated less than 25 LBS.
        a. Do not exceed maximum concentrated load recommended by the manufacturer on any support.
        b. Conduit hangers:
            1) Continuous threaded rods combined with struts or conduit clamps: Do not use perforated strap hangers and iron bailing wire.
        c. Do not use suspended ceiling support systems to support raceways.
        d. Hangers in metal roof decks:
            1) Utilize fender washers.
            2) Not extend above top of ribs.
            3) Not interfere with vapor barrier, insulation, or roofing.
    5. Conduit support system fasteners:
        a. Use sleeve-type expansion anchors as fasteners in masonry wall construction.
        b. Do not use concrete nails and powder-driven fasteners.

3.6 OUTLET, PULL AND JUNCTION BOX INSTALLATION

A. General:
    1. Install products in accordance with manufacturer's instructions.
    2. See Specification Section 26 05 00 and the Drawings for area classifications.
    3. Fill unused punched-out, tapped, or threaded hub openings with insert plugs.
    4. Size boxes to accommodate quantity of conductors enclosed and quantity of conduits connected to the box.

B. Outlet Boxes:
    1. Permitted uses of metallic outlet boxes:

a. Housing of wiring devices:
    1) Recessed in all stud framed walls and ceilings.
    2) Recessed in poured concrete, concrete block and brick walls of architecturally finished areas and exterior building walls.
b. Pull or junction box:
    1) Above gypsum wall board or acoustical tile ceilings.
    2) Above 10 FT in an architecturally finished area where there is no ceiling.
    3) Above 10 FT in dry non-architecturally finished areas.

2. Permitted uses of cast outlet boxes:
    a. Housing of wiring devices surface mounted in non-architecturally finished dry, wet, corrosive, highly corrosive and hazardous areas.
    b. Pull and junction box surface mounted in non-architecturally finished dry, wet areas.
3. Mount device outlet boxes where indicated on the Drawings and at heights as scheduled in Specification Section 26 05 00.
4. Set device outlet boxes plumb and vertical to the floor.
5. Outlet boxes recessed in walls:
    a. Install with appropriate stud wall support brackets or adjustable bar hangers so that they are flush with the face of the wall.
    b. Locate in ungrouted cell of concrete block with bottom edge of box flush with bottom edge of block and flush with the face of the block.
6. Place barriers between switches in boxes with 277 V switches on opposite phases.
7. Back-to-back are not permitted.

C. Pull and Junction Boxes:

1. Install pull or junction boxes in conduit runs where indicated or required to facilitate pulling of wires or making connections.
    a. Make covers of boxes accessible.
2. Permitted uses of NEMA 1 enclosure:
    a. Pull or junction box surface mounted above removable ceiling tiles of an architecturally finished area.
3. Permitted uses of NEMA 3R enclosure:
    a. Pull or junction box surface mounted in exterior locations.
4. Permitted uses of NEMA 4 enclosure:
    a. Pull or junction box surface mounted in areas designated as wet.

END OF SECTION

SECTION 26 05 43
ELECTRICAL - EXTERIOR UNDERGROUND

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Material and installation requirements for:
   a. Handhole.
   b. Underground conduits and ductbanks.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Procurement and Contracting Requirements.
2. Section 26 05 26 - Grounding.
3. Section 26 05 33 - Raceways and Boxes.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American Association of State Highway and Transportation Officials (AASHTO):
   a. HB-17, Standard Specifications for Highway Bridges.
2. ASTM International (ASTM):
   a. A536, Standard Specification for Ductile Iron Castings.
3. National Fire Protection Association (NFPA):
   a. 70, National Electrical Code (NEC).
4. Society of Cable Telecommunications Engineers (SCTE):
   a. 77, Specifications for Underground Enclosure Integrity.

1.3 DEFINITIONS

A. Direct-Buried Conduit(s):

1. Individual (single) underground conduit.
2. Multiple underground conduits, arranged in one or more planes, in a common trench.

B. Concrete Encased Ductbank: An individual (single) or multiple conduit(s), arranged in one or more planes, encased in a common concrete envelope.

1.4 SUBMITTALS

A. Shop Drawings:

1. Product technical data:
   a. Provide submittal data for all products specified in PART 2 of this Specification Section.
2. Fabrication and/or layout drawings:
   a. Provide dimensional drawings of each manhole indicating all specified accessories and conduit entry locations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Prefabricated composite handholes:
   a. Armorcast Products Company.

b. Quazite by Hubbell.
c. Synertech by Oldcastle Enclosure Solutions.

2. Precast handholes:
   a. Lister Industries Ltd.
   b. Oldcastle Enclosure Solutions.
   c. Jensen Precast and Utility Concrete Products.
3. Handhole and ductbank accessories:
   a. Cantex, Inc.
   b. Condux International, Inc.
   c. Neenah Enterprises, Inc.
   d. Prime Conduit.
   e. Thomas and Betts.
   f. Underground Devices, Inc.
   g. Unistrut by Atkore International, Inc.

2.2 MANHOLES AND HANDHOLES

A. Prefabricated Composite Material Handholes:

1. Handhole body and cover: Fiberglass reinforced polymer concrete conforming to all test provisions of SCTE 77.
2. Minimum load ratings: SCTE 77 Tier 22.
3. Open bottom.
4. Stackable design as required for specified depth.
5. Cover:
   a. Engraved legend of "ELECTRIC" or "COMMUNICATIONS".
   b. Non-gasketed bolt down with stainless steel penta head bolts.
   c. Lay-in non-bolt down, when cover is over 100 LBS.
   d. One or multiple sections so the maximum weight of a section is 125 LBS.
6. Cover lifting hook: 24 IN minimum in length.

B. Precast Handholes:

1. Fiberglass reinforced polymer concrete or steel reinforced cement concrete structures:
2. AASHTO live load rating: H-20 for full deliberate vehicle traffic.
3. Mating edges: Tongue and groove type.
4. Solid bottom with a 12 IN x 12 IN or 12 IN DIA french drain in the bottom of each manhole.

2.3 CONCRETE HANDHOLE ACCESSORIES

A. Cover and Frame:

1. Cast ductile iron: ASTM A536.
2. AASHTO live load rating: H-20.
3. Diameter: 30 IN.
4. Cast the legend "ELECTRICAL" or "COMMUNICATIONS" into manhole and handhole covers.

2.4 UNDERGROUND CONDUIT AND ACCESSORIES

A. Concrete and reinforcing steel: See Division 03 Specifications.

B. Conduit: See Specification Section 26 05 33.

C. Duct Spacers/Supports:

1. High density polyethylene or high impact polystyrene.

2. Interlocking web or mesh design.
3. Provide 3 IN minimum spacing between conduits.
4. Accessories, as required:
    a. Hold down bars.
    b. Ductbank strapping.

PART 3 - EXECUTION

3.1 GENERAL

A. Drawings indicate the intended location of manholes and handholes and routing of ductbanks and direct buried conduit.

1. Field conditions may affect actual routing.

B. Manhole and Handhole Locations:

1. Approximately where shown on the Drawings.
2. As required for pulling distances.
3. As required to keep pulling tensions under allowable cable tensions.
4. As required for number of bends in ductbank routing.
5. Shall not be installed in a swale or ditch.
6. Determine the exact locations after careful consideration has been given to the location of other utilities, grading, and paving.
7. Locations are to be approved by the Engineer prior to excavation and placement or construction of manholes and handholes.

C. Install products in accordance with manufacturer's instructions.

D. Install manholes and handholes in conduit runs where indicated or as required to facilitate pulling of wires or making connections.

3.2 MANHOLES AND HANDHOLES

A. Prefabricated Composite Material Handholes:

1. For use in areas subjected to occasional non-deliberate vehicular traffic.
2. Place handhole on a foundation of compacted 1/4 to 1/2 IN crushed rock or gravel a minimum of 8 IN thick and 6 IN larger than handholes footprint on all sides.
3. Provide concrete encasement ring around handhole per manufacturers installation instructions (minimum of 10 IN wide x 12 IN deep).
4. Install so that the surrounding grade is 1 IN lower than the top of the handhole.
5. Size: As indicated on the Drawings or as required for the number and size of conduits.
6. Provide cable rails and pulling eyes as needed.

B. Precast Manholes and Handholes:

1. For use in vehicular and non-vehicular traffic areas.
2. Construction:
    a. Grout or seal all joints, per manufacturer's instructions.
    b. In each manhole and handhole, drive 3/4 IN x 10 FT long copper clad ground rod into the earth with approximately 6 IN exposed above finished floor.
        1) Drill opening in floor for ground rod.
        2) Connect all metallic components to ground rod by means of #8 AWG minimum copper wire and approved grounding clamps.
3. Place manhole or handhole on a foundation of compacted 1/4 to 1/2 IN crushed rock or gravel a minimum of 8 IN thick and 6 IN larger than manholes or handholes footprint on all sides.

4. Install so that the top of cover is 1 IN above finished grade.
    a. Where existing grades are higher than finished grades, install sufficient number of courses of curved segmented concrete block between top of handhole and manhole frame to temporarily elevate manhole cover to existing grade level.
5. After installation is complete, backfill and compact soil around manholes and handholes.
6. Handhole size:
    a. As indicated on the Drawings or as required for the number and size of conduits entering or as indicated on the Drawings.
    b. Minimum floor dimension of 4 FT x 4 FT and minimum depth of 4 FT.

3.3 UNDERGROUND CONDUITS

A. General Installation Requirements:

1. Ductbank types per location:
    a. Concrete encased ductbank:
        1) Under roads.
        2) Pad mounted transformer secondaries.
        3) __As indicated on the drawings.
        4) As indicated in the Ductbank Schedule.
2. Do not place concrete or soil until conduits have been observed by the Engineer.
3. Ductbanks shall be sloped a minimum of 4 IN per 100 FT or as detailed on the Drawings.
    a. Low points shall be at manholes or handholes.
4. During construction and after conduit installation is complete, plug the ends of all conduits.
5. Provide conduit supports and spacers.
    a. Place supports and spacers for rigid nonmetallic conduit on maximum centers as indicated for the following trade sizes:
        1) 1 IN and less: 3 FT.
        2) 1-1/4 to 3 IN: 5 FT.
        3) 3-1/2 to 6 IN: 7 FT.
    b. Place supports and spacers for rigid steel conduit on maximum centers as indicated for the following trade sizes:
        1) 1 IN and less: 10 FT.
        2) 1-1/4 to 2-1/2 IN: 14 FT.
        3) 3 IN and larger: 20 FT.
    c. Securely anchor conduits to supports and spacers to prevent movement during placement of concrete or soil.
6. Stagger conduit joints at intervals of 6 IN vertically.
7. Make conduit joints watertight and in accordance with manufacturer's recommendations.
8. Accomplish underground changes in direction of runs exceeding a total of 15 DEG by long sweep bends having a minimum radius of 25 FT.
    a. Sweep bends may be made up of one or more curved or straight sections or combinations thereof.
9. Furnish manufactured elbows at end of runs.
    a. Minimum radius of 18 IN for conduits less than 3 IN trade size and 36 IN for conduits 3 IN trade size and larger.
10. Field cuts requiring tapers shall be made with the proper tools and shall match factory tapers.
11. After the conduit run has been completed:
    a. Prove joint integrity and test for out-of-round duct by pulling a test mandrel through each conduit.

1) Test mandrel:
a) Length: Not less than 12 IN.
b) Diameter: Approximately 1/4 IN less than the inside diameter of the conduit.

b. Clean the conduit by pulling a heavy duty wire brush mandrel followed by a rubber duct swab through each conduit.

12. Pneumatic rodding may be used to draw in lead wire.
    a. Install a heavy nylon cord free of kinks and splices in all unused new ducts.
    b. Extend cord 3 FT beyond ends of conduit.
13. Transition from rigid nonmetallic conduit to rigid metallic conduit, per Specification Section 26 05 33, prior to entering a structure or going above ground.
14. Place warning tape in trench directly over ductbanks, direct-buried conduit, and direct-buried wire and cable.
15. Placement of conduits stubbing into handholes and manholes shall be located to allow for proper bending radiuses of the cables.

B. Concrete Encased Ductbank:

1. Ductbank system consists of conduits completely encased in minimum 3 IN of concrete on each side of conduit and with separations between different cabling types as required in Specification Section 26 05 33 or as detailed on the Drawings.
2. Install so that top of concrete encased duct, at any point:
    a. Is not less than 24 IN below grade.
    b. Is below pavement sub-grading.
3. Where identified and for a distance 10 FT either side of the area, the concrete shall be reinforced.
    a. The reinforcement shall consist of #4 bars and #4 ties placed 12 IN on center, in accordance with Division 03 Specification Sections or as detailed on the Drawings.
    b. Conduit supports to be staggered to minimize weak vertical shear point.
4. Conduit supports shall provide a uniform minimum clearance of 3 IN between the bottom of the trench and the bottom row of conduit.
5. Conduit separators shall provide a uniform minimum clearance of 3 IN between conduits or as required in Specification Section 26 05 33 for different cabling types.

C. Direct-Buried Conduit(s):

1. Install so that the top of the uppermost conduit, at any point:
    a. Is not less than 30 IN below grade.
    b. Is below pavement sub-grading.
2. Provide a uniform minimum clearance of 3 IN between conduits or as required in Specification Section 26 05 33 for different cabling types.
    a. Maintain the separation of multiple planes of conduits by one of the following methods:
        1) Install multilevel conduits with the use of conduit supports and separators to maintain the required separations, and backfill with flowable fill (100 PSI).
        2) Install the multilevel conduits one level at a time.
            a) Each level is backfilled with the appropriate amount of soil and compaction.

END OF SECTION

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SECTION 26 08 13
ACCEPTANCE TESTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Basic requirements for acceptance testing.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. InterNational Electrical Testing Association (NETA):
   a. ATS, Standard for Acceptance Testing Specifications for Electric Power Equipment and Systems.
2. Nationally Recognized Testing Laboratory (NRTL).
3. Telecommunications Industry Association/Electronic Industries Alliance/American National Standards Institute (TIA/EIA/ANSI):
   a. 455-78-B, Optical Fibres - PART 1-40: Measurement Methods and Test Procedures - Attenuation.

B. Qualifications:

1. Testing firm:
   a. An independent firm performing, as the sole or principal part of its business for a minimum of 10 years, the inspection, testing, calibration , and adjusting of systems.
   b. Must have an established monitoring and testing equipment calibration program with accuracy traceable in an unbroken chain, according to NIST.
2. Field personnel:
   a. Minimum of one year field experience covering all phases of electrical equipment inspection, testing, and calibration.
   b. Relay test technician having previous experience with testing and calibration of relays of the same manufacturer and type used on project and proficient in setting and testing the types of protection elements used.
   c. Supervisor certified by NETA or NICET.
      1) As an alternative, supervising technician may be certified by the equipment manufacturer
3. Analysis personnel:
   a. Minimum three years combined field testing and data analysis experience.
   b. Supervisor certified by NETA or NICET.
      1) As an alternative, supervising technician may be certified by the equipment manufacturer.

C. Phasing Diagram:

1. Coordinate with Utility Company for phase rotations and Phase A, B and C markings.
   a. Create a phasing diagram showing the coordinated phase rotations with generators and motors through the transformers.

1.3 SUBMITTALS

A. Shop Drawings:

1. Equipment Monitoring and Testing Plan.

B. Informational Submittals:

1. Prior to energizing equipment:
    a. Coordinated phasing diagram.
    b. Photocopies of continuity tests.
2. Within two weeks after successful completion of Demonstration Period (Commissioning Period):
    a. Single report containing information including:
        1) Summary of Project.
        2) Information from pre-energization testing.
        3) Testing and monitoring reports.

PART 2 - PRODUCTS

2.1 FACTORY QUALITY CONTROL

A. Provide Electrical equipment with all factory tests required by the applicable industry standards or NRTL.

B. Factory testing will not be accepted in lieu of specified field acceptance testing requirements.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. General:

1. Complete electrical testing in three phases:
    a. Pre-energization testing phase.
    b. Equipment energized with no load.
    c. Equipment energized under load.
2. Perform testing in accordance with this Specification Section and NETA ATS.
3. Provide field setting and programming of all adjustable protective devices and meters to settings as determined by the approved coordination study.
4. Equip testing and analysis personnel with all appropriate project related reference material required to perform tests, analyze results, and provide documentation including, but not limited to:
    a. Contract Drawings and Specifications.
    b. Related construction change documentation.
    c. Approved Shop Drawings.
    d. Approved Operation and Maintenance Manuals.
    e. Other pertinent information as required.

B. Equipment Monitoring and Testing Plan:

1. Approved in accordance with Shop Drawing submittal schedule.
2. Included as a minimum:
    a. Qualifications of firm, field personnel, and analysis personnel doing the Work.
    b. List and description of testing and analysis equipment to be utilized.
    c. List of all equipment to be testing, including:
        1) Name and tag numbers identified in the Contract Documents.
        2) Manufacturer’s serial numbers.
        3) Other pertinent manufacturer identification,

C. Instruments Used in Equipment and Connections Quality Control Testing:

1. Minimum calibration frequency:
    a. Field analog instruments: Not more than 6 months.

b. Field digital instruments: Not more than 12 months.
c. Laboratory instruments: Not more than 12 months.
d. If instrument manufacturer's calibration requirements are more stringent, those requirements shall govern.

2. Carry current calibration status and labels on all testing instruments.
3. See individual testing programs for additional instrumentation compliance requirements.

D. Testing and Monitoring Program Documentation:

1. Provide reports with tabbed sections for each piece of equipment tested.
2. Include all testing results associated with each piece of equipment under that equipment's tabbed section.
   a. Include legible copies of all forms used to record field test information.
3. Prior to start of testing, submit one copy of preliminary report format for Engineer review and comment
   a. Include data gathering and sample test report forms that will be utilized.
4. In the final report, include as a minimum, the following information for all equipment tested:
   a. Equipment identification, including:
      1) Name and tag numbers identified in the Contract Documents.
      2) Manufacturer's serial numbers.
      3) Other pertinent manufacturer identification,
   b. Date and time of each test.
   c. Ambient conditions including temperature, humidity, and precipitation.
   d. Visual inspection report.
   e. Description of test and referenced standards, if any, followed while conducting tests.
   f. Results of initial and all retesting.
   g. Acceptance criteria.
   h. "As found" and "as left" conditions.
   i. Corrective action, if required, taken to meet acceptance.
   j. Verification of corrective action signed by the Contractor, equipment supplier, and Owner's representative.
   k. Instrument calibration dates of all instruments used in testing.
5. Provide three (3) bound final reports prior to Project final completion.

E. Electrical Equipment and Connections Testing Program:

1. See individual Division 26 Specification Sections for equipment specific testing requirements.
2. Test all electrical equipment.
   a. Perform all required NETA testing.
   b. Perform all required NETA testing plus the optional testing identified with each specific type of equipment in Article 3.2 of this Specification Section.

3.2 SPECIFIC EQUIPMENT TESTING REQUIREMENTS

A. Switchgear and Switchboards:

1. Perform inspections and tests per NETA ATS 7.1.
2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.

B. Transformers - Small Dry Type:

1. Perform inspections and tests per NETA ATS 7.2.1.1.
2. Perform the following additional tests:

a. Record phase-to-phase, phase-to-neutral, and neutral-to-ground voltages at no load after energizing, and at operating load after startup.

3. Adjust tap connections as required to provide secondary voltage within 2-1/2% of nominal under normal load after approval of Engineer.
4. Record as-left tap connections.

C. Transformers - Large Dry Type:

1. Perform inspections and tests per NETA ATS 7.2.1.2.
2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.
3. Perform the following additional tests:
   a. Record phase-to-phase, phase-to-neutral, and neutral-to-ground voltages at no load after energizing, and at operating load after start-up.
4. Adjust tap connections as required to provide secondary voltage within 2-1/2% of nominal under normal load.
5. Record as-left tap connections.

D. Transformers - Liquid Filled:

1. Perform inspections and tests per NETA ATS 7.2.2.
2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.
3. Perform the following additional tests:
   a. Record phase-to-phase, phase-to-neutral, and neutral-to-ground voltages at no load after energizing, and at operating load after start-up.
4. Adjust tap changer setting as required to provide secondary voltage within 2-1/2% of nominal under normal load after approval of Engineer.
5. Record as-left tap changer setting.

E. Transformer Cooling Fans/Temperature Controllers:

1. Verify each temperature sensor is of the correct type and rating and provides the correct output signal at ambient temperature.
2. Using a thermocouple or RTD simulator, verify correct temperature indication and alarm and fan control relay operation by signal injection.
3. Verify operation of controls in manual and automatic mode.
4. Verify operation of all cooling fans, record running current and compare to nameplate value.
5. Verify trip circuit operation where provided.

F. Cable - Low Voltage:

1. Perform inspections and tests per NETA ATS 7.3.2.

G. Cable - Optical Fiber:

1. Perform inspections on tests per TIA/EIA/ANSI 455-78-B, including:
   a. Optical time domain reflectometer test.
   b. Power attenuation test.
   c. Gain margin test.

H. Busway and Busduct:

1. Perform inspections and tests per NETA ATS 7.4.
2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.

I. Air Interrupter Switches:

1. Perform inspections and tests per NETA ATS 7.5 and NETA ATS 7.6.
2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.
3. Perform the following optional tests per NETA ATS on all medium voltage switches:
    a. Insulation resistance phase-to-phase, phase-to-ground in open and closed positions and across each open pole.

J. Low Voltage Power Circuit Breakers:

1. Perform inspections and tests per NETA ATS 7.6.1.2.
    a. Tests shall include primary current injection testing of all breakers at final settings.
    b. Where short-time or instantaneous settings on large frame breakers are beyond the current capability of field testing, primary injection tests at reduced currents shall be permitted if combined with secondary injection calibration test of trip unit at final settings.
2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.
3. Perform the following additional tests:
    a. Shunt trip devices minimum tripping voltage.
4. Record as-left settings.

K. Low Voltage Molded Case Circuit Breakers:

1. Perform inspections and tests per NETA ATS 7.6.1.1.
2. Components:
    a. Test all components per applicable paragraphs of this Specification Section and NETA ATS.
    b. Thermal magnetic breakers: Visual and mechanical inspection per NETA ATS only.
    c. Solid state trip type: Visual and mechanical inspection and electrical tests per NETA ATS.
3. Record as-left settings.

L. Network Protectors:

1. Perform inspections and tests per NETA ATS 7.8.
2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.
3. Perform all tests identified as optional per NETA ATS:
4. Perform the following additional tests:
    a. Verify reverse current sensitivity by opening transformer primary switch with feeder energized and no load on transformer and observing that network protector opens on magnetizing current alone.

M. Protective Relays:

1. Perform inspections and tests per NETA ATS 7.9.
    a. Tests to be performed using secondary injection of 3 PH current and potential at final settings.
    b. Test at manufacturer’s recommended test points and critical timing points identified on relay setting sheet.
2. Perform all tests identified as optional per NETA ATS.
3. Perform the following additional tests:
    a. Verification of direct trip of associated lockout relay or circuit breaker(s) by using relay test function or shorting trip contact at relay case.
    b. Microprocessor-based relays:

1) Complete commissioning procedure per manufacturer's instructions, followed by tests of each relay element at final settings.
2) Verification of all internally-programmed logic.

c. Verification of all auxiliary input and output signals.

d. Verification of power supply/self-diagnostic alarm contact and remote annunciation.

4. Record as-left settings.

N. Instrument Transformers:

1. Perform inspections and tests per NETA ATS 7.10.
2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.
3. Perform the following optional tests per NETA ATS:
   a. Dielectric withstand test on potential transformers.

O. Grounding:

1. Perform inspections and tests per NETA ATS 7.13.
2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.

P. Ground Fault Protection:

1. Perform inspections and tests per NETA ATS 7.14.
2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.
3. Perform the following optional tests per NETA ATS:
   a. Control wiring insulation resistance.
4. Perform the following additional tests for four-wire systems:
   a. Primary current injection into switchgear bus with test set configured to simulate transformer source and high current jumper used to simulate unbalanced load and ground fault conditions.
   b. Verify no tripping for unbalanced load on each feeder and each main breaker.
   c. Verify no tripping for unbalanced load across tie breaker for dual-source schemes.
   d. Verify tripping for ground fault on load side of feeder each feeder and on each main bus.
   e. Verify tripping for ground fault on a single feeder and on each main bus through tie breaker(s) for multiple-source schemes.

Q. Generators:

1. Perform inspections and tests per NETA ATS 7.15.2.
2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.
3. Perform the following additional tests:
   a. Load and cycle crank test per Specification Section 26 32 14.

R. DC Power Systems:

1. Perform inspections and tests per NETA ATS 7.18.
2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.
3. Perform the following optional tests per NETA ATS:
   a. Cell impedance test.

END OF SECTION

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SECTION 26 26 13
PACKAGE POWER SUPPLY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Package power supply consisting of a transformer and panelboard.

B. Related Sections include but are not necessarily limited to:

1. Division 00 - Procurement and Contracting Requirements.
2. Section 26 05 00 - Electrical - Basic Requirements.
3. Section 26 05 26 - Grounding.
4. Section 26 28 00 - Overcurrent and Short Circuit Protective Devices.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
   a. C57.96, Guide for Loading Dry-Type Distribution and Power Transformers.
2. National Electrical Manufacturers Association (NEMA):
   a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
   b. PB 1, Panelboards.
   c. ST 20, Dry Type Transformers for General Applications.
3. Underwriters Laboratories, Inc. (UL):
   a. 67, Standard for Panelboards.
   b. 1561, Standard for Safety Dry-Type General Purpose and Power Transformers.

1.3 SUBMITTALS

A. Shop Drawings:

1. Product technical data:
   a. Provide submittal data for all products specified in PART 2 of this Specification Section.
   b. See Specification Section 26 05 00 for additional requirements.
2. Fabrication and/or layout drawings:
   a. Nameplate drawing.
   b. Panelboard layout with alphanumeric designation, branch circuit breakers size and type, as indicated in the panelboard schedules.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. General Electric.
2. Hammond Power Solutions.
3. Square D by Schneider Electric.
4. Eaton.
5. Siemens Corporation.

2.2 PACKAGED POWER SUPPLY

A. General:

1. Standards: IEEE C57.96, NEMA PB 1, NEMA ST 20, UL 67 and UL 1561.
2. Package power supply includes a main primary circuit breaker, an encapsulated dry-type transformer and a secondary panelboard with main circuit breaker.

B. Ratings:

1. Single or three-phase as indicated on the Drawings.
2. KVA and voltage ratings as indicated on the Drawings.
3. Suitable for use as service entrance equipment.

C. Transformer:

1. Non-ventilated, air cooled, two winding type.
2. Core and coil assembly encapsulated in a proportioned mixture of resin and aggregate to provide a moistureproof, shock resistant seal.
3. Cores:
   a. High grade, non-aging silicon steel with high magnetic permeability, and low hysteresis and eddy current losses.
   b. Magnetic flux densities are to be kept well below the saturation point.
4. Coils: Continuous wound with electrical grade aluminum and grounded to the enclosure.
5. Insulation system: 185 DEGC with a 115 DEGC rise.
6. Taps: Two, 5 PCT FCBN.
7. Sound levels:
   a. Manufacturer shall guarantee not to exceed the following:
      1) 9 kVA and less: 40 dB.
      2) 10 to 30 kVA: 45 dB.

D. Panelboard and Protective Devices:

1. Bus: Aluminum.
2. Factory installed wiring between primary breaker and transformer, secondary breaker and transformer and distribution section.
3. 480 VAC primary circuit breaker: 14,000 AMP minimum interrupting rating.
4. 240 VAC or less secondary circuit breaker: 10,000 AMP minimum interrupting rating.
5. Feeder breakers:
   a. Plug-in type with 10,000 AMP minimum interrupting rating.
   b. See Section 26 28 00 for additional requirements.

E. Enclosure:

1. Main, secondary and feeder circuit breakers enclosed with a padlockable hinged door.
2. Wiring compartment suitable for conduit entry and large enough to allow convenient wiring.
3. Totally enclosed, non-ventilated, NEMA 3R, steel finished with a rust inhibitor primer and manufacturer’s standard paint.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Ground in accordance with Section 26 05 26 or as indicated on the Drawings.

END OF SECTION

SECTION 26 27 26
WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Material and installation requirements for:
    a. Wall switches.
    b. Receptacles.
    c. Device wallplates and coverplates.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Procurement and Contracting Requirements.
2. Section 26 05 00 - Electrical - Basic Requirements.
3. Section 26 05 33 - Raceways and Boxes.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. National Electrical Manufacturers Association (NEMA):
    a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
    b. WD 1, General Color Requirements for Wiring Devices.
    c. WD 6, Wiring Devices - Dimensional Requirements.
2. Underwriters Laboratories, Inc. (UL):
    a. 20, General-Use Snap Switches.
    b. 498, Standard for Attachment Plugs and Receptacles.
    c. 514A, Metallic Outlet Boxes.
    d. 894, Standard for Switches for Use in Hazardous (Classified) Locations.
    e. 943, Ground-Fault Circuit-Interrupters.
    f. 1010, Standard for Receptacle-Plug Combinations for Use in Hazardous (Classified) Locations.

1.3 SUBMITTALS

A. Shop Drawings:

1. Product technical data:
    a. Provide submittal data for all products specified in PART 2 of this Specification Section.
    b. See Specification Section 26 05 00 for additional requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Wall switches and receptacles:
    a. Cooper Wiring Devices by Eaton.
    b. Hubbell Incorporated Wiring Device-Kellems.
    c. Leviton Manufacturing Company.
    d. Legrand/Pass & Seymour.

e. Eaton Crouse-Hinds.
f. Hubbell Killark.

2.2 WALL SWITCHES

A. Basic requirements unless modified in specific requirements paragraph of switches per designated areas or types:

1. Industrial Specification Grade.
2. Quiet action, snap switch.
3. Self-grounding with grounding terminal.
4. Back and side wired.
5. Solid silver cadmium oxide contacts.
6. Rugged thermoplastic and/or nylon housing and one-piece switch arm.
7. Ratings: 20 A, 120/277 VAC.
8. Switch handle color: White.
9. Types as indicated on the Drawings:
   a. Single-pole.
   b. Double-pole.
   c. 3-way.
   d. 4-way.
10. Standards: UL 20, UL 514A, NEMA WD 1, NEMA WD 6.

B. Architecturally Finished Area Specific Requirements:

1. Commercial Specification Grade.
2. Quiet action, snap switch.
3. Ratings: 15A, 120/277V.
4. Switch handle type: Decorator rocker or paddle.
5. Switch handle color: White.
6. Wallplate:
   a. Single or multiple gang as required.

C. Wet or Damp Non-Architecturally Finished or Exterior Area Specific Requirements:

1. Coverplate:
   a. Cast aluminum, gasketed, stainless steel hardware, natural, lacquer, or factory painted finish.
   b. Operator type:
      1) Side mounted rocker type handle to operate snap switch.
      2) Front mounted lever type handle to operate snap switch.
      3) Push/pull operator to operate snap switch.
      4) Spring type door to cover snap switch.
   c. Wet location rated.
   d. Single or multiple gang as required.

2.3 RECEPTACLES

A. Basic requirements unless modified in specific requirements paragraph of receptacles and per designated areas:

1. Industrial Specification Grade.
2. Straight blade.
3. Brass triple wipe line contacts.

4. One-piece grounding system with double wipe brass grounding contacts and self-grounding strap with grounding terminal.
5. Back and side wired.
6. Rating: 20 A, 125 VAC.
7. High impact nylon body.
8. Receptacle body color:
    a. Normal power: Ivory.
9. Duplex or simplex as indicated on the Drawings.
10. Configuration: NEMA 5-20R.
11. Standards: UL 498, UL 514A, NEMA WD 1, NEMA WD 6.

B. Receptacle Type Specific Requirements:

1. Basic receptacles:
    a. Weather-resistant when located in exterior locations or interior damp or wet areas as indicated on the Drawings.
        1) Identification: Letters “WR” on face of receptacle.
2. Ground Fault Circuit Interrupter (GFCI):
    a. Specification Grade.
    b. Class A protection.
    c. Feed through type.
    d. Test and reset buttons.
    e. Self-testing.
    f. Visual indicator light.
    g. Weather-resistant when located in exterior locations or interior damp or wet areas as indicated on the Drawings.
        1) Identification: Letters “WR” on face of receptacle.
    h. Additional standards: UL 943.

C. Architecturally Finished Areas Specific Requirements:

1. Wallplate:
    a. Single or multiple gang as required.

D. Dry Non-Architecturally Finished Areas Specific Requirements:

1. Coverplate for use on surface mounted outlet boxes:
    a. Cast iron alloy, galvanized and factory painted finish.
    b. Cast aluminum, natural, lacquer or factory painted finish.
    c. Sheet steel, galvanized.
    d. Sheet aluminum.
    e. Single or multiple gang as required.
2. Wallplate for use on recessed outlet boxes:
    a. Single or multiple gang as required.

E. Wet Non-architecturally Finished Areas Specific Requirements:

1. Coverplate:
    a. Extra-duty rated, weatherproof (NEMA 3R) while in use, gasketed, stainless steel hardware, copper-free aluminum, 3.2 IN minimum cover depth for #12 AWG cords.

F. Exterior Locations Specific Requirements:

1. Coverplate:

a. Extra-duty rated, weatherproof (NEMA 3R) while in use, gasketed, stainless steel hardware, copper-free aluminum, 3.2 IN minimum cover depth for #12 AWG cord.

G. Special Purpose Receptacles:

1. NEMA configuration as indicated on the Drawings.
2. Coverplate: See requirements per area designations herein.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Mount devices where indicated on the Drawings and as scheduled in Specification Section 26 05 00.

C. See Specification Section 26 05 33 for device outlet box requirements.

D. Where more than one receptacle is installed in a room, they shall be symmetrically arranged.

E. Provide blank plates for empty outlets.

END OF SECTION

SECTION 26 28 00
OVERCURRENT AND SHORT CIRCUIT PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Low voltage circuit breakers.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Procurement and Contracting Requirements.
2. Section 26 05 00 - Electrical - Basic Requirements.
3. Section 26 08 13 - Acceptance Testing.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
   a. C37.13, Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures.
   b. C37.16, Low-Voltage Power Circuit Breakers and AC Power Circuit Protectors - Preferred Ratings, Related Requirements, and Application Recommendations.
   c. C37.17, Trip Devices for AC and General Purpose DC Low Voltage Power Circuit Breakers.
2. National Fire Protection Association (NFPA):
   a. 70, National Electrical Code (NEC).
3. Underwriters Laboratories, Inc. (UL):
   a. 489, Standard for Safety Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures.
   b. 943, Standard for Safety for Ground-Fault Circuit-Interrupters.
   c. 1066, Standard for Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures.

1.3 SUBMITTALS

A. Shop Drawings:

1. Product technical data including:
   a. Provide submittal data for all products specified in PART 2 of this Specification Section.
   b. See Specification Section 26 05 00 for additional requirements.

B. Informational Submittals:

1. Reports:
   a. Short circuit study report.
   b. Protective coordination study report.
   c. As-left condition of all circuit breakers that have adjustable settings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Circuit breakers:

a. Eaton.
b. General Electric Company.
c. Square D Company.
d. Siemens.

2.2 CIRCUIT BREAKERS

A. Molded Case Type:

1. General:
   a. Standards: UL 489.
   b. Unit construction.
   c. Over-center, toggle handle operated.
   d. Quick-make, quick-break, independent of toggle handle operation.
   e. Manual and automatic operation.
   f. All poles open and close simultaneously.
   g. Three position handle: On, off and tripped.
   h. Molded-in ON and OFF markings on breaker cover.
   i. One-, two- or three-pole as indicated on the Drawings.
   j. Current and interrupting ratings as indicated on the Drawings.
   k. Bolt on type.
2. Thermal magnetic type:
   a. Inverse time overload and instantaneous short circuit protection by means of a thermal magnetic element.
   b. Frame size 150 amp and below:
      1) Non-interchangeable, non-adjustable thermal magnetic trip units.
   c. Frame sizes 225 to 400 amp (trip settings less than 400A):
      1) Interchangeable and adjustable instantaneous thermal magnetic trip units.
   d. Ground Fault Circuit Interrupter (GFCI) Listed:
      1) Standard: UL 943.
      2) One- or two-pole as indicated on the Drawings.
      3) Class A ground fault circuit.
      4) Trip on 5 mA ground fault (4-6 mA range).
3. Solid state trip type:
   a. Inverse time overload, instantaneous short circuit and ground fault protection by means of a solid state trip element, associated current monitors and flux shunt trip mechanism.
   b. Frame size 400 amp to 1200 amp (trip settings between 400 and 1200A):
      1) Standard rating.
      2) Interchangeable current sensor or rating plug.
      3) Adjustable long time pick-up setting.
         a) Adjustable from 50 to 100 PCT of the current sensor or rating plug.
      4) Adjustable short time pick-up setting.
      5) Adjustable instantaneous pick-up.
      6) Fixed ground fault pick-up, when indicated on the Drawings.
4. Motor circuit protector:
   a. Adjustable instantaneous short circuit protection by means of a magnetic or solid state trip element.
   b. Sized for the connected motor.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Current and interrupting ratings as indicated on the Drawings.

B. Series rated systems not acceptable.

C. Devices shall be ambient temperature compensated.

D. Circuit Breakers:

1. Molded case circuit breakers shall incorporate the following, unless indicated otherwise on the Drawings:
    a. Frame sizes 400 amp and less with trip setting less than 400A shall be thermal magnetic type.
    b. Motor circuit protectors sized for the connected motor.

3.2 FIELD QUALITY CONTROL

A. Coordinated Power System Protection:

1. Prepare a study to demonstrate that the equipment and system constructed meet the specified requirements for equipment ratings, coordination and protection.
2. Perform the studies in accordance with IEEE 242 and IEEE 399.
3. Include the name of the software developer, software package and software version number in the computer generated studies.
4. System short circuit study report:
    a. Begin the study at the main service electrical gear and extend down the system through all buses.
        1) Perform a balanced three-phase fault, bolted line-to-line fault and line-to-ground fault study.
    b. Prepare a one-line diagram to show the electrical system buses, transformers and all sources of fault current including generators and motors.
    c. Utilize manufacturer's data for the actual proposed equipment (e.g., transformer impedance).
    d. Coordinate the available utility fault current with the power utility company.
    e. Show input data in tabular form in the report and/or on the one-line diagram.
        1) Input data shall include but is not limited to:
            a) Utility fault current or MVA and X/R ratio.
            b) Bus voltages.
            c) Conductor sizes and type of conduit.
            d) Generator and motor sizes and contributions.
            e) Transformer sizes and impedances.
    f. Show available fault current at each bus in tabular form in the report and/or on the one-line diagram.
    g. Perform studies for both normal power and emergency/standby power scenarios.
5. System protective coordination study report:
    a. Begin the study at the main service electrical gear and extend down the system through all buses as required to ensure a coordinated power system.
    b. Demonstrate that the maximum possible degree of selectivity has been obtained between devices specified for the protection of equipment and conductors from damage from overloads and fault conditions.
        1) Where necessary, an appropriate compromise shall be made between system protection and service continuity.
        2) Consider system protection and service continuity to be of equal importance.

c. Prepare a one-line diagram to show the electrical system buses, transformers and protective devices.
d. Utilize manufacturer's data for the actual proposed protective devices.
e. Summarize the coordination study, conclusions and recommendations.
1) As a minimum, include the following:
a) The manufacturer's information used to prepare the study.
b) Assumptions made during the study.
c) Recommended taps and settings of all adjustable devices in tabulated form.
d) Composite coordination time-current curves on log-log paper showing:
(1) That the settings for each protective device will provide protection and selectivity.
(2) Identify each curve.
(3) Cable and equipment damage points.
(4) Circuit interrupting device operating and interrupting times.
(5) One-line sketch of the part of the system being investigated.
(6) Include as many curves as possible on a graph while maintaining readability.
e) Position time-current curves for each device to provide for maximum selectivity to minimize system disturbances during fault clearing.
f) Advise the Engineer of potential coordination problems discovered during the study and include recommendations to resolve the problem.
(1) Provide time-current curves for the "as found" and "proposed" conditions for upgrade/retrofit projects.
g) Submit the report for approval 90 days prior to equipment energization.

B. Adjustable Circuit Breakers:
1. Set all circuit breaker adjustable taps as defined on the Drawings, except adjust motor circuit protectors per the motor nameplate and NFPA 70 requirements.

END OF SECTION

SECTION 26 28 16
SAFETY SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Safety switches.

B. Related Specification Sections include but are not necessarily limited to:

1. Section 26 05 00 - Electrical - Basic Requirements.
2. Section 26 28 00 - Overcurrent and Short Circuit Protective Devices.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. National Electrical Manufacturers Association (NEMA):
   a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
   b. KS 1, Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum).
2. Underwriters Laboratories, Inc. (UL):
   a. 98, Enclosed and Dead-Front Switches.

1.3 SUBMITTALS

A. Shop Drawings:

1. Product technical data:
   a. Provide submittal data for all products specified in PART 2 of this Specification Section.
   b. Provide a Summary Table or use Exhibit A that associates the safety switch features with connected equipment tag number. Exhibit A indicates minimum data required.
   c. See Specification Section 26 05 00 for additional requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following safety switch manufacturers are acceptable:

1. Eaton.
2. GE by ABB.
3. Square D by Schneider Electric.
4. Siemens Corporation.
5. Appleton by Emerson Electric Co.
6. Crouse-Hinds by Eaton.
7. Killark by Hubbell.

2.2 SAFETY SWITCHES

A. General:

1. Non-fusible or fusible as indicated on the Drawings.
2. Suitable for service entrance when required.
3. NEMA Type HD heavy-duty construction.
4. Switch blades will be fully visible in the OFF position with the enclosure door open.
5. Quick-make/quick-break operating mechanism.

6. Deionizating arc chutes.
7. Manufacture double-break rotary action shaft and switchblade as one common component.
8. Clear line shields to prevent accidental contact with line terminals.
9. Operating handle (except NEMA 7 and NEMA 9 rated enclosures):
    a. Red and easily recognizable.
    b. Padlockable in the OFF position.
    c. Interlocked to prevent door from opening when the switch is in the ON position with a defeater mechanism.

B. Ratings:
1. Horsepower rated of connected motor.
2. Voltage and amperage: As indicated on the Drawings.
3. Short circuit withstand:
    a. Non-fused: 10,000A.
    b. Fused: 200,000A.

C. Accessories, when indicated in PART 3 of this Specification Section or on the Drawings:
1. Neutral kits.
2. Ground lug kits.
3. Auxiliary contact kits:
    a. Opens before main switch.
    b. Rated 10A at 125/250 VAC.
    c. One N.O. and one N.C. contact.

D. Enclosures:
1. NEMA 1 rated:
    a. Body and cover: Sheet steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
    b. With or without knockouts, hinged and lockable door.
2. NEMA 3R rated:
    a. Body and cover: Sheet steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
    b. With or without knockouts, hinged and lockable door.
3. NEMA 4 rated:
    a. Body and cover: Sheet steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
    b. No knockouts, external mounting flanges, hinged, gasketed and lockable door.
4. NEMA 4X rated (metallic):
    a. Body and cover: Type 304 or 316 stainless steel.
    b. No knockouts, external mounting flanges, hinged and gasketed door.
5. NEMA 4X rated (nonmetallic):
    a. Body and cover: Ultraviolet light protected fiberglass-reinforced polyester boxes.
    b. No knockouts, external mounting flanges, hinged, gasketed and lockable door.
6. NEMA 7 and NEMA 9 rated:
    a. Cast gray iron alloy or copper-free aluminum with manufacturer's standard finish.
    b. Drilled and tapped openings or tapered threaded hub.
    c. Gasketed cover bolted-down with stainless steel bolts.
    d. External mounting flanges.
    e. Operating handle padlockable in the OFF position.

7. NEMA 12 rated:
    a. Body and cover: Sheet steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
    b. No knockouts, external mounting flanges, hinged and gasketed door.

E. Overcurrent and short circuit protective devices:
    1. Fuses.
    2. See Specification Section 26 28 00 for overcurrent and short circuit protective device requirements.

F. Standards: NEMA KS 1, UL 98.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install as indicated and in accordance with manufacturer's instructions and recommendations.

B. Install switches adjacent to the equipment they are intended to serve unless otherwise indicated on the Drawings.

C. Permitted uses of NEMA 1 enclosure:
    1. Surface or flush mounted in areas designated dry in architecturally finished areas.

D. Permitted uses of NEMA 3R enclosure:
    1. Surface mounted in exterior location for HVAC equipment only.

E. Permitted uses of NEMA 4 enclosure:
    1. Surface mounted in areas designated as wet.

F. Permitted uses of NEMA 4X metallic enclosure:
    1. Surface mounted in areas designated as wet and/or corrosive.

G. Permitted uses of NEMA 4X nonmetallic enclosure:
    1. Surface mounted in areas designated as corrosive.
    2. Surface mounted in areas designated as highly corrosive.

H. Permitted uses of NEMA 7 enclosure:
    1. Surface mounted in areas designated as Class I hazardous.

I. Permitted uses of NEMA 9 enclosure:
    1. Surface mounted in areas designated as Class II hazardous.

J. Permitted uses of NEMA 12 enclosure:
    1. Surface mounted in areas designated as dry in non-architecturally finished areas.

END OF SECTION

EXHIBIT A

Safety Switch Summary Table					
Equipment Tag	Switch Model Number	Rated Amps	Fused / Non-fused	Enclosure Type	Accessories
Example	Per MFR	60A	NF	NEMA 4X non-metallic	Ground lug, Aux Contact

SECTION 26 28 17
SEPARATELY MOUNTED CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Separately mounted circuit breakers.

B. Related Sections include but are not necessarily limited to:

1. Division 00 - Procurement and Contracting Requirements.
2. Section 26 05 00 - Electrical - Basic Requirements.
3. Section 26 28 00 - Overcurrent and Short Circuit Protective Devices.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. National Electrical Manufacturers Association (NEMA):
   a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
2. Underwriters Laboratories, Inc. (UL):
   a. 489, Molded Case Circuit Breakers, Molded Case Switches, and Circuit Breaker Enclosures.
   b. 1203, Standard for Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations.

1.3 SUBMITTALS

A. Shop Drawings:

1. Product technical data:
   a. Provide submittal data for all products specified in PART 2 of this Specification Section.
   b. Provide a table that associates equipment model number with equipment tag number.
   c. See Specification Section 26 05 00 for additional requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Eaton.
2. General Electric.
3. Square D by Schneider Electric.
4. Siemens Corporation.
5. Appleton by Emerson Electric Co.
6. Crouse-Hinds by Eaton.
7. Killark by Hubbell.

2.2 COMPONENTS

A. NEMA 1 rated:

1. Body and cover: Sheet steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
2. With or without knockouts, hinged or unhinged cover.

3. Breaker is front operable and padlockable in the OFF position.
4. Suitable for service entrance.

B. NEMA 4X rated:

1. Body and cover: Type 304 or 316 stainless steel.
2. No knockouts, external mounting flanges, hinged and gasketed door.
3. Front operating handle padlockable in the OFF position and interlocked to prevent door from opening when the breaker is ON.
4. Suitable for service entrance.

C. Standards: UL 489.

D. Overcurrent and short circuit protective devices:

1. Molded case circuit breaker.
2. See Section 26 28 00 for overcurrent and short circuit protective device requirements.
3. Factory installed.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install as indicated and in accordance with manufacturer's recommendations and instructions.

B. Permitted uses of NEMA 1 enclosure:

1. Surface or flush mounted in areas designated dry in architecturally finished areas.

C. Permitted uses of NEMA 4X enclosure:

1. Surface mounted in areas designated as wet and/or corrosive.

END OF SECTION

SECTION 26 32 14
ENGINE GENERATOR - DIESEL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Engine generator equipment.
2. Fuel storage tanks.
3. Engine generator enclosures and accessories.
4. Access stairs and platforms, including performance and design criteria for required delegated design services.

B. Related Requirements: Include, but are not necessarily limited to:

1. Section 26 05 00 - Electrical - Basic Requirements.

1.2 REFERENCES

A. Reference Standards:

1. Environmental Protection Agency (EPA):
   a. 40 CFR Part 60, Subpart IIII, Protection of Environment, Standards of Performance for New Stationary Sources, Standards for Performance for Stationary Compression Ignition Internal Combustion Engines.
2. National Electrical Manufacturers Association (NEMA):
   a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
   b. MG 1, Motors and Generators.
3. National Fire Protection association (NFPA):
   a. 70, National Electrical Code (NEC):
      1) Article 701, Legally Required Standby Systems.
4. Underwriters Laboratories, Inc. (UL):
   a. 2200, Standard for Stationary Engine Generator Assemblies.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Supplier:
   a. The engine generator equipment manufacturer or other authorized Supplier has unit responsibility for furnishing all components of required engine generator systems and proper, initial operation of systems required by this Section.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Schedule: Where the Work includes furnishing more than one engine generator system, submit schedule of engine generator systems, indicating for each engine generator system: identification or tag number, engine generator size, location, enclosure type, fuel storage tank capacity, and other pertinent data.
   b. Dimensioned plan, elevation, sections, and detail drawings for engine generator equipment, enclosures, and other components furnished by engine generator manufacturer.
   c. Fuel storage tank.
   d. Wire interconnection drawings.

e. Control panel layout drawings and internal wiring diagrams.

2. Product Data:
   a. Manufacturer's literature and published data for all components and accessories of engine generator systems.
   b. Comply with Section 26 05 00 - Electrical - Basic Requirements, regarding required Submittals.
   c. Engine/generator performance curves.
3. Delegated Design Instruments of Service Submittals:
   a. For access stairs and platforms, submit the following documents prepared, sealed, and signed by licensed, registered delegated design professional retained by Contractor, Subcontractor, or Supplier:
      1) Design drawings.
      2) Design specifications.
      3) Certificate of Compliance.
4. Testing Plans, Procedures, and Testing Limitations:
   a. Testing procedure, apparatus, and limitations of apparatus and procedure, for:
      1) Source quality control activities indicated in this Section.
      2) Field quality control activities indicated in this Section.

B. Informational Submittals: Submit the following:

1. Certificates:
   a. Generator equipment manufacturer's documentation of engine USEPA certification including USEPA family name and generator equipment model designation.
2. Other Required Delegated Design Submittals for access stairs and platforms:
   a. Delegated Design Calculations:
      1) Complete design calculations, sealed and signed by delegated design professional, indicating: Basis of design, including list of Laws and Regulations (including code) and standards used for design.
      2) Delegated Design Calculations will not be checked and are submitted for record purposes only.
   b. Shop Drawings bearing delegated design professional's approval stamp. Alternatively, such drawings may be submitted as delegated design professional's "instruments of service" design drawings, required above, when such drawings are sealed and signed by the delegated design professional.
   c. Product data bearing delegated design professional's approval stamp.
3. Supplier Instructions:
   a. Serial numbers of items furnished, equipment nameplate information, and similar information for all items furnished.
   b. Instructions for handling, installing, and startup.
4. Source Quality Control Submittals:
   a. Results of tests, inspections, and other quality control activities required by the Contract Documents and performed at the place of production or fabrication.
5. Field Quality Control Submittals:
   a. Results of tests, inspections, and other quality control activities required by the Contract Documents and performed at the Site.
6. Supplier Site Visit Reports:
   a. Report of each visit to the Site by Supplier, summarizing purpose of visit, activities while onsite, problems encountered, advice given to Contractor or Subcontractor, and actions taken.
7. Qualifications:

a. Contractor's, Subcontractor's, or Supplier's delegated design professional.

C. Closeout Submittals: Submit the following:

1. Post-Startup Statement:
   a. Equipment installation, startup, and operational statement for each engine generator system provided.
2. Keying:
   a. Upon Substantial Completion, furnish to Owner or facility manager (if any) not less than two sets of keys for locks on generator system enclosures.

D. Maintenance Material Submittals:

1. Furnish the following items and submit documentation of delivery to and acceptance of such items by Owner or facility manager (if any):
   a. Spare Parts and Extra Materials:
      1) Furnish spare parts and extra materials sufficient for one year of operation as recommended by generator system manufacturer, for each generator system furnished.

1.5 FIELD CONDITIONS

A. Ambient Conditions:

1. Ambient Air Temperature:
2. Minimum: 19.8 degrees F.
3. Maximum: 94.2degrees F.

B. Existing Conditions:

1. Site Elevation: 522 feet above sea level.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Engine generator unit:
   a. Blue Star Power Systems.
   b. Caterpillar.
   c. Cummins.
   d. Kohler.
   e. MTU, a Rolls Royce Solution.
   f. Taylor Power Systems.
   g. Or equal.
2. Silencers:
   a. Generator equipment manufacturer's standard.
   b. Or equal.
3. Battery charger:
   a. Generator equipment manufacturer's standard.
4. Governor:
   a. Generator equipment manufacturer's standard.
   b. Or equal.
5. Radiator:
   a. Generator equipment manufacturer's standard.

6. Vibration isolators:
    a. Generator equipment manufacturer's standard.
    b. Or equal.
7. Day tank:
    a. Generator equipment manufacturer's standard.
    b. Or equal.

2.2 DESCRIPTION

A. Engine generators will be used and rated for:

1. Legally required standby power during a utility power outage, NFPA 70, Article 701.

2.3 EQUIPMENT

A. Emissions Requirements:

1. Each generator system's exhaust emissions shall comply with Laws and Regulations. Federal, State and Local government requirements, including but not limited to:
    a. Environmental Protection Agencies (USEPA) New Source Performance Standards (NSPS), 40 CFR Part 60, Subpart IIII.

B. Performance and Configuration Requirements:

1. The Unit shall be capable of providing standby power without over or under loading the Unit.
2. Deviations from the indicated size on the drawings based on the manufacturer's calculation shall be brought to the attention of the Engineer.

2.4 COMPONENTS

A. Engine Generator Unit General:

1. Diesel engine direct-connected to alternating current generator mounted on suitable rigid steel skid supports.
2. Mount unit on skid suitable for installation on concrete foundation.
3. Base rating on operation at rated RPM when equipped with all operating accessories.
4. Standards: UL 2200.

B. Engine:

1. Four-cycle, full compression ignition, single acting, solid-injection unit, either vertical or V-type pistons turbo charged with after cooling.
2. Fuel supply: No. 2 Diesel.
3. Removable full wet-type cylinder liners of close grained alloy iron, heat treated for proper hardness to obtain maximum life.
4. Capable of operating at idle or light loads for extended periods of time.

C. Injection Pumps and Valves:

1. Type not requiring adjustment in service, which may be individually removed and replaced.
2. Individual injection pump and valve for each cylinder.
3. Fuel injection pumps: Positive action, constant-stroke, actuated by cam driven by gears from engine crankshaft.
4. Fuel lines between injection pumps and valves: Heavy seamless steel tubing.
5. Flexible fuel line connectors for supply and return connections at pump.

D. Oil Pump:

1. Gear-type lubricating oil pump to supply oil under pressure to main bearings, crank pin bearings, pistons, timing gears, camshaft bearings and valve rocker mechanism.

2. Spray cool and lubricate pistons.
3. Oil filters so located that lubricating oil is continuously filtered, except during periods when oil is automatically by-passed to protect vital parts when filters are clogged.
4. Filter elements accessible and easily removable.
5. Filter elements: Effective full flow, replaceable resin-impregnated cellulose type.
6. Equip filter system with spring-loaded by-pass valve.
7. Oil cooler: Water-cooled, engine-mounted.

E. Fuel System:

1. Fuel pump: Built-in gear-type, engine-driven fuel transfer pump, capable of supplying fuel at constant pressure against head of 12 feet.
2. Equip fuel system with replaceable fuel filter elements arranged for easy removal without breaking any fuel line connections or disturbing fuel pumps or any other part of engine.
3. Locate all fuel filters in an accessible housing, ahead of injection pumps to thoroughly filter fuel before it reaches the pump.
4. Use no screens or filters requiring cleaning or replacement of injection pumps or valve assemblies.

F. Governor: Fully enclosed electronic type governor with actuator capable of providing accurate speed control within 1% of rated speed, complete with panel-mounted electronic assembly with ramp generator and speed-sensing modules.

G. Air Cleaners: Engine-mounted, dry type air cleaners of sufficient capacity.

H. Electric Starting System:

1. Sufficient capacity to crank at speed which will start engine under normal operating conditions.
2. Controls to provide automatic cranking of engine when generator is called to start.
3. Prevent excessive cranking which could damage cranking motor.
4. Automatic stop controls.
5. Starter motors with positive-engagement feature.

I. Cooling System:

1. Capacity for cooling engine at the specified operating conditions.
2. Engine driven, centrifugal type water circulating pump and thermostatic valve to maintain the engine at recommended temperature level.
3. Unit mounted radiator.
    a. Core guard flexible duct adapter.
    b. Site glass at top of unit.
    c. Engine driven blower fan.
    d. Low water level cutoff switch.
4. Provide fan guards.

J. Heater:

1. Thermostatically controlled jacket water heater(s) to maintain cooling jacket at the manufacturer's recommended temperature at the specified low ambient temperature.
2. 208 V, single phase.

K. Silencer:

1. Suitable type for residential silencing.
2. Seamless, stainless steel, flexible, exhaust adapter for exhaust outlet to silencer.

L. Engine Instruments and Controls:

1. Engine-mounted instruments:
    a. Oil pressure gage.
    b. Water temperature gage.
    c. Run time meter.
    d. Battery voltage meter.
2. Automatic cycle cranking and over-crank protection.
3. Safety controls: Equip engine with automatic safety controls to shut down engine in event of low lubricating oil pressure, high jacket water temperature, overspeed or overcrank.
4. Auxiliary control devices: Either integral with specified engine instruments, control, and safety devices or as separate devices as required to operate various signal circuits specified for remote annunciator panel.
5. Three NO auxiliary contacts for interface with louvers, fans or other miscellaneous equipment.
    a. Contacts shall close when generator is started.

M. Fuel Day Tank:

1. Double wall sub-base day tank mounted underneath engine generator unit.
2. Steel construction, top and bottom baffles, steel channel side supports, weatherproof secondary containment, rust preventive interior coating, rust proofed and finish painted exterior.
3. Tank connections: Fuel level gauge, fuel lines to generator, fill, vent, drain and pressure relief.
4. Manual overfill protection.
5. Low level warning with contacts for remote alarm.
    a. Set to alarm at 50% of capacity.
6. Critical low level shutoff with contacts for remote alarm.
7. Leak detection alarm with contacts for remote alarm.
8. Capacity: 72 hours at full load.

N. Batteries:

1. Lead acid type.
2. Furnish electrolyte separately for use when installation is complete and unit is ready for testing.

O. Battery Charger:

1. Output current rating of at least 1/20th of ampere hour capacity of battery and capable of automatically switching between low rate (float) mode and high rate (equalize) mode.
2. Solid state rectifiers, DC voltmeter and ammeter, fuse input and output, and 115 VAC input.
3. Malfunction alarm contacts (minimum): low and high battery voltage, weak battery and charger failure.

P. Generator:

1. Brushless, 4-pole drip-proof revolving field type with permanent magnet, 2/3 pitch stator, direct-coupled rotor, Class H insulation.
2. Minimum continuous standby ratings:
    a. As indicated on the Drawings, substantiated by manufacturer's standard published curves and conform to NEMA MG 1 specification.
    b. Special ratings or maximum ratings are not acceptable.
3. Rated to serve up to 50% non-linear load without exceeding rated temperature rise.

4. Minimum efficiency: 92% at 50 to 110% of nominal standby rating, less than 30% instantaneous voltage dip at full load and rated power factor and suitable for simultaneous operation with other future units connected in parallel.
5. Stator and rotor: 130 degrees C temperature rise with minimum Class H insulated with 100 percent epoxy impregnation and overcoat of resilient insulating material to reduce possible fungus and/or abrasive deterioration.
6. Directly connect stator to engine flywheel housing.
7. Drive rotor through semiflexible driving flange to ensure permanent alignment.
8. Self-ventilating with suitable blower, air inlet and outlet openings.
9. Provide terminal box of adequate size for entrance of conduit and termination of conductors.
10. Generator drive free from critical torsional vibration within operating range.
11. Provide generator mounted main circuit breaker:
    a. Solid state molded case type.
    b. Ratings as indicated.

Q. Voltage Regulator:

1. SCR type, to maintain 2% voltage regulation from 0 to full load with steady state modulation not exceeding plus 1/2% including cross-current compensation to provide maximum of 5% unbalance in kVA load sharing between this unit and possible future generators.
2. Automatic protection against short circuits on system.
3. Permit unit to operate at no load below rated frequency for engine start up and shut down procedures.
4. Provide voltage level and gain controls for normal operating adjustments.
5. Provide voltage level control with minimum range of plus or minus 5% from rated voltage.
6. Mount regulator, volts per hertz type, in generator housing on suitable vibration isolators.

R. Generator Instruments and Controls:

1. Generator mounted NEMA 1 type, illuminated vibration isolated instrument and control panel(s).
2. AC voltmeter and phase selector switch.
3. AC ammeter and phase selector switch.
4. Frequency meter.
5. Run-off-auto engine, start-stop control switch.
6. Emergency stop.
7. Run time meter.
8. Governor control rheostat.
9. Voltage level adjustment rheostat.
10. Cool down time delay 0-15 minute adjustable.
11. Cycle cranking control.
12. Minimum red shut down indicating lights as follows:
    a. Overcrank.
    b. Overspeed.
    c. Low lubricating oil pressure.
    d. High engine water temperature.
13. Minimum amber alarm indicator lights as follows:
    a. Control switch not in auto position.
    b. Low engine water temperature (less than 70 degrees F).
    c. Low fuel in day tank.

d. Day tank leak.
e. Battery charger malfunctioning.
f. Low battery voltage.

14. Minimum amber prealarm indicator lights as follows:
    a. High engine water temperature.
    b. Low lubricating oil pressure.
15. Common dry contact and audible alarm to indicate when one or more alarm or prealarm conditions exist.

S. Vibration Isolators: Vibration system shall consist of engine and generator mount isolators with or without additional mechanical spring isolators rubber pads to control both high and low frequency vibrations between major components, sub-base and structural foundation and to provide required vibration isolation for the seismic zone of the Project.

2.5 ACCESSORIES

A. Provide interposing relays (24 VDC to 120 VAC) as required for interfacing with customer's 120 Vac monitoring system.

B. Generator set non-walk-in weather protective enclosure:

1. Sheet steel with side servicing panels, air intake louvers and rear control panel access door.
2. Side servicing panels shall have two locking points; all panels and doors shall be key lockable.
3. Pitched roof with silencing exhaust muffler mounted inside the enclosure.
4. Completely install enclosure on generator set mounting base.

C. Generator set mounted load bank:

1. Integrated on the radiator discharge end of the generator set.
2. Load bank sized at 50% minimum rating of the alternator.
3. Individual and user configurable step loads.
4. Individual step loads can be user configured as always connected or only connected when generator set testing.
5. Load sensing controls to drop load bank steps as required in order to avoid user configurable generator load setpoints.
6. Modular design that allows for the individual step loads to be replaced in the field.

2.6 SOURCE QUALITY CONTROL

A. Individually test each prime mover.

1. Apply derating factors for the proposed site to test data.
2. Continuously test for a period not less than two hours.
3. Test procedure shall be as follows:
    a. Start prime mover and upon reaching rated RPM, pick up 100 percent of nameplate KW rating at rated power factor in one step.
    b. Observe and record the cranking time(s) required to start and run for each prime mover.
    c. Observe and record the time required to come up to operating speed for each prime mover.
    d. Record voltage and frequency overshoot for each prime mover.
    e. Record voltage, frequency and amperes.
    f. Record oil pressure, water temperature where applicable and battery charge rate at first load acceptance and at 15 minute intervals thereafter for each prime mover.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install all components as indicated and in accordance with manufacturer's recommendations and instructions.

B. Fill cooling system with solution of 50-50 water and ethylene glycol anti-freeze to prevent freezing at temperatures as low as minus 30 degrees F.

C. Provide fuel for a full day tank.

D. Install all wiring to engine in conduit.

1. Control wiring on engine may be factory installed in high temperature loom.

E. Provide control wiring in conduit between generator control panel and remote devices as described under generator instrument and controls paragraph and remote annunciator paragraph of this Specification.

F. Mount on concrete pad utilizing vibration/seismic isolators, see structural drawings for pad detail.

3.2 FIELD QUALITY CONTROL

A. Field Tests and Inspections:

1. Provide two load tests and one cycle crank test.
2. Tests one and two shall be for continuous period of no less than two hours each.
3. Engineer and Owner shall be notified seven days prior to testing.
4. Test number one:
    a. With prime mover(s) in a "cold start" condition and emergency load at normal operating level, initiate a normal power failure by opening all switches or breakers supplying normal power to facility.
    b. Observe and record the time delay on engine start.
    c. Observe and record the cranking time(s) required to start and run for each prime mover.
    d. Observe and record the time required to come up to operating speed for each prime mover.
    e. Record voltage and frequency overshoot for each prime mover.
    f. Observe and record time required to achieve steady-state condition with all switches transferred to emergency position.
    g. Record voltage, frequency and amperes.
    h. Record oil pressure, water temperature where applicable and battery charge rate at 5-minute intervals for the first 15 minutes and at 15 minute intervals thereafter for each prime mover.
    i. Return normal power to facility, record time delay on retransfer to normal for each switch and cooldown time delay for each prime mover.
5. Test number two:
    a. Immediately after completion of test number one, start prime mover and upon reaching rated RPM, pick up 100% of nameplate KW rating in one step.
        1) Unity power factor is acceptable for on-site testing
    b. Observe and record the cranking time(s) required to start and run for each prime mover.
    c. Observe and record the time required to come up to operating speed for each prime mover.
    d. Record voltage and frequency overshoot for each prime mover.
    e. Observe and record time required to achieve steady-state condition.
    f. Record voltage, frequency and amperes.

g. Record oil pressure, water temperature where applicable and battery charge rate at first load acceptance and at 15 minute intervals thereafter for each prime mover.

6. Cycle crank test:
   a. Perform test for each prime mover.
      1) Utilize any method recommended by manufacturer to prevent prime mover(s) from running.
      2) Put control switch into "run" position to cause prime mover to crank.
   b. A complete cranking cycle shall consist of an automatic crank period of approximately 15 seconds duration followed by a rest period of approximately 15 seconds duration.
      1) Upon starting and running of the prime mover, further cranking shall cease.
      2) Two means of cranking termination shall be utilized so that one will act as a backup to the other to prevent inadvertent starter engagement.
      3) Cranking limiter time shall be 75 seconds for cycle crank.
7. Furnish load banks of required ratings necessary for tests.
8. Record engine fuel consumption by means of test equipment.
9. Test all safeties specified for generator instruments and controls and generator remote annunciator panel as recommended by manufacturer and as required to verify proper operation.
10. The Contractor shall be responsible for fuel and all consumables use during the test.

B. Supplier’s onsite services: Employ and pay for services of equipment manufacturer's field service representative(s) to:

1. Inspect equipment covered by this Specification Section.
2. Supervise pre-startup adjustments and installation checks.
3. Conduct initial startup of equipment and perform operational checks.
4. Provide Owner written statement that manufacturer's equipment has been installed properly, started up, tested, and is ready for operation by facilities operations and maintenance personnel.
5. Provide training of facility operation and maintenance personnel.

END OF SECTION

SECTION 26 36 00
TRANSFER SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manual transfer switches.

B. Related Sections include but are not necessarily limited to:

1. Division 00 - Procurement and Contracting Requirements.
2. Division 01 - General Requirements.
3. Section 26 05 00 - Electrical - Basic Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. National Electrical Manufacturers Association (NEMA):
   a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
   b. KS 1, Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
2. Underwriters Laboratories, Inc. (UL):
   a. 98, Standard for Safety Enclosed and Dead-Front Switches.
   b. 1008, Standard for Safety Switch Equipment.

1.3 SUBMITTALS

A. Shop Drawings:

1. Product technical data:
   a. Provide submittal data for all products specified in PART 2 of this Specification:
   b. See Section 26 05 00 for additional requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

A. See Section 26 05 00.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the listed manufacturers are acceptable:

1. Automatic transfer switches:
   a. Automatic Switch Company.
   b. Kohler.
   c. Onan.
   d. Russelectric.
   e. Zenith Products.
2. Manual transfer switches:
   a. Automatic Switch Company.
   b. Eaton.
   c. General Electric Company.
   d. Russelectric.
   e. Square D Company.

f. Siemens.
g. Zenith Products.

2.2 MANUAL TRANSFER SWITCH

A. Double throw load break rated with:
1. Quick-make/quick-break operating mechanism.
2. Deionizating arc chutes.
3. Double-break rotary action shaft and switchblade shall be manufactured as one common component.
4. Clear line shields to prevent accidental contact with line terminals.

B. Operating handle: Easily recognizable and padlockable in both positions.

C. Wiring configuration to allow single load to be supplied by a normal or alternate source.

D. Ratings:
1. Voltage and amperage: As indicated on Drawings.
2. Short circuit withstand: Equal to or greater than the upstream equipment.

E. Enclosure:
1. NEMA 4X rated:
a. Body and cover: Type 304 or 316 stainless steel.
b. No knockouts, external mounting flanges, hinged, gasketed and lockable door.

F. Standards: NEMA KS 1, UL 98.

2.3 AUTOMATIC TRANSFER SWITCH

A. Construction:
1. Electrically operated mechanically held, double throw, air-break type.
2. Silver-surface main contacts and protect by arcing contacts.
3. Switch shall have provisions for visual inspection of switch blades and contacts.
4. Mechanical design will positively open all ungrounded conductors from normal source before connection is made to alternate source and will positively open alternate source before connection is made to normal source.
5. Mechanical interlock to ensure the switch cannot be readily disabled, disconnected, improperly adjusted, removed or otherwise made inoperative.
6. Make all contacts and coils readily accessible for replacement from front of panel without major disassembly.
7. Ratings:
a. Continuous duty in both normal and emergency.
b. Three-phase, three-pole, four-wire.
c. Voltage and current ratings as indicated on the Drawings.
d. Short circuit withstand rating equal to or greater than the normal source electrical gear.
8. Standards: UL 1008.

B. Operation:
1. Microprocessor based control module.
2. Open transition.
3. Red and green indicating lights with fuses, identification nameplates, and test switch on front to simulate normal power failure at switch.
4. Engine starting contacts and all other auxiliary contacts and accessory devices for functions to be performed.

5. Supervisory voltage relays on each phase of normal source and single phase supervisory voltage and frequency relay for emergency source.
    a. Normal source voltage sensing.
        1) Adjustable pickup from 85-100 PCT of rated voltage, factory set 90 PCT.
        2) Adjustable dropout from 75-98 PCT of pickup setting, factory set 85 PCT.
    b. Emergency source voltage and frequency sensing:
        1) Adjustable pickup from 85-100 PCT of rated voltage, factory set 90 PCT.
        2) Fixed voltage dropout at 85 PCT of pickup setting.
        3) Adjustable pickup from 90-100 PCT of rated frequency, factory set 95 PCT.
        4) Fixed frequency dropout at 88 PCT of pickup setting.
6. Time delays:
    a. Engine start, adjustable from 0 to 10 seconds, factory set at 4 seconds, to avoid unnecessary starting caused by short time outages.
    b. Transfer to generator, adjustable from 0 to 120 seconds, factory set at 10 seconds.
    c. Retransfer to normal, adjustable from 2 to 30 minutes, factory set at 15 minutes to avoid erratic operation caused by short time reestablishment of normal source.
        1) Automatically bypassed when emergency source fails and normal source is available.
    d. Generator cool down, adjustable from 0 to 60 minutes, factory set at 10 minutes.
7. Exerciser timer:
    a. Enable and disable function.
    b. Selectable to exercise with or without transferring load.
    c. Adjustable exercise duration from 1 minute to 24 HRS, factory set at 15 minutes.
    d. Adjustable day of the week exercise setting, factory set for Monday.
8. Inphase monitor:
    a. Compare the phase relationship and frequency difference between the normal and emergency sources and permit transfer the first time the sources are within 15 electrical degrees and only if transfer can be accomplished within 60 electrical degrees as determined by monitoring the frequency differences.
    b. Inphase transfer accomplished if both sources are within 2 Hz of rated frequency and 70 PCT or more of rated voltage.

C. Enclosure:
1. NEMA 4X rated.
2. Body and cover: Type 304 or 316 stainless steel.
3. No knockouts, hinged and lockable door.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install as indicated and in accordance with manufacturer's recommendations and instructions.

B. Connect as indicated in one-line diagram.

C. Mounting of manual transfer switches: Wall-mounted.

D. Mounting of automatic transfer switches:
1. Wall-mounted or floor mounted on 4 IN high concrete pad.

E. Manual Transfer Switch Enclosure:
1. Permitted uses of NEMA 4X rated enclosure:
    a. Surface mounted in areas designated as wet and/or corrosive.

END OF SECTION

SECTION 26 43 13
LOW VOLTAGE SURGE PROTECTION DEVICES (SPD)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Type 1 SPD - High exposure locations (switchgear, switchboard, panelboard or motor control center), integrally mounted.
2. Type 2 SPD - High exposure locations (switchgear, switchboard, panelboard or motor control center), externally mounted.

B. Related Sections include but are not necessarily limited to:

1. Division 00 - Procurement and Contracting Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
   a. C62.41, Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
   b. C62.41.1, Guide on the Surge Environment in Low-Voltage (1000V and Less) AC Power Circuits.
   c. C62.41.2, Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits.
   d. C62.45, Recommended Practice on Surge Testing For Equipment Connected to Low-Voltage (1000V and Less) AC Power Circuits.
2. National Electrical Manufacturers Association (NEMA):
   a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
3. National Fire Protection Association (NFPA):
   a. 70, National Electrical Code (NEC).
4. Underwriters Laboratories, Inc. (UL):
   a. 1283, Standard for Electromagnetic Interference Filters.
   b. 1449, Standard for Surge Protective Devices.

B. Qualifications:

1. Provide devices from a manufacturer who has been regularly engaged in the development, design, testing, listing and manufacturing of SPDs of the types and ratings required for a period of 10 years or more and whose products have been in satisfactory use in similar service.
   a. Upon request, suppliers or manufacturers shall provide a list of not less than three customer references showing satisfactory operation.

1.3 DEFINITIONS

A. Clamping Voltage:

1. The applied surge shall be induced at the 90 DEG phase angle of the applied system frequency voltage.
2. The voltage measured at the end of the 6 IN output leads of the SPD and from the zero voltage reference to the peak of the surge.

B. Let-Through Voltage:

1. The applied surge shall be induced at the 90 DEG phase angle of the applied system frequency voltage.

2. The voltage measured at the end of the 6 IN output leads of the SPD and from the system peak voltage to the peak of the surge.

C. Maximum Continuous Operating Voltage (MCOV): The maximum steady state voltage at which the SPD device can operate and meet its specification within its rated temperature.

D. Maximum Surge Current:

1. The maximum 8 x 20 microsecond surge current pulse the SPD device is capable of surviving on a single-impulse basis without suffering either performance degradation or more than 10 PCT deviation of clamping voltage at a specified surge current.
2. Listed by mode, since number and type of components in any SPD may very by mode.

E. MCC: Motor Control Center.

F. Protection Modes: This parameter identifies the modes for which the SPD has directly connected protection elements, i.e., line-to-neutral (L-N), line-to-line (L-L), line-to-ground (L-G), neutral-to-ground (N-G).

G. Surge Current per Phase:

1. The per phase rating is the total surge current capacity connected to a given phase conductor.
    a. For example, a wye system surge current per phase would equal L-N plus L-G; a delta system surge current per phase would equal L-L plus L-G.
    b. The N-G mode is not included in the per phase calculation.

H. System Peak Voltage: The electrical equipment supply voltage sine wave peak (i.e., for a 480/277 V system the L-L peak voltage is 679V and the L-N peak voltage is 392 V).

1.4 SUBMITTALS

A. Shop Drawings:

1. Product technical data including:
    a. Manufacturer's qualifications.
    b. Standard catalog cut sheet.
    c. Electrical and mechanical drawing showing unit dimensions, weights, mounting provisions, connection details and layout diagram of the unit.
    d. Testing procedures and testing equipment data.
    e. Create a Product Data Sheet for each different model number of SPD provided (i.e., Model XYZ with disconnect and Model XYZ without disconnect, each require a Product Data Sheet).
        1) Data in the Product Data Sheet heading:
            a) SPD Type Number per PART 2 of the Specification.
            b) Manufacturer’s Name.
            c) Product model number.
        2) Data in the Product Data Sheet body:
            a) Column one: Specified value/feature of every paragraph of PART 2 of the Specification.
            b) Column two: Manufacturer’s certified value confirming the product meets the specified value/feature.
            c) Name of the nationally recognized testing laboratory that preformed the tests.
            d) Warranty information.
        3) Data in the Product Data Sheet closing:
            a) Signature of the manufacturer’s official (printed and signed).
            b) Title of the official.
        4) Date of signature.

B. Operation and Maintenance Manuals:

1. Warranty.

1.5 WARRANTY

A. Minimum of a five year Warranty from date of shipment against failure when installed in compliance with applicable national/local electrical codes and the manufacturer's installation, operation and maintenance instructions.

PART 2 - PRODUCTS

2.1 GENERAL

A. Standards: IEEE C62.41.1, IEEE C62.41.2, IEEE C62.45, MIL-STD 220B, UL 1283, UL 1449.

2.2 TYPE 1 SPD

A. Product:

1. SPD tag number or electrical equipment tag number SPD is connected to MDP.
2. Integrally mounted in panelboard MDP.
3. Hybrid solid-state high performance suppression system.
    a. Do not use a suppression system with gas tubes, spark gaps or other components which might short or crowbar the line resulting in interruption of normal power flow to connected loads.
4. Do not connect multiple SPD modules in series to achieve the specified performance.
5. Designed for parallel connection.
6. Field connection: Use mechanical or compression lugs for each phase, neutral and ground that will accept bus bar or #10 through #1/0 conductors.
7. Device monitor:
    a. Long-life, solid state, externally visible indicators and Form C dry contact(s) that monitors the on-line status of each mode of the units suppression filter system and power loss in any of the phases.
    b. A fuse status only monitor system is not acceptable.

B. Operating Voltage: The nominal unit operating voltage and configuration as indicated on Drawings.

C. Modes of Protection: All modes.

1. Three phase (delta): L-L, L-G.
2. Three phase (wye): L-N, L-L, L-G and N-G.
3. Single phase (2-pole): L-L, L-N, L-G and N-G.
4. Single phase: L-N, L-G and N-G.

D. Maximum Continuous Operating Voltage: Less than 130 PCT of system peak voltage.

E. Operating Frequency: 45 to 65 Hz.

F. Short Circuit Rating: Equal to or greater than rating of equipment SPD is connected to.

G. Maximum Surge Current: 240,000 A per phase, 120,000 A per mode minimum.

H. Minimum Repetitive Surge Current Capacity: 4000 IEEE C High waveform impulses with no degradation greater than 10 PCT deviation of the clamping voltage.

I. SPD Protection:

1. Integral unit level and/or component level overcurrent fuses and sustained overvoltage thermal cutout device.
2. An IEEE C High waveforms shall not cause the fuse to open and render the SPD inoperable.

J. Maximum Clamping Voltages: Dynamic test at the 90 degree phase angle including 6 IN lead length and measured from the zero voltage reference:

System Voltage	Test Mode	IEEE C62.41		UL 1449
		C High V & I Wave	B Combination Wave	
L-L < 250 V **L-N < 150 V**	L-L	1470 V	1000 V	800 V
	L-N	850 V	600 V	500 V
	L-G	1150 V	800 V	600 V
	N-G	1150 V	800 V	600 V
L-L > 250 V **L-N > 150 V**	L-L	2700 V	2000 V	1800 V
	L-N	1500 V	1150 V	1000 V
	L-G	2000 V	1550 V	1200 V
	N-G	2000 V	1550 V	1200 V

K. EMI-RFI Noise Rejection: Attenuation greater than 30 dB for frequencies between 100 kHz and 100 MHz.

2.3 TYPE 2 SPD

A. Product:

1. Internally mounted in switchboards, panelboardsor MCCs and mounted adjacent to panelboards, as indicated on one-line drawings
2. Hybrid solid-state high performance suppression system.
   a. Do not use suppression system with gas tubes, spark gaps or other components which might short or crowbar the line resulting in interruption of normal power flow to connected loads.
3. Do not connect multiple SPD modules in series to achieve the specified performance.
4. Designed for parallel connection.
5. Enclosure:
   a. Metallic NEMA 1 for interior locations.
   b. Metallic NEMA 4 for exterior locations.
6. Field connection:
   a. Mechanical or compression lugs for each phase, neutral and ground that will accept #10 through #1/0 conductors. OR
   b. Preinstalled lead conductors: Size per manufacturer, length as required with a maximum of 5 FT.
7. Device monitor:
   a. Long-life, solid state, externally visible indicators and Form C dry contact(s) that monitor the on-line status of each mode of the units suppression filter system or power loss in any of the phase.
   b. A fuse status only monitor system is not acceptable.
8. Accessories (when specifically specified): Unit mounted disconnect switch.

B. Operating Voltage: Nominal unit operating voltage and configuration as indicated on the Drawings.

C. Modes of Protection: All modes.

1. Three phase (delta): L-L, L-G.

2. Three phase (wye): L-N, L-L, L-G and N-G.
3. Single phase (2 pole): L-L, L-N, L-G and N-G.
4. Single phase: L-N, L-G and N-G.

D. Maximum Continuous Operating Voltage: Less than 130 PCT of system peak voltage.

E. Operating Frequency: 45 to 65 Hz.

F. Short Circuit Rating: Equal to or greater than rating of equipment SPD is connected to.

G. Maximum Surge Current: 240,000 A per phase, 120,000 A per mode minimum.

H. Minimum Repetitive Surge Current Capacity: 4000 IEEE C High waveform impulses with no degradation of more than 10 PCT deviation of the clamping voltage.

I. SPD Protection:

1. Integral unit level and/or component level overcurrent fuses and sustained overvoltage thermal cutout device.
2. An IEEE C High waveforms shall not cause the fuse to open and render the SPD inoperable.

J. Maximum Clamping Voltages: Dynamic test at the 90 DEG phase angle including 6 IN lead length and measured from the zero voltage reference:

System Voltage	Test Mode	IEEE C62.41		UL 1449
		C High V & I Wave	B Combination Wave	
L-L < 250 V **L-N < 150 V**	L-L	1470 V	1000 V	800 V
	L-N	850 V	600 V	500 V
	L-G	1150 V	800 V	600 V
	N-G	1150 V	800 V	600 V
L-L > 250 V **L-N > 150 V**	L-L	2700 V	2000 V	1800 V
	L-N	1500 V	1150 V	1000 V
	L-G	2000 V	1550 V	1200 V
	N-G	2000 V	1550 V	1200 V

K. EMI-RFI Noise Rejection: Attenuation greater than 30 dB for frequencies between 100 kHz and 100 MHz.

2.4 SOURCE QUALITY CONTROL

A. SPD approvals and ratings shall be obtained by manufacturers from nationally recognized testing laboratories.

B. The SPD are to be tested as a complete SPD system including:

1. Integral unit level and/or component level fusing.
2. Neutral and ground shall not be bonded during testing.
3. 6 IN lead lengths.
4. Integral disconnect switch when provided.

C. The “as installed” SPD system including the manufacturers recommended circuit breaker, the SPD is connected to, will not open when tested with a IEEE C3 combination waveform.

D. Tests to be performed in accordance with IEEE C62.45:

1. Clamping voltage performance testing using IEEE C62.41 Category waveforms.

2. Single pulse surge current capacity test.
3. Repetitive surge current capacity testing.
4. Spectrum analysis for EMI-RFI noise rejection.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Type 2, 4 and 5 SPD:

1. Mounting options:
   a. On wall or support structure adjacent to the equipment to be protected with leads routed through conduit.
2. Install leads as short and straight as possible.
3. Maximum lead length: 18 IN.
4. Minimum lead size:
5. As indicated on plans or as recommended by manufacturer.When conduit connection is used, provide a minimum of four twists per foot in the lead conductors and install in NFPA 70 sized conduit.
6. Connect leads to the equipment to be protected by one of the following means:
   a. Through a circuit breaker or molded case switch mounted in the equipment.
      1) Use manufacturer recommended circuit breaker size.

END OF SECTION