



Buncombe County

Asheville, North Carolina

Specifications and Bid Documents

for

Buncombe County Courthouse
Electrical Upgrades

Document Date: November 15, 2023

Bid Date/Time: December 13, 2023, at 2:00 PM

Bid Documents



Buncombe County

Asheville, North Carolina

Specifications and Bid Documents

for

Buncombe County Courthouse
Electrical Upgrades



Phillip
A. Fisher

Digitally signed
by Phillip A.
Fisher
Date: 2023.11.15
10:02:49 -05'00'



*Post Office Box 2259
Asheville, North Carolina 28802*

Document Date: November 15, 2023
Bid Date/Time: December 13, 2023, at 2:00 PM
McGill Project # 22.03516

**County of Buncombe
Buncombe County Courthouse
Asheville, North Carolina**

Electrical Upgrades

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ADVERTISEMENT FOR BIDS

Sealed proposals will be received until **2:00 PM on December 13, 2023**, by **Buncombe County, North Carolina**, in the Board Room of the Buncombe County Permit Office located at 30 Valley Street, Asheville, North Carolina 28801 for the project entitled **Buncombe County Courthouse Electrical Upgrades** at which time and place bids will be opened and read.

The project generally consists of replacing the main 208Y/120 V, 3000 A switchboard with a new switchboard and two distribution panelboards. Twenty -Five (25) feeder circuits will be reconfigured to be supplied by the new switchboard and panelboards.

A pre-bid meeting will be held for all interested bidders on November 22, 2023, at 2:00 PM at the project site. Meet in front of the Detention Center located at 20 Davidson Drive.

The Bidding Documents for the project may be examined at the following website:

McGill Associates, PA

www.mcgillbidline.com

Digital copies of Bid Documents are available for a fee of \$75 to qualified bidders at www.mcgillassociates.com. These documents may be viewed and downloaded, via the "Bids" link, by selecting this project from the project list or by entering Quest Project Number 8815349. For assistance and free membership registration, contact QuestCDN at (952) 233-1632 or info@questcdn.com.

The County reserves the unqualified right to reject any and all bids.

Signed: Mike Mace, General Services Director
 Buncombe County
 Asheville, NC
 (Owner)

NOTICE TO BIDDERS

Sealed proposals will be received until 2:00 PM on December 13, 2023, by Buncombe County in Asheville, NC, at the Board Room of the Buncombe County Permit Office located at 30 Valley Street, Asheville, North Carolina 28801 and immediately thereafter publicly opened and read for the furnishing of labor, material and equipment entering into the construction of

Buncombe County Courthouse Electrical Upgrades

The project generally consists of replacing the main 208Y/120 V, 3000 A switchboard with a new switchboard and two distribution panelboards. 25 feeder circuits will be reconfigured to be supplied by the new switchboard and panelboards.

A pre-bid meeting will be held for all interested bidders on November 22, 2023, at 2:00 PM at the project site. Meet in front of the Detention Center located at 20 Davidson Drive. Bids will be received for Contract type –single prime. All proposals shall be lump sum.

Any questions regarding the Bid Documents should be directed in writing via email to McGill Associates, PA at phil.fisher@mcgillassociates.com. Questions must be received by 2:00 PM on December 1, 2023, to allow for addressing by addendum.

The Bidding Documents for the project may be examined at the following website:

McGill Associates, PA

www.mcgillbidline.com

Digital copies of Bid Documents are available to qualified bidders at www.mcgillassociates.com. These documents may be viewed and downloaded, via the “Bids” link, by selecting this project from the project list or by entering Quest Project Number 8815349. For assistance and free membership registration, contact QuestCDN at (952) 233-1632 or info@questcdn.com.

Bidders are encouraged to only secure project bid documents as noted above. Neither the Owner nor the Designer will be responsible for full or partial sets of Bidding Documents, including any Addenda, obtained from any source other than the Designer and their representative plan provider, QuestCDN. Each Bidder shall be responsible for the review of all addenda for the project and shall acknowledge the addenda on the bid form.

NOTE: The bidder shall include with the bid proposal the form *Identification of Minority Business Participation* identifying the minority business participation it will use on the project and shall include either *Affidavit A* or *Affidavit B* as applicable. Forms and instructions are included within the Proposal Form in the bid documents. Failure to complete these forms is grounds for rejection of the bid. (GS143-128.2c Effective 1/1/2002.)

All contractors are hereby notified that they must have proper license as required under the state laws governing their respective trades.

General contractors are notified that Chapter 87, Article 1, General Statutes of North Carolina, will be observed in receiving and awarding general contracts. General contractors submitting bids on this project must have license classification for: N/A – see Exemption below.

NOTE--SINGLE PRIME CONTRACTS: Under GS 87-1, a contractor that superintends or manages construction of any building, highway, public utility, grading, structure or improvement shall be deemed a "general contractor" and shall be so licensed. Therefore a single prime project that involves other trades will require the single prime contractor to hold a proper General Contractors license. **EXCEPT:** On public buildings being bid single prime, where the total value of the general construction does not exceed 25% of the total construction value, contractors under GS87- Arts 2 and 4 (Plumbing, Mechanical & Electrical) may bid and contract directly with the Owner as the SINGLE PRIME CONTRACTOR and may subcontract to other properly licensed trades. [GS87-1.1- Rules .0210](#)

Plumbing, Mechanical and Electrical prime contractors are notified that General Statutes Chapter 87, Articles 2 & 4, will be observed in receiving and awarding plumbing, mechanical and electrical contracts.

Each proposal shall be accompanied by a cash deposit or a certified check drawn on some bank or trust company, insured by the Federal Deposit Insurance Corporation, of an amount equal to not less than five percent (5%) of the proposal, or in lieu thereof a bidder may offer a bid bond of five percent (5%) of the bid executed by a surety company licensed under the laws of North Carolina to execute the contract in accordance with the bid bond. Said deposit shall be retained by the owner as liquidated damages in event of failure of the successful bidder to execute the contract within ten days after the award or to give satisfactory surety as required by law.

A performance bond and a payment bond will be required for one hundred percent (100%) of the contract price.

Payment will be made based on ninety-five percent (95%) of monthly estimates and final payment made upon completion and acceptance of work.

No bid may be withdrawn after the scheduled closing time for the receipt of bids for a period of 60 days.

The owner reserves the right to reject any or all bids and to waive informalities.

Designer:
McGill Associates, PA
(Name)

Owner:
Mike Mace, General Services Director
Buncombe County, North Carolina
(Owner Name/Title/Agency)

55 Broad Street., Asheville, NC 28801
Asheville, NC 28801
(Address)

(828) 232-0575
(Phone)

INSTRUCTIONS TO BIDDERS

STANDARD FORM FOR CONSTRUCTION PROJECTS

INSTRUCTIONS TO BIDDERS

For a proposal to be considered it must be in accordance with the following instructions:

1. PROPOSALS

Proposals must be made in strict accordance with the Form of Proposal provided therefor, and all blank spaces for bids, alternates, and unit prices applicable to bidder's work shall be properly filled in. When requested alternates are not bid, the proposer shall so indicate by the words "No Bid". Any blanks shall also be interpreted as "No Bid". The bidder agrees that bid on Form of Proposal detached from specifications will be considered and will have the same force and effect as if attached thereto. Photocopied or faxed proposals will not be considered. Numbers shall be stated both in writing and in figures for the base bids and alternates. If figures and writing differ, the written number will supersede the figures.

Any modifications to the Form of Proposal (including alternates and/or unit prices) will disqualify the bid and may cause the bid to be rejected.

The bidder shall fill in the Form of Proposal as follows:

- a. If the documents are executed by a sole owner, that fact shall be evidenced by the word "Owner" appearing after the name of the person executing them.
- b. If the documents are executed by a partnership, that fact shall be evidenced by the word "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 persons shall appear after their signatures. The seal of the corporation shall be impressed on each signature page of the documents.
- d. If the proposal 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. If the contractor's license of a bidder is held by a person other than an owner, partner or officer of a firm, then the licensee shall also sign and be a party to the proposal. The title "Licensee" shall appear under his/her signature.

Proposals should be addressed as indicated in the Advertisement for Bids and be delivered, enclosed in an opaque sealed envelope, marked "Proposal" and bearing the title of the work, name of the bidder, and the contractor's license number of the bidder. Bidders should clearly mark on the outside of the bid envelope which contract(s) they are bidding.

Bidder shall identify on the bid, the minority businesses that will be utilized on the project with corresponding total dollar value of the bid and affidavit listing good faith efforts or an affidavit indicating work under contract will be self-performed, as required by G.S. 143-128.2(c) and G.S. 143-128.2(f). Failure to comply with these requirements is grounds for rejection of the bid.

For projects bid in the single-prime alternative, the names and license numbers of major subcontractors shall be listed on the proposal form.

It shall be the specific responsibility of the bidder to deliver his bid to the proper official at the selected place and prior to the announced time for the opening of bids. Later delivery of a bid for any reason, including delivery by any delivery service, shall disqualify the bid.

Unit prices quoted in the proposal shall include overhead and profit and shall be the full compensation for the contractor's cost involved in the work. See General Conditions, Article 19c-1.

2. EXAMINATION OF CONDITIONS

It is understood and mutually agreed that by submitting a bid the bidder acknowledges that he has carefully examined all documents pertaining to the work, the location, 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 himself as to the nature of the work, the condition of existing buildings and structures, the conformation of the ground, the character, quality and quantity of the material to be encountered, the character of the equipment, machinery, plant and any other facilities needed preliminary to and during prosecution 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 and Health Act of 1970 and all rules and regulations issued pursuant thereto. It is further mutually agreed that by submitting a proposal the bidder acknowledges that he has satisfied himself as to the feasibility and meaning of the plans, drawings, specifications and other contract documents for the construction of the work and that he accepts all the terms, conditions and stipulations contained therein; and that he is prepared to work in cooperation with other contractors performing work on the site.

Reference is made to contract documents for the identification of those surveys and investigation reports of subsurface or latent physical conditions at the site or otherwise affecting performance of the work which have been relied upon by the designer in preparing the documents. The owner will make copies of all such surveys and reports available to the bidder upon request.

Each bidder may, at his own expense, make such additional surveys and investigations as he may deem necessary to determine his bid price for the performance of the work. Any on-site investigation shall be done at the convenience of the owner. Any reasonable request for access to the site will be honored by the owner.

3. BULLETINS AND ADDENDA

Any addenda to specifications issued during the time of bidding are to be considered covered in the proposal and in closing a contract they will become a part thereof. It shall be the bidder's responsibility to ascertain prior to bid time the addenda issued and to see that his bid includes any changes thereby required.

Should the bidder find discrepancies in, or omission from, the drawings or documents or should he be in doubt as to their meaning, he shall at once notify the designer who will send written instructions in the form of addenda to all bidders. Notification should be no later than seven (7) days prior to the date set for receipt of bids. Neither the owner nor the designer will be responsible for any oral instructions.

All addenda should be acknowledged by the bidder(s) on the Form of Proposal. However, even if not acknowledged, by submitting a bid, the bidder has certified that he has reviewed all issued addenda and has included all costs associated within his bid.

4. BID SECURITY

Each proposal shall be accompanied by a cash deposit or a certified check drawn on some bank or trust company insured by the Federal Deposit Insurance Corporation, or a bid bond in an amount equal to not less than five percent (5%) of the proposal, said deposit to be retained by the owner as liquidated damages in event of failure of the successful bidder to execute the contract within ten (10) days after the award or to give satisfactory surety as required by law (G.S. 143-129).

Bid bond shall be conditioned that the surety will, upon demand, forthwith make payment to the obligee upon said bond if the bidder fails to execute the contract. The owner may retain bid securities of any bidder(s) who may have a reasonable chance of award of contract for the full duration of time stated in the Notice to Bidders. Other bid securities may be released sooner, at the discretion of the owner. All bid securities (cash or certified checks) shall be returned to the bidders promptly after award of contracts, and no later than seven (7) days after expiration of the holding period stated in the Notice to Bidders. Standard Form of Bid Bond is included in these specifications and shall be used.

5. RECEIPT OF BIDS

Bids shall be received in strict accordance with requirements of the General Statutes of North Carolina. Bid security shall be required as prescribed by statute. Prior to the closing of the bid, the bidder will be permitted to change or withdraw his bid.

6. OPENING OF BIDS

Upon opening, all bids shall be read aloud. Once bidding is closed, there shall not be any withdrawal of bids by any bidder and no bids may be returned by the designer to any bidder. After the opening of bids, no bid may be withdrawn, except under the provisions of General Statute 143-129.1, for a period of thirty days unless otherwise specified. Should the successful bidder default and fail to execute a contract, the contract may be awarded to the next lowest and responsible bidder. The owner reserves the unqualified right to reject any and all bids. Reasons for rejection may include, but shall not be limited to, the following:

- a. If the Form of Proposal furnished to the bidder is not used or is altered.
- b. If the bidder fails to insert a price for all bid items, alternate and unit prices requested.
- c. If the bidder adds any provisions reserving the right to accept or reject any award.
- d. If there are unauthorized additions or conditional bids, or irregularities of any kind which tend to make the proposal incomplete, indefinite or ambiguous as to its meaning.
- e. If the bidder fails to complete the proposal form where information is requested so the bid may be properly evaluated by the owner.
- f. If the unit prices contained in the bid schedule are unacceptable to the owner and the State Construction Office.
- g. If the bidder fails to comply with other instructions stated herein.

7. BID EVALUATION

The award of the contract will be made to the lowest responsible bidder as soon as practical. The owner may award on the basis of the base bid and any alternates the owner chooses.

Before awarding a contract, the owner may require the apparent low bidder to qualify himself to be a responsible bidder by furnishing any or all of the following data:

- a. The latest financial statement showing assets and liabilities of the company or other information satisfactory to the owner.
- b. A listing of completed projects of similar size.
- c. Permanent name and address of place of business.
- d. The number of regular employees of the organization and length of time the organization has been in business under present name.
- e. The name and home office address of the surety proposed and the name and address of the responsible local claim agent.
- f. The names of members of the firms who hold appropriate trade licenses, together with license numbers.
- g. If prequalified, contractor info will be reviewed and evaluated comparatively to submitted prequalification package.

Failure or refusal to furnish any of the above information, if requested, shall constitute a basis for disqualification of any bidder.

In determining the lowest responsible, responsive bidder, the owner shall take into consideration the bidder's compliance with the requirements of G.S. 143-128.2(c), the past performance of the bidder on construction contracts for the State with particular concern given to completion times, quality of work, cooperation with other contractors, and cooperation with the designer and owner. Failure of the low bidder to furnish affidavit and/or documentation as required by G.S. 143-128.2(c) shall constitute a basis for disqualification of the bid.

Should the owner adjudge that the apparent low bidder is not the lowest responsible, responsive bidder by virtue of the above information, said apparent low bidder will be so notified and his bid security shall be returned to him.

8. PERFORMANCE BOND

The successful bidder, upon award of contract, shall furnish a performance bond in an amount equal to 100 percent of the contract price. See Article 35, General Conditions.

9. PAYMENT BOND

The successful bidder, upon award of contract, shall furnish a payment bond in an amount equal to 100 percent of the contract price. See Article 35, General Conditions.

10. PAYMENTS

Payments to the successful bidders (contractors) will be made on the basis of monthly estimates. See Article 31, General Conditions.

11. PRE-BID CONFERENCE

Prior to the date set for receiving bids, the Designer may arrange and conduct a Pre-Bid Conference for all prospective bidders. The purpose of this conference is to review project requirements and to respond to questions from prospective bidders and their subcontractors or material suppliers related to the intent of bid documents. Attendance by prospective bidders shall be as required by the "Notice to Bidders".

12. SUBSTITUTIONS

In accordance with the provisions of G.S. 133-3, material, product, or equipment substitutions proposed by the bidders to those specified herein can only be considered during the bidding phase until fourteen (14) days prior to the receipt of bids when submitted to the Designer with sufficient data to confirm material, product, or equipment equality. Proposed substitutions submitted after this time will be considered only as potential change order.

Submittals for proposed substitutions shall include the following information:

- a. Name, address, and telephone number of manufacturer and supplier as appropriate.
- b. Trade name, model or catalog designation.
- c. Product data including performance and test data, reference standards, and technical descriptions of material, product, or equipment. Include color samples and samples of available finishes as appropriate.
- d. Detailed comparison with specified products including performance capabilities, warranties, and test results.
- e. Other pertinent data including data requested by the Designer to confirm product equality.

If a proposed material, product, or equipment substitution is deemed equal by the Designer to those specified, all bidders of record will be notified by Addendum.

GENERAL CONDITIONS OF THE CONTRACT

STANDARD FORM FOR SINGLE PRIME CONSTRUCTION PROJECTS

**NORTH CAROLINA
COUNTY OF BUNCOMBE**

GENERAL CONDITIONS OF THE CONTRACT

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ARTICLE 1 - DEFINITIONS

- a. The **contract documents** consist of the Request for Proposal (RFP); General Contractor's formal response to the RFP; General Conditions of the Contract; special conditions if applicable; the drawing and specifications, including all bulletins, addenda or other modifications of the drawings and specifications incorporated into the documents prior to their execution; the contract; the performance bond; the payment bond; insurance certificates. All of these items together form the contract.
- b. The **Owner** is Buncombe County Government.
- c. The **designer** or **project designer** means the firm or firms of architects or engineers or both (and their consultants) which have undertaken to design the project pursuant to a contract with the Owner, (hereinafter, the "design contract").
- d. Intentionally left blank for sequential numbering purposes.
- e. A **subcontractor**, as the term is used herein, shall be a trade contractor, a general, mechanical, electrical, plumbing, specialty contractor, or a trade contractor, who has entered into a direct contract with a GC, and includes one who furnishes materials worked to a special design in accordance with plans and specifications covered by the contract, but does not include one who only sells or furnishes materials not requiring work so described or detailed.
- f. **Written notice** shall be defined as notice in writing delivered in person to the contractor, or to a partner of the firm in the case of a partnership, or to a member of the contracting organization, or to an officer of the organization in the case of a corporation, or sent to the last known business address of the contracting organization by registered mail.
- g. **Work**, as used herein as a noun, is intended to include materials, labor, and workmanship of the appropriate contractor as supervised by the GC.
- h. The **project** is the total construction work to be performed under the contract documents.
- i. Intentionally left blank for sequential numbering purposes.
- j. **Change order**, as used herein, shall mean a written order to the GC subsequent to the signing of the contract authorizing a change in the contract. The change order shall be signed by the GC, designer and the Owner, in that order (Article 19).
- k. **Field Order**, as used herein, shall mean a written approval for the GC to proceed with the work requested by Owner prior to issuance of a formal Change Order. The field order shall be signed by the GC, designer, and Owner.
- l. **Field Change**, as used herein shall mean a written approval from the Owner for the GC to proceed with work requested by the Owner.

- m. **Time of Completion**, as stated in the contract documents, is to be interpreted as consecutive calendar days measured from the date established in the written Notice to Proceed, or such other date as may be established herein (Article 23).
- n. **Liquidated damages**, as stated in the contract documents, is an amount reasonably estimated in advance to cover the consequential damages associated with the Owner's economic loss in not being able to use the Project for its intended purposes at the end of the contract's completion date as amended by change order, if any, by reason of failure of the GC to complete the work within the time specified. Liquidated damages does not include the Owner's extended contract administration costs (including but not limited to additional fees for architectural and engineering services, testing services, inspection services, commissioning services, etc.), such other damages directly resulting from delays caused solely by the GC, or consequential damages that the Owner identified in the bid documents that may be impacted by any delay caused solely by the GC (e.g., if a multi-phased project-subsequent phases, delays in start of other projects that are dependent on the completion of this Project, extension of leases and/or maintenance agreements for other facilities).
- o. **Surety**, as used herein, shall mean the bonding company or corporate body which is bound with and for the GC, and which engages to be responsible for the GC and his acceptable performance of the work.
- p. **Routine written communications between the Designer and the General Contractor** are any communication other than a "request for information" provided in letter, memo, or transmittal format, sent by mail, courier, electronic mail, or facsimile. Such communications cannot be identified as "request for information".
- q. **Clarification or Request for information (RFI)** is a request from the GC seeking an interpretation or clarification by the Designer relative to the contract documents. The RFI, which shall be labeled (RFI), shall clearly and concisely set forth the issue or item requiring clarification or interpretation and why the response is needed. The RFI must set forth the GC's interpretation or understanding of the contract documents requirements in question, along with reasons for such an understanding.
- r. **Approval** means written or imprinted acknowledgement that materials, equipment or methods of construction are acceptable for use in the work.
- s. **Inspection** shall mean examination or observation of work completed or in progress to determine its compliance with contract documents.
- t. **"Equal to" or "approved equal"** shall mean materials, products, equipment, assemblies, or installation methods considered equal by the bidder in all characteristics (physical, functional, and aesthetic) to those specified in the contract documents. Acceptance of equal is subject to approval of the designer and owner.
- u. **"Substitution" or "substitute"** shall mean materials, products, equipment, assemblies, or installation methods deviating in at least one characteristic (physical, functional, or aesthetic) from those specified, but which in the opinion of the bidder would improve

competition and/or enhance the finished installation. Acceptance of substitution is subject to the approval of the designer and owner.

- v. **Provide** shall mean furnish and install complete in place, new, clean, operational, and ready for use.
- w. **Indicated and shown** shall mean provide as detailed, or called for, and reasonably implied in the contract documents.
- x. **Special inspector** is one who inspects materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with the approved construction documents and referenced standards.
- y. **Commissioning** is a quality assurance process that verifies and documents that building components and systems operate in accordance to the owner's project requirements and the project design documents.
- z. **Designer Final Inspection** is the inspection performed by the design team to determine the completeness of the project in accordance with approved plans and specifications. This inspection occurs prior to final inspection.
- aa. left blank for numbering purposes
- bb. **Beneficial Occupancy** is requested by the owner and is occupancy or partial occupancy of the building after all life safety items have been completed as determined by the local Authority Having Jurisdiction (AHJ). Life safety items include but not limited to fire alarm, sprinkler, egress and exit lighting, fire rated walls, egress paths and security.
- cc. **Final Acceptance** is the date in which the Owner accepts the construction as totally complete. This includes the local AHJ and certification by the designer that all punch lists are completed.

ARTICLE 2 - INTENT AND EXECUTION OF DOCUMENTS

- a. The drawings and specifications are complementary, one to the other. That which is shown on the drawings or called for in the specifications shall be as binding as if it were both called for and shown. The intent of the drawings and specifications is to establish the scope of all labor, materials, transportation, equipment, and any and all other things necessary to provide a complete job. In case of discrepancy or disagreement in the contract documents, the order of precedence shall be: Form of Contract, specifications, large-scale detail drawings, small- scale drawings.
- b. The wording of the specifications shall be interpreted in accordance with common usage of the language except that words having a commonly used technical or trade meaning shall be so interpreted in preference to other meanings.
- c. The GC shall execute each copy of the response to RFP, contract, performance bond and payment bond as follows:

- 1 If the documents are executed by a sole Owner, that fact shall be evidenced by the word "Owner" appearing after the name of the person executing them.
- 2 If the documents are executed by a partnership, that fact shall be evidenced by the word "Co-Partner" appearing after the name of the partner executing them.
- 3 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 persons shall appear after their signatures. The seal of the corporation shall be impressed on each signature page of the documents.
- 4 If the documents are made by a joint venture, they shall be executed by each member of the joint venture in the above form for sole Owner, partnership or corporation, whichever form is applicable to each particular member.
- 5 All signatures shall be properly witnessed.
- 6 If the General Contractor's license is held by a person other than an Owner, partner or officer of a firm, then the licensee shall also sign and be a party to the contract. The title "Licensee" shall appear under his/her signature.
- 7 The bonds shall be executed by an attorney-in-fact. There shall be attached to each copy of the bond a certified copy of power of attorney properly executed and dated.
- 8 Each copy of the bonds shall be countersigned by an authorized individual agent of the bonding company licensed to do business in North Carolina. The title "Licensed Resident Agent" shall appear after the signature.
- 9 The seal of the bonding company shall be impressed on each signature page of the bonds.
- 10 The GC's signature on the performance bond and the payment bond shall correspond with that on the contract.

ARTICLE 3 - CLARIFICATIONS AND DETAIL DRAWINGS

- a. In such cases where the nature of the work requires clarification by the designer, such clarification shall be furnished by the designer with reasonable promptness by means of written instructions or detail drawings, or both. Clarifications and drawings shall be consistent with the intent of contract documents, and shall become a part thereof.
- b. The GC and the Designer shall prepare, if deemed necessary, a schedule fixing dates upon which foreseeable clarifications will be required. The schedule will be subject to addition or change in accordance with progress of the work. The Designer shall furnish drawings or clarifications in accordance with that schedule. The GC shall not proceed with the work without such detail drawings and/or written clarifications.

ARTICLE 4 - COPIES OF DRAWINGS AND SPECIFICATIONS

The Designer or owner shall furnish free of charge to the GC electronic copies of plans and specifications. If requested by the GC, up to 3 paper copies of plans and specifications will be provided free of charge, plus a clean set of black line prints on white paper of all appropriate drawings, upon which the GC shall clearly and legibly record all work-in-place that is at variance with the contract documents. Additional sets shall be furnished at cost, including mailing, to the GC at the request of the GC.

ARTICLE 5 - SHOP DRAWINGS, SUBMITTALS, SAMPLES, DATA

- a. Within fifteen (15) consecutive calendar days of the notice to proceed, a schedule for anticipated submission of all shop drawings, product data, samples, and similar submittals shall be prepared by the GC and provided to the designer. This schedule shall indicate the items, relevant specification sections, other related submittal data, and the date when these items will be furnished to the designer.
- b. The GC shall review, approve and submit to the Designer all Shop Drawings, Coordination Drawings, Product Data, Samples, Color Charts, and similar submittal data required or reasonably implied by the Contract Documents. Required Submittals shall bear the GC's stamp of approval, any exceptions to the Contract Documents shall be noted on the submittals, and copies of all submittals shall be of sufficient quantity for the Designer to retain up to three (3) copies of each submittal for his own use plus additional copies as may be required by the GC. Submittals shall be presented to the Designer in accordance with the schedule submitted in paragraph (a) so as to cause no delay in the activities of the Owner.
- c. The Designer shall review required submittals promptly, noting desired corrections if any, and retaining three (3) copies (1 for the Designer, 1 for the owner) for his use. The remaining copies of each submittal shall be returned to the GC not later than twenty (20) days from the date of receipt by the Designer, for the GC's use or for corrections and resubmittal as noted by the Designer. When resubmittals are required, the submittal procedure shall be the same as for the original submittals.
- d. Approval of shop drawings by the designer shall not be construed as relieving the GC from responsibility for compliance with the design or terms of the contract documents nor from responsibility of errors of any sort in the shop drawings, unless such error has been called to the attention of the designer in writing by the GC.

ARTICLE 6 - WORKING DRAWINGS AND SPECIFICATIONS AT THE JOB SITE

- a. The GC shall maintain, in readable condition at his job office, one complete set of working drawings and specifications for his work including all shop drawings. Such drawings and specifications shall be available for use by the Designer or his authorized representative, and the owner.

- b. The GC shall maintain at the job office, a day-to-day record of work-in-place that is at variance with the contract documents. Such variations shall be fully noted on project drawings by the GC and submitted to the designer upon project completion and no later than thirty (30) days after acceptance of the project.
- c. The contractor shall maintain at the job office a record of all required tests that have been performed, clearly indicating the scope of work inspected and the date of approval or rejection.

ARTICLE 7 - OWNERSHIP OF DRAWINGS AND SPECIFICATIONS

All drawings and specifications are instruments of service and remain the property of the Owner. The use of these instruments on work other than this contract without permission of the Owner is prohibited. All copies of drawings and specifications other than contract copies shall be returned to the Owner upon request after completion of the work.

ARTICLE 8 - MATERIALS, EQUIPMENT, EMPLOYEES

- a. The GC shall, unless otherwise specified, supply and pay for all labor, transportation, materials, tools, apparatus, scaffolding and incidentals necessary for the completion of his work, and to install, maintain and remove all equipment of the construction, other utensils or things, and be responsible for the safe, proper and lawful construction, maintenance and use of same. The GC shall construct in the best and most workmanlike manner, a complete job and everything incidental thereto, as shown on the plans, stated in the specifications, or reasonably implied there from, all in accordance with the contract documents.
- b. All materials shall be new and of quality specified, except where reclaimed material is authorized herein and approved for use. Workmanship shall at all times be of a grade accepted as the best practice of the particular trade involved, and as stipulated in written standards of recognized organizations or institutes of the respective trades except as exceeded or qualified by the specifications.
- c. Upon notice, the GC shall furnish evidence as to quality of materials.
- d. Products are generally specified by ASTM or other reference standard and/or by manufacturer's name and model number or trade name. When specified only by reference standard, the GC may select any product meeting this standard, by any manufacturer. When several products or manufacturers are specified as being equally acceptable, the GC has the option of using any product and manufacturer combination listed. However, the GC shall be aware that the cited examples are used only to denote the quality standard of product desired and that they do not restrict bidders to a specific brand, make, manufacturer or specific name; that they are used only to set forth and convey to bidders the general style, type, character and quality of product desired; and that equivalent products will be acceptable. The GC shall be responsible for reviewing all substitution requests from their subcontractors prior to submission to the Project Designer and Owner and shall track & monitor all such requests. Requests for substitution of materials, items, or equipment shall be submitted to the Project Designer for approval or disapproval; such approval or disapproval shall be made by the designer prior to the opening of bids. Alternate materials

may be requested after award if it can clearly be demonstrated that it is an added benefit to the owner and the designer and the owner approves.

- e. The GC shall obtain written approval from the designer for the use of products, materials, equipment, assemblies or installation methods claimed as equal to those specified. Such approvals must be obtained as soon after contract awards as possible and before any materials are ordered.
- f. The Designer is the judge of equality for proposed substitution of products, materials or equipment.
- g. If at any time during the construction and completion of the work covered by these contract documents, the conduct of any workman of the various crafts be adjudged a nuisance to the Owner or Designer, or if any workman be considered detrimental to the work, the GC shall order such parties removed immediately from grounds.

ARTICLE 9 - ROYALTIES, LICENSES AND PATENTS

It is the intention of the contract documents that the work covered herein will not constitute in any way infringement of any patent whatsoever unless the fact of such patent is clearly evidenced herein. The GC shall protect and save harmless the Owner against suit on account of alleged or actual infringement. The GC shall pay all royalties and/or license fees required on account of patented articles or processes, whether the patent rights are evidenced hereinafter.

ARTICLE 10 - PERMITS, INSPECTIONS, FEES, REGULATIONS

- a. The GC shall give all notices and comply with all laws, ordinances, codes, rules and regulations bearing on the conduct of the work under this contract. If the GC observes that the drawings and specifications are at variance therewith, he shall promptly notify the Designer in writing. Any necessary changes required after contract award shall be made by change order in accordance with Article 19. If the GC performs any work or authorizes any work to be performed knowing it to be contrary to such laws, ordinances, codes, rules and regulations, and without such notice to the designer, he shall bear all cost arising there from. Additional requirements implemented after bidding will be subject to equitable negotiations.
- b. All work under this contract shall conform to the North Carolina State Building Code and other State, local and national codes as are applicable. The cost of all required inspections and permits shall be the responsibility of the GC unless otherwise specified.
- c. Projects constructed by Buncombe County or a subdivision thereof are subject to inspection by appropriate county or municipal authorities and building codes. The GC shall cooperate with the county and/or municipal authorities by obtaining building permits. Permits shall be obtained at GC's cost.
- d. Projects involving local funding (Community Colleges) are also subject to county and municipal building codes and inspection by local authorities. The GC shall pay the cost of these permits and inspections unless otherwise specified.

ARTICLE 11 - PROTECTION OF WORK, PROPERTY AND THE PUBLIC

- a. The GC shall be responsible for the entire site and the building or construction of the same and provide all the necessary protections, as required by the Owner or designer, and by laws or ordinances governing such conditions. The GC shall be responsible for any damage to the Owner's property or of that of others on the job, by them, their personnel, or their subcontractors, and shall make good such damages. The GC shall be responsible for and pay for any damages caused to the Owner. The GC shall have access to the project at all times.
- b. The GC shall be responsible to cover and protect all portions of the structure when the work is not in progress, provide and set all temporary roofs, covers for doorways, sash and windows, and all other materials necessary to protect all the work on the building. Any work damaged through the lack of proper protection or from any other cause, shall be repaired or replaced without extra cost to the Owner.
- c. No fires of any kind will be allowed inside or around the operations during the course of construction without special permission from the Designer.
- d. The GC shall ensure that all trees and shrubs designated to remain in the vicinity of the construction operations are protected in accordance with the requirements of the plans and specifications. All walks, roads, etc., shall be barricaded as directed by the designer to keep the public away from the construction. All trenches, excavations or other hazards in the vicinity of the work shall be well barricaded and properly lighted at night.
- e. The GC shall develop and implement a project safety plan that provides all necessary safety measures for the protection of all persons on the job, including the requirements of the A.G.C. *Accident Prevention Manual in Construction*, as amended, and shall fully comply with all state laws or regulations and North Carolina State Building Code requirements to prevent accident or injury to persons on or about the location of the work. The GC shall clearly mark or post signs warning of hazards existing, and shall barricade excavations, elevator shafts, stairwells and similar hazards. The GC shall insure that protection is provided against damage or injury resulting from falling materials and that all protective devices and signs be maintained throughout the progress of the work.
- f. The GC shall adhere to the rules, regulations and interpretations of the North Carolina Department of Labor relating to Occupational Safety and Health Standards for the Construction Industry (Title 29, Code of Federal Regulations, Part 1926, published in Volume 39, Number 122, Part II, June 24, 1974, *Federal Register*), and revisions thereto as adopted by N.C.G.S. 95-126 through 155.
- g. The GC shall designate a responsible person of his organization as safety officer/inspector to inspect the project site for unsafe health and safety hazards, to report these hazards to the contractor for correction, and whose duties also include accident prevention on the project, and to provide other safety and health measures on the project site as required by the terms and conditions of the contract. The name of the safety inspector shall be made

known to the designer and owner at the time of the preconstruction conference and in all cases prior to any work starting on the project.

- h. In the event of an emergency affecting the safety of life, the protection of work, or the safety of adjoining properties, the GC is hereby authorized to act at his own discretion, without further authorization from anyone, to prevent such threatened injury or damage. Any compensation claimed by the GC on account of such action shall be determined as provided for under Article 19(b).
- i. Any and all costs associated with correcting damage caused to adjacent properties of the construction site or staging area shall be borne by the contractor. These costs shall include but not be limited to flooding, mud, sand, stone, debris, and discharging of waste products.

ARTICLE 12 - SEDIMENTATION POLLUTION CONTROL ACT OF 1973

- a. Any land-disturbing activity performed by the GC in connection with the project shall comply with all erosion control measures set forth in the contract documents and any additional measures which may be required in order to ensure that the project is in full compliance with the Sedimentation Pollution Control Act of 1973, as implemented by Title 15, North Carolina Administrative Code, Chapter 4, Sedimentation Control, Subchapters 4A, 4B and 4C, as amended (15 N.C.A.C. 4A, 4B and 4C).
- b. Upon receipt of notice that a land-disturbing activity is in violation of said act, the GC shall be responsible for ensuring that all steps or actions necessary to bring the project in compliance with said act are promptly taken.
- c. The GC shall be responsible for defending any legal actions instituted pursuant to N.C.G.S. 113A-64 against any party or persons described in this article.
- d. To the fullest extent permitted by law, the GC shall indemnify and hold harmless the Owner, the designer and the agents, consultants and employees of the Owner and designer, from and against all claims, damages, civil penalties, losses and expenses, including, but not limited to, attorneys' fees, arising out of or resulting from the performance of work or failure of performance of work, provided that any such claim, damage, civil penalty, loss or expense is attributable to a violation of the Sedimentation Pollution Control Act. Such obligation shall not be construed to negate, abridge or otherwise reduced any other right or obligation of indemnity which would otherwise exist as to any party or persons described in this article.

ARTICLE 13 - INSPECTION OF THE WORK

- a. It is a condition of this contract that the work shall be subject to inspection during normal working hours by the designer, designated official representatives of the Owner and those persons required by state law to test special work for official approval. The GC shall therefore provide safe access to the work at all times for such inspections.

- b. All instructions to the GC will be made only by or through the designer or his designated project representative. Observations made by official representatives of the Owner shall be conveyed to the designer for review and coordination prior to issuance to the GC.
- c. The GC shall perform quality control inspections on the work of Principal Trade and Specialty Contractors to guard the Owner against defects and deficiencies in the work and shall coordinate this activity with the on-site duties of the Project Designer. The GC shall advise the Project Designer of any apparent variation and/or deviation from the intent of the Contract Documents and shall take the necessary action to correct such variations and deviations.
- d. All work shall be inspected by designer, special inspector prior to being covered by the contractor. The GC shall give a minimum of two week notice unless otherwise agreed to by all parties. If inspection fails, after the first re-inspection all costs associated with additional re-inspections shall be borne by the GC.
- e. Where special inspection or testing is required by virtue of any state laws, instructions of the designer, specifications or codes, the GC shall give adequate notice to the Project Designer of the time set for such inspection or test, if the inspection or test will be conducted by a party other than the Project Designer. Such special tests or inspections will be made in the presence of the Project Designer, or his authorized representative, and it shall be the GC's responsibility to serve ample notice of such tests.
- f. All laboratory tests shall be paid by the Owner unless provided otherwise in the contract documents except the GC shall pay for laboratory tests to establish design mix for concrete and for additional tests to prove compliance with contract documents where materials have tested deficient except when the testing laboratory did not follow the appropriate ASTM testing procedures.
- g. Should any work be covered up or concealed prior to inspection and approval by the Project Designer such work shall be uncovered or exposed for inspection, if so requested by the Project Designer in writing. Inspection of the work will be made promptly upon notice from the GC. All cost involved in uncovering, repairing, replacing, recovering and restoring to design condition, the work that has been covered or concealed will be paid by the GC.

ARTICLE 14 - CONSTRUCTION SUPERVISION AND SCHEDULE

- a. On-site representatives of the GC shall manage the work and coordinate the work with the activities of the Owner and Project Designer to complete the project with the Owner's objectives of cost, time and quality. Throughout the progress of the work, the GC shall maintain a competent and adequate full-time staff approved by the Owner and Project Designer. It is understood that the designated and approved on-site representative of the GC will remain on the job and in responsible charge as long as those persons remain employed by the GC unless otherwise requested or agreed to by the Owner. The GC shall establish an on-site organization with appropriate lines of authority to act on behalf of the GC. Instructions, directions or notices given to the designated on-site authority shall be as

binding as if given to the GC. However, directions, instructions, and notices shall be confirmed in writing.

- b. The GC shall examine and study the drawings and specifications and fully understand the project design, and shall provide constant and efficient supervision to the work. Should he discover any discrepancies of any sort in the drawings or specifications, he shall report them to the designer without delay. He will not be held responsible for discrepancies in the drawings and/or specifications, but shall be held responsible to report them should they become known to him.
- c. The GC shall call and preside over monthly job site progress conferences. The GC shall require attendance from other subcontractors and material suppliers who can contribute toward maintaining required job progress. It shall be the principal purpose of these meetings, or conferences, to effect coordination, cooperation and assistance in every practical way toward the end of maintaining progress of the project on schedule and to complete the project within the specified contract time. The GC shall be prepared to assess progress of the work and to recommend remedial measures for correction of progress as may be appropriate. The GC with assistance from the Designer shall be the coordinator of the conferences and shall preside as chairman. The GC shall turn over a copy of his daily reports to the Designer and Owner at the job site progress conference. Owner will determine daily report format.
- d. The GC, if necessary, shall employ an engineer or a land surveyor licensed in the State of North Carolina to lay out the work and to establish a bench mark nearby in a location where same will not be disturbed and where direct instruments sights may be taken.
- e. Intentionally left blank for sequential numbering purposes.
- f. The CPM schedule shall be a complete computer generated network analysis showing the complete sequence of construction activities, identifying the work of separate stages and other logically grouped activities, indicating early and late start and early and late finish dates, float duration and a complete logic. Monthly updates will show the estimated completion of each activity.
- g. Intentionally left blank for sequential numbering purposes.
- h. The GC shall maintain the project CPM schedule, making monthly adjustments, updates, corrections, etc., which are necessary to finish the project within the time allotted by the contract. In doing so, the GC shall keep the designer fully informed as to all changes and updates to the schedule. The GC shall submit to the Project Designer a monthly report of the status of all work activities. The monthly status report shall show the actual work completed to date in comparison with the original amount of work scheduled. If the work is behind schedule, the GC must indicate in writing what measures are being taken to bring the work back on schedule and ensure that the contract completion date is not exceeded. If the work is greater than thirty (30) days behind schedule and no legitimate requests for time extensions are in process, then the GC shall prepare and submit to the Project Designer a recovery schedule for review and approval. Failure of the GC to abide by the directives

in this paragraph will give the Owner cause to exercise the remedies set forth in Article 29 of the General Conditions and pursue any other legal remedies allowed it by law.

ARTICLE 15 – {NOT USED}

ARTICLE 16 – {NOT USED}

ARTICLE 17 – {NOT USED}

ARTICLE 18 - DESIGNER'S STATUS

- a. The Project Designer shall provide liaison and necessary inspection of the work to ensure compliance with plans and specifications. He is the agent of the Owner only for the purpose of constructing this work and to the extent stipulated in the contract documents. He has authority to stop work or to order work removed, or to order corrections of faulty work where such action may be necessary to assure successful completion of the work.
- b. The Project Designer is the impartial interpreter of the contract documents, and, as such, he shall exercise his powers under the contract to enforce faithful performance by both the Owner and the GC, taking sides with neither.
- c. Should the Project Designer cease to be employed on the work for any reason whatsoever, then the Owner shall employ a competent replacement who shall assume the status of the former Project Designer.
- d. The Project Designer will make periodic inspections of the project at intervals appropriate to the stage of construction. He will inspect the progress, the quality and the quantity of the work.
- e. The Project Designer and the Owner shall have access to the work whenever it is in preparation and progress during normal working hours. The GC shall provide facilities for such access so the Designer may perform his functions under the contract documents.
- f. Based on the Project Designer's inspections and evaluations of the project, the Project Designer shall issue interpretations, directives and decisions as may be necessary to assist the GC in the administration of the project. His decisions relating to artistic effect and technical matters shall be final, provided such decisions are within the limitations of the contract. The GC's decisions, however, relating to means and methods, and administration of the contracts the GC holds are final.

ARTICLE 19 - CHANGES IN THE WORK

- a. The Owner may have changes made in the work covered by the contract. These changes will not invalidate and will not relieve or release the GC from any guarantee given by him pertinent to the contract provisions. These changes will not affect the validity of the guarantee bond and will not relieve the surety or sureties of said bond. All extra work shall be executed under conditions of the original contract.

- b. Except in an emergency endangering life or property, no change shall be made by the contractor except upon receipt of approved change order or written field order from the designer, countersigned by the owner authorizing such change. No claim for adjustments of the contract price shall be valid unless this procedure is followed.

A field order, transmitted by email, fax, or hand delivered, may be used where the change involved impacts the critical path of the work. A formal change order shall be issued as expeditiously as possible.

In the event of emergency endangering life or property, the County may direct the GC to proceed on a time and material basis whereupon the GC shall proceed and keep accurately on such form as may be required, a correct account of costs together with all proper invoices, payrolls and supporting data. Upon completion of the work the change order will be prepared as outlined under either Method "c(1)" or Method "c(2)" or both.

- c. In determining the values of changes, either additive or deductive, the GC is restricted to the use of the following methods:

- 1 Where the extra work involved is covered by unit prices quoted in the proposal, the value of the change shall be computed by application of unit prices based on quantities estimated or actual as agreed of the items involved, except in such cases where a quantity exceeds the estimated quantity allowance in the contract by one hundred percent (100%) or more. In such cases, either party may elect to proceed under subparagraph c2 herein. If neither party elects to proceed under c2, then unit prices shall apply.
- 2 The contracting parties shall negotiate and agree upon the equitable value of the change prior to issuance of the change order, and the change order shall stipulate the corresponding lump sum adjustment to the contract price.

- d. Under Paragraph "b" and Methods "c(2)" above, the allowances for overhead and profit combined for a Principal Trade or Specialty Contractor and all multi-tier subcontractors shall not exceed fifteen percent (15%) of **net cost** of the work. In the case of deductible change orders, under Method "c(2)" and Paragraph (b) above, the contractor shall include no less than five percent (5%) profit, but no allowances for overhead.

- e. The term "net cost" as used herein shall mean the difference between all proper cost additions and deductions. The "cost" as used herein shall be limited to the following:

- 1 The actual costs of materials and supplies incorporated or consumed as part of the project;
- 2 The actual costs of labor expended on the project site;
- 3 The actual costs of labor burden, limited to the costs of social security (FICA) and Medicare/Medicaid taxes; unemployment insurance costs; health/dental/vision insurance premiums; paid employee leave for holidays, vacation, sick leave, and/or petty leave, not to exceed a total of 30 days per year; retirement contributions;

worker's compensation insurance premiums; and the costs of general liability insurance when premiums are computed based on payroll amounts; the total of which shall not exceed thirty percent (30%) of the actual costs of labor;

- 4 The actual costs of rental for tools, excluding hand tools; equipment; machinery; and temporary facilities required for the project;
 - 5 The actual costs of premiums for bonds, insurance, permit fees and sales or use taxes related to the project. Overtime and extra pay for holidays and weekends shall not be incurred by the Owner as a cost item or otherwise.
- f. Should concealed conditions be encountered in the performance of the work below grade, or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the contract documents, the contract sum and time for completion may be equitably adjusted by change order upon claim by either party made within thirty (30) days after the condition has been identified. The cost of such change shall be arrived at by one of the foregoing methods. All change orders shall be supported by a breakdown showing method of arriving at net cost as defined above.
- g. In all change orders, the procedure will be for the Project Designer to request proposals for the change order work in writing. The Project Designer shall verify correctness. Within fourteen (14) days after receipt of the GC's proposal, the Project Designer shall prepare the change order and forward to the GC for his signature or otherwise respond, in writing, to the GC's proposal. Within seven (7) days after receipt of the change order executed by the GC, the Project Designer shall, certify the change order by his signature, and forward the change order and all supporting data to the Owner for the Owner's signature. The Owner shall execute the change order for final approval, within seven (7) days of receipt. Copies will be sent to the Project Designer for distribution to the GC and the surety. In case of emergency or extenuating circumstances, approval of changes may be obtained verbally by telephone or field orders approved by all parties, then shall be substantiated in writing as outlined under normal procedure.
- h. At the time of signing a change order, the GC shall be required to certify as follows:
- "I certify that my bonding company will be notified forthwith that my contract has been changed by the amount of this change order, and that a copy of the approved change order will be mailed upon receipt by me to my surety."
- i. A change order, when issued, shall be full compensation, or credit, for the work included, omitted or substituted. It shall show on its face the adjustment in time for completion of the project as a result of the change in the work.
- j. If, during the progress of the work, the Owner requests a change order and the GC's terms are unacceptable, the Owner, may require the GC to perform such work on a time and material basis in accordance with paragraph "b" above. Without prejudice, nothing in this paragraph shall preclude the Owner from performing or to have performed that portion of the work requested in the change order.

ARTICLE 20 - CLAIMS FOR EXTRA COST AND DISPUTE RESOLUTION

- a. Should the GC consider that as a result of any instructions given in any form by the designer, he is entitled to extra cost above that stated in the contract, he shall give written notice thereof to the designer within seven (7) days without delay. The written notice shall clearly state that a claim for extra cost is being made and shall provide a detailed justification for the extra cost. The GC shall not proceed with the work affected until further advised, except in emergency involving the safety of life or property, which condition is covered in Article 19(b) and Article 11(h). No claims for extra compensation will be considered unless the claim is so made. The Designer shall render a written decision within seven (7) days of receipt of claim.
- b. The GC shall not act on instructions received by him from persons other than the Project Designer, and any claims for extra compensation or extension of time on account of such instruction will not be honored. The Project Designer will not be responsible for misunderstandings claimed by the GC of verbal instructions which have not been confirmed in writing, and in no case shall instructions be interpreted as permitting a departure from the contract documents unless such instruction is confirmed in writing and supported by a properly authorized change order.
- c. To prevent disputes and litigation, it is agreed by the parties that any claim or dispute between the Owner and the Design Consultant, that any claim, dispute, or other matter in question arising out of or related to this Agreement shall be subject to voluntary non-binding mediation as a condition precedent to the institution of legal or equitable proceedings by either party. If the parties are unable to agree upon a certified mediator to hear their dispute, the President of the Buncombe County Bar Association shall name a mediator to hear the matter. 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. The costs of the process shall be divided equally between the parties to the dispute.
- d. The mediation session shall be private and shall be held in Buncombe County, North Carolina or in another North Carolina County agreed upon by both parties. Mediation under this Article 11 shall not be the cause for a delay of the Project which is the focus of the dispute.
- e. 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 judgment may be entered upon it in accordance with applicable law in any court of competent jurisdiction.
- f. 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 Buncombe 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.

ARTICLE 21 - MINOR CHANGES IN THE WORK

The Project Designer will have the authority to order minor changes in the work not involving an adjustment in the contract sum or time for completion, and not inconsistent with the intent of the contract documents. Such changes shall be effected by written order, and shall be binding on the Owner and the GC.

ARTICLE 22 - UNCORRECTED FAULTY WORK

Should the correction of faulty or damaged work be considered inadvisable or inexpedient by the Owner and the Project Designer, the Owner shall be reimbursed by the GC. A change order will be issued to reflect a reduction in the contract sum.

ARTICLE 23 - TIME OF COMPLETION, DELAYS, EXTENSION OF TIME

- a. The final completion date will be as determined by the Owner, Designer and GC during the pre-construction phase of the project and will be incorporated into the contract for construction services between the Owner and the GC.
- b. The GC shall commence work to be performed under this agreement on a date to be specified in a written Notice to Proceed from the Project Designer and shall fully complete all work hereunder within the time of completion specified. For each day in excess of the above number of days, the GC shall pay the Owner the sum stated as liquidated damages reasonably estimated in advance to cover the losses to be incurred by the Owner by reason of failure of the GC to complete the work within the time specified, such time being in the essence of this contract and a material consideration thereof.
- c. If the GC is delayed at any time in the progress of his work by any act or negligence of the Owner or the Project Designer, or by any employee of either; by changes ordered in the work; by labor disputes at the project site; by abnormal weather conditions not reasonably anticipated for the locality where the work is performed; by unavoidable casualties; by any causes beyond the contractor's control; or by any other causes which the designer and Owner determine may justify the delay, then the contract time may be extended by change order for the time which the designer and Owner may determine is reasonable.

Time extensions will not be granted for rain, wind, snow or other natural phenomena of normal intensity for the locality where work is performed. For purpose of determining extent of delay attributable to unusual weather phenomena, a determination shall be made by comparing the weather for the contract period involved with the average of the preceding five (5) year climatic range during the same time interval based on the National Oceanic and Atmospheric Administration National Weather Service statistics for the locality where work is performed and on daily weather logs kept on the job site by the GC reflecting the effect of the weather on progress of the work and initialed by the designer's representative. No weather delays shall be considered after the building is dried in unless work claimed to be delayed is on the critical path of the baseline schedule or approved

updated schedule. Time extensions for weather delays, acts of God, labor disputes, fire, delays in transportation, unavoidable casualties or other delays which are beyond the control of the Owner do not entitle the Contractor to compensable damages for delays. Any contractor claim for compensable damages for delays is limited to delays caused solely by the owner or its agents. Contractor caused delays shall be accounted for before owner or designer caused delays in the case of concurrent delays.

- d. Request for extension of time shall be made in writing to the designer, copies to the owner, within twenty (20) days following cause of delay. In case of continuing cause for delay, the GC shall notify the designer copies to the owner, of the delay within twenty (20) days of the beginning of the delay and only one claim is necessary.
- e. The GC shall notify his surety in writing of extension of time granted.
- f. No claim shall be allowed on account of failure of the Project Designer to furnish drawings or instructions until twenty (20) days after demand for such drawings and/or instructions. See Article 5c. Demand must be in written form clearly stating the potential for delay unless the drawings or instructions are provided. Any delay granted will begin after the twenty (20) day demand period is concluded.

ARTICLE 24 - PARTIAL UTILIZATION/BENEFICIAL OCCUPANCY

- a. The Owner may desire to occupy or utilize all or a portion of the project when the work is substantially complete.
- b. Should the owner request a utilization of a building or portion thereof, the designer shall perform a designer final inspection of area after being notified by the contractor that the area is ready for such. After the contractor has completed designer final inspection punch list and the designer has verified, then the designer shall schedule a beneficial occupancy inspection at a time and date acceptable to the owner and contractor(s). If beneficial occupancy is granted, in such areas the following will be established:
 - 1. The beginning of guarantees and warranties period for the equipment necessary to support in the area.
 - 2. The owner assumes all responsibilities for utility costs for entire building.
 - 3. Contractor will obtain consent of surety.
 - 4. Contractor will obtain endorsement from insurance company permitting beneficial occupancy.
 - 5. The Owner shall have the right to exclude the GC from any part of the project which the Project Designer has so certified to be substantially complete, but the Owner will allow the GC reasonable access to complete or correct work to bring it into compliance with the contract.

6. Occupancy by the Owner under this article will in no way relieve the GC from his contractual requirement to complete the project within the specified time. The contractor will not be relieved of liquidated damages because of beneficial occupancy. The designer may prorate liquidated damages based on the percentage of project occupied.

ARTICLE 25 - FINAL INSPECTION, ACCEPTANCE, AND PROJECT CLOSEOUT

- a. Upon notification from the GC that the project is complete and ready for inspection, the Project Designer shall make a designer final inspection to verify that the project is complete and ready for final inspection. Prior to final inspection, the GC shall ensure that all items requiring corrective measures noted at the designer final inspection are complete. The Project Designer shall schedule a final inspection at a time and date acceptable to the Owner and the GC.
- b. At the final inspection, the designer and his consultants shall, if job conditions warrant, record a list of items that are found to be incomplete or not in accordance with the contract documents. At the conclusion of the final inspection, the designer and Owners' representative shall make the following determinations:
 1. That the project is completed and accepted.
 2. That the project is accepted subject to the correction of the list of discrepancies (punch list). All punch list items must be completed within thirty (30) days of final inspection or the Owner may invoke Article 28, Owner's Right to Do Work.
 3. That the project is not complete and another date for a final inspection will be established.
- c. Within fourteen (14) days of acceptance per Paragraph b1 or within fourteen (14) days after completion of punch list per Paragraph b2 above, the Project Designer shall certify the work and issue applicable certificate(s) of compliance.
- d. Any discrepancies listed or discovered after the date of final inspection and acceptance under Paragraphs b1 or b2 above shall be handled in accordance with Article 42.
- e. The date of acceptance will establish the following:
 1. The beginning of guarantees and warranties period.
 2. The date on which the GC's insurance coverage for public liability, property damage and builder's risk may be terminated.
 3. That no liquidated damages (if applicable) shall be assessed after this date.
 4. The termination date of utility cost to the GC (if applicable).

- f. **Prior to issuance of final acceptance date, the contractor shall have his authorized representatives visit the project and give full instructions to the designated personnel regarding operating, maintenance, care, and adjustment of all equipment and special construction elements. In addition, the contractor shall provide to the owner a complete instructional video (media format acceptable to the owner) on the operation, maintenance, care and adjustment of all equipment and special construction elements.**

ARTICLE 26 - CORRECTION OF WORK BEFORE FINAL PAYMENT

- a. Any work, materials, fabricated items or other parts of the work which have been condemned or declared not in accordance with the contract by the designer shall be promptly removed from the work site by the GC, and shall be immediately replaced by new work in accordance with the contract at no additional cost to the Owner. Work or property of the Owner, damaged or destroyed by virtue of such faulty work, shall be made good at the expense of the GC.
- b. Correction of condemned work described above shall commence within twenty-four (24) hours after receipt of notice from the Project Designer, and shall make satisfactory progress until completed.
- c. Should the GC fail to proceed with the required corrections, then the Owner may complete the work in accordance with the provisions of Article 28.

ARTICLE 27 - CORRECTION OF WORK AFTER FINAL PAYMENT

See Article 35, Performance Bond and Payment Bond, and Article 42, Guarantee. Neither the final certificate, final payment, occupancy of the premises by the Owner, nor any provision of the contract, nor any other act or instrument of the Owner, nor the Project Designer, shall relieve the GC from responsibility for negligence, or faulty material or workmanship, or failure to comply with the drawings and specifications. The GC shall correct or make good any defects due thereto and repair any damage resulting therefrom, which may appear during the guarantee period following final acceptance of the work except as stated otherwise under Article 42, Guarantee. The Owner will report any defects as they may appear to the GC and establish a time limit for completion of corrections by the GC. The Owner will be the judge as to the responsibility for correction of defects.

ARTICLE 28 - OWNER'S RIGHT TO DO WORK

If, during the progress of the work or during the period of guarantee, the GC fails to prosecute the work properly or to perform any provision of the contract, the Owner, after seven (7) days written notice sent by certified mail, return receipt requested, to the GC from the designer, may perform or have performed that portion of the work. The cost of the work may be deducted from any amounts due or to become due to the GC, such action and cost of same having been first approved by the Project Designer. Should the cost of such action of the Owner exceed the amount due or to become due the GC, then the GC or his surety, or both, shall be liable for and shall pay to the Owner the amount of said excess.

ARTICLE 29 - ANNULMENT OF CONTRACT

If the GC fails to begin the work under the contract within the time specified, or the progress of the work is not maintained on schedule, or the work is not completed within the time above specified, or fails to perform the work with sufficient workmen and equipment or with sufficient materials to ensure the prompt completion of said work, or shall perform the work unsuitably or shall discontinue the prosecution of the work, or if the GC shall become insolvent or be declared bankrupt or commit any act of bankruptcy or insolvency, or allow any final judgment to stand against him unsatisfied for a period of forty-eight (48) hours, or shall make an assignment for the benefit of creditors, or for any other cause whatsoever shall not carry on the work in an acceptable manner, the Owner may give notice in writing, sent by certified mail, return receipt requested, to the GC and his surety of such delay, neglect or default, specifying the same, and if the GC within a period of seven(7) days after such notice shall not proceed in accordance therewith, then the Owner shall, declare this contract in default, and, thereupon, the surety shall promptly take over the work and complete the performance of this contract in the manner and within the time frame specified. In the event the surety shall fail to take over the work to be done under this contract within seven(7) days after being so notified and notify the Owner in writing, sent by certified mail, return receipt requested, that he is taking the same over and stating that he will diligently pursue and complete the same, the Owner shall have full power and authority, without violating the contract, to take the prosecution of the work out of the hands of said GC, to appropriate or use any or all contract materials and equipment on the grounds as may be suitable and acceptable and may enter into an agreement, either by public letting or negotiation, for the completion of said contract according to the terms and provisions thereof or use such other methods as in his opinion shall be required for the completion of said contract in an acceptable manner. All costs and charges incurred by the Owner, together with the costs of completing the work under contract, shall be deducted from any monies due or which may become due said GC and surety. In case the expense so incurred by the Owner shall be less than the sum which would have been payable under the contract, if it had been completed by said GC, then the said GC and surety shall be entitled to receive the difference, but in case such expense shall exceed the sum which would have been payable under the contract, then the GC and the surety shall be liable and shall pay to the Owner the amount of said excess.

ARTICLE 30 – GENERAL CONTRACTOR’S RIGHT TO STOP WORK OR TERMINATE THE CONTRACT

- a. Should the work be stopped by order of a court having jurisdiction, or by order of any other public authority for a period of three months, due to cause beyond the fault or control of the GC, or if the Owner should fail or refuse to make payment on account of a certificate issued by the designer within forty-five (45) days after receipt of same, then the GC, after fifteen (15) days' written notice sent by certified mail, return receipt requested, to the Owner and the designer, may suspend operations on the work or terminate the contract.
- b. The Owner shall be liable to the GC for the cost of all materials delivered and work performed on this contract plus ten (10) percent overhead and profit and shall make such payment. The designer shall be the judge as to the correctness of such payment.

ARTICLE 31 - REQUEST FOR PAYMENT

- a. Not later than the fifth day of the month, the GC shall submit to the designer a request for payment for work done during the previous month. The request shall be in the form agreed upon between the GC and the designer, but shall show substantially the value of work done and materials delivered to the site during the period since the last payment, and shall sum up the financial status of the contract with the following information:
 1. Total of contract including change orders.
 2. Value of work completed to date.
 3. Less five percent (5%) retainage, provided however, that after fifty percent (50%) of the GC's work has been satisfactorily completed on schedule, with approval of the owner and written consent of the surety, further requirements for retainage will be waived only so long as work continues to be completed satisfactorily and on schedule.
 4. Less previous payments.
 5. Current amount due.
- b. Prior to submitting the first payment request, the GC shall prepare a schedule showing a breakdown of the contract price. This schedule of values will be submitted to & approved by the designer and Owner within 30 days of the Notice to Proceed. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the designer and Owner may require.
- c. Applications for payment shall be in a form agreed upon by the GC, designer and Owner and shall be prepared and supported by such data to substantiate the accuracy of the request as the designer may require.
- d. Intentionally left blank for sequential numbering purposes.
- e. Intentionally left blank for sequential numbering purposes.
- f. When payment is made on account of stored materials and equipment, such materials must be stored on the owner's property, and the requests for payments shall be accompanied by invoices or bills of sale or other evidence to establish the owner's title to such materials and equipment. Such payments will be made only for materials that have been customized or fabricated specifically for this project. Raw materials or commodity products including but not limited to piping, conduit, CMU, metal studs and gypsum board may not be submitted. Responsibility for such stored materials and equipment shall remain with the GC regardless of ownership title. Such stored materials and equipment shall not be removed from the owner's property. Should the space for storage on-site be limited, the GC, at his option, shall be permitted to store such materials and/or equipment in a suitable space off-site. Should the GC desire to include any such materials or equipment in his application for payment, they must be stored in the name of the owner in an independent, licensed, bonded warehouse approved by the designer and owner and located as close to the site as possible. The warehouse selected must be approved by the GC's bonding and

insurance companies; the material to be paid for shall be assigned to the owner and shall be inspected by the designer. Upon approval by the designer and owner of the storage facilities and materials and equipment, payment therefore will be certified. Responsibility for such stored materials and equipment shall remain with the GC. Such stored materials and equipment shall not be moved except for transportation to the project site. Under certain conditions, the designer may approve storage of materials at the point of manufacture, which conditions shall be approved by the designer and the owner prior to approval for the storage and shall include an agreement by the storing party which unconditionally gives the County absolute right to possession of the materials at any time. Bond, security and insurance protection shall continue to be the responsibility of the GC.

- g. In the event of beneficial occupancy, retainage of funds due the GC may be reduced with the approval of the Owner to an equitable amount to cover the list of items to be completed or corrected. Retainage may not be reduced to less than two and one-half (2 1/2) times the estimated value of the work to be completed or corrected. Reduction of retainage must be with the consent and approval of the GC's bonding company.

ARTICLE 32 - CERTIFICATES OF PAYMENT AND FINAL PAYMENT

- a. Within five (5) days from receipt of request for payment from the GC, the designer shall issue and forward to the Owner a certificate for payment. This certificate shall indicate the amount requested or as approved by the designer. If the certificate is not approved by the designer, he shall state in writing to the GC and the Owner his reasons for withholding payment.
- b. No certificate issued or payment made shall constitute an acceptance of the work or any part thereof. The making and acceptance of final payment shall constitute a waiver of all claims by the Owner except:
 - 1. Claims arising from unsettled liens or claims against the GC.
 - 2. Faulty work or materials appearing after final payment.
 - 3. Failure of the contractor to perform the work in accordance with drawings and specifications, such failure appearing after payment.
 - 4. As conditioned in the performance bond and payment bond.
- c. The making and acceptance of final payment shall constitute a waiver of all claims by the GC except those claims previously made and remaining unsettled (Article 20(c)).
- d. Prior to submitting request for final payment to the designer for approval, the GC shall fully comply with all requirements specified in the "project closeout" section of the specifications. These requirements include but not limited to the following:
 - 1. Submittal of Product and Operating Manuals, Warranties and Bonds, Guarantees, Maintenance Agreements, As-Built Drawings, Certificates of Inspection or

Approval from agencies having jurisdiction. (The designer must approve the Manuals prior to delivery to the Owner).

2. Transfer of required attic stock material and all keys in an organized manner.
 3. Record of Owner's training.
 4. Resolution of any final inspection discrepancies.
 5. Granting access to Contractor's records, if Owner's internal auditors have made a request for such access pursuant to Article 52.
- e. The GC shall forward to the designer, the final application for payment along with the following documents:
1. List of minority business subcontractors and material suppliers showing breakdown of contracts amounts and total actual payments to subcontractors and material suppliers.
 2. Affidavit of Release of Liens.
 3. Affidavit from GC of payment to material suppliers and subcontractors. (See Article 36).
 4. Consent of Surety to Final Payment.
 5. Certificates of state agencies required by state law.
- f. The designer will not authorize final payment until the work under contract has been certified by Project Designer, certificates of compliance issued, and the GC has complied with the closeout requirements. The designer shall forward the GC's final application for payment to the Owner along with respective certificate(s) of compliance required by law.

ARTICLE 33 - PAYMENTS WITHHELD

- a. The designer may withhold payment for the following reasons:
1. Faulty work not corrected.
 2. The unpaid balance on the contract is insufficient to complete the work in the judgment of the designer.
 3. To provide for sufficient contract balance to cover liquidated damages that will be assessed against the GC.
- b. The Owner may authorize the withholding of payment for the following reasons:
1. Claims filed against the GC or evidence that a claim will be filed.

2. Evidence that subcontractors have not been paid.
- c. Intentionally left blank for sequential numbering purposes.
- d. When grounds for withholding payments have been removed, payment will be released. Delay of payment due the GC without cause will make owner liable for payment of interest to the GC in accordance with G.S. 143-134.1. As provided in G.S.143-134.1(e) the owner shall not be liable for interest on payments withheld by the owner 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.

ARTICLE 34 - MINIMUM INSURANCE REQUIREMENTS

GC agrees their insurance policies shall be endorsed evidencing the minimum insurance coverage and limits set forth below prior to the County's signing of this Agreement. The insurance coverage and limits set forth below shall be deemed minimum coverage limits and shall not be construed in any way as a limitation on GC's duty to carry adequate insurance. All policies of insurance shall be on a primary basis, non-contributory with any other insurance coverages and/or self-insurance carried by the County. The minimum insurance coverage which the GC shall procure and maintain at its sole cost and expense during the term of the Agreement is as follows:

Worker's Compensation. Coverage at the statutory limits in compliance with applicable State and Federal laws. GC shall ensure that any subcontractors also have workers compensation coverage at the statutory limits.

Employer's Liability. Coverage with minimum limits of \$1,000,000 each employee accident and \$1,000,000 each employee disease.

Commercial General Liability. Insurance covering all operations performed by the GC with a minimum limit of \$5,000,000 per occurrence with a \$10,000,000 aggregate. Coverage shall not contain any endorsement(s) excluding nor limiting Product/Completed Operations or Contractual Liability. Buncombe County shall be named as an additional insured under the policy.

Commercial general liability coverage shall not restrict coverage under such policy with respect to the escape or release of pollutants at or from a site owned or occupied by or rented or loaned to County. This policy shall not limit the scope of coverage for liability arising from pollution, explosion, collapse, underground property damage or damage to the work.

Professional Liability. Insurance covering GC for acts, errors, or omissions in performance of the Agreement with a minimum limit of \$1,000,000 per claim with a \$2,000,000 aggregate. Policy is to be on a primary basis if other professional liability is carried. This policy shall remain in effect three (3) years after project completion.

Contractor's Pollution Liability. If GC's commercial general liability policy referenced above does not include an endorsement including the Limited Pollution Liability Extension, GC will be required to purchase a Pollution Liability policy with limits of \$1,000,000 per loss and \$1,000,000 aggregate. GC shall keep this policy in effect 3 years after completion of the project. Buncombe

County shall be named as an additional insured with respect to liability and defense of suits arising out of the activities performed by, or on behalf of GC, including completed operations.

Business Automobile Liability. Insurance covering all owned, non-owned, and hired vehicles used in performance of this Agreement. The minimum combined single limit per occurrence shall be \$1,000,000 and shall include uninsured/underinsured motorist coverage per N.C. Gen. Stat. § 20-279.21.

Umbrella/Excess Liability. If the underlying liability policy limits are less than those required, GC may provide an excess or umbrella policy to meet the required limits of insurance. The excess or umbrella policy shall extend coverage over the underlying general liability policy. Any additional insured under any policy of the underlying insurance will automatically be an additional insured under this insurance.

Builder's Risk. GC shall purchase and maintain property insurance (Builder's Risk) in the amount of the initial contract plus values of subsequent modification, change orders, and loss of materials supplied or installed by others comprising the value of the entire project at the site on a replacement cost basis (subject to such deductible amounts as may be required by laws and regulations). Such builder's risk insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed to in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made or until no person or entity other than Buncombe County has insurable interest in the property to be covered, whichever is earlier. This insurance shall include the interests of the Owner, Contractor, Subcontractors, Owner's Representatives and Owner's Representative's Consultants in the Work.

The Builders' Risk Coverage shall be written on a Special Covered Cause of Loss form and shall include theft, vandalism, malicious mischief, collapse, false-work, temporary buildings, transit, debris removal including demolition, increased cost of construction, architect's fees and expenses, soft costs, flood (including water damage), earthquake, and if applicable, all below and above ground structures, piping, foundations including underground water and sewer mains, piling including the ground on which the structure rests and excavation, backfilling, filling, and grading. Insured property shall include portions of the work located away from the site but intended for use at the site, and shall also cover portions of the work in transit. The policy shall cover the cost of removing debris, including demolition as may be made legally necessary by the operation of any law, ordinance or regulation.

Contractors engaged in modifications of existing structures are required to secure a Beneficial Occupancy Endorsement to enable the County to occupy the facility during construction.

Additional Insurance Provisions.

If GC maintains higher limits than the minimums shown above, the County requires and shall be entitled to coverage for the higher limits maintained by GC. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the County.

GC shall provide the County with certificates of insurance listing County as the certificate holder and evidencing the above amounts. Buncombe County shall be named as additional insured under the commercial general liability policy and if applicable, GC's Pollution Liability policy. Before

commencing work and for any subsequent renewals, GC shall furnish the County with certificates of insurance on an approved form.

Each insurance policy required above shall state that coverage shall not be canceled, except with written notice to the County, delivered in accordance with the policy provisions. All insurance shall be procured from reputable insurers authorized and qualified to do business in North Carolina with a rating of A- or better as determined by A. M. Best Company and shall be in a form acceptable to the County.

GC shall require and verify that all subcontractors maintain insurance meeting all the requirements stated herein, and GC shall ensure that Buncombe County is an additional insured on insurance required from subcontractors.

Waiver of Subrogation: GC hereby grants to County a waiver of any right to subrogation which any insurer of said Contractor may acquire against the County by virtue of payment of any loss under such insurance. GC agrees to obtain any endorsement that may be necessary to affect this waiver of subrogation.

Providing and maintaining adequate insurance coverage is a material obligation of GC and is of the essence of this contract. GC may meet its requirements of maintaining specified coverage and limits by demonstrating to the County that there is in force insurance with equivalent coverage and limits that will offer at least the same protection to the County. GC shall at all times comply with the terms of such insurance policies, and all requirements of the insurer under any such insurance policies, except as they may conflict with existing North Carolina laws or this contract. The limits of coverage under each insurance policy maintained by GC shall not be interpreted as limiting the contractor's liability and obligations under the contract.

Nothing in this section is intended to affect or abrogate Buncombe County's governmental immunity.

ARTICLE 35 - PERFORMANCE BOND AND PAYMENT BOND

- a. The GC shall furnish a performance bond and payment bond executed by a surety company authorized to do business in North Carolina. The bonds shall be in the full contract amount, for the entire project. Bonds shall be executed in the form bound with the specifications.
- b. All bonds shall be countersigned by an authorized agent of the bonding company who is licensed to do business in North Carolina.

ARTICLE 36 - CONTRACTOR'S AFFIDAVIT

The final payment of retained amount due the GC on account of the contract shall not become due until the GC has furnished to the Owner through the designer an affidavit signed, sworn and notarized to the effect that all payments for materials, services or subcontracted work in connection with his contract have been satisfied, and that no claims or liens exist against the GC in connection with this contract.

ARTICLE 37 - ASSIGNMENTS

The GC shall not assign any portion of this contract nor subcontract in its entirety. Except as may be required under terms of the performance bond or payment bond, no funds or sums of money due or become due the GC under the contract may be assigned.

ARTICLE 38 - USE OF PREMISES

- a. The GC shall confine his apparatus, the storage of materials and the operations of his workmen to limits indicated by law, ordinances, permits or directions of the designer and shall not exceed those established limits in his operations.
- b. The GC shall not load or permit any part of the structure to be loaded with a weight that will endanger its safety.
- c. The GC shall enforce the designer's and owner's instructions regarding signs, advertisements, fires and smoking.
- d. No firearms, any type of alcoholic beverages or drugs (other than those prescribed by a physician) will be permitted at the job site.

ARTICLE 39 - CUTTING, PATCHING AND DIGGING

- a. The GC shall ensure that all cutting, fitting or patching that may be required to make the work come together properly and fit it to receive or be received by work of other contractors shown upon or reasonably implied by the drawings and specifications for the completed structure, as the designer may direct.
- b. Any cost brought about by defective or ill-timed work shall be borne by the party responsible therefor.
- c. No subcontractor shall endanger any work of another such contractor by cutting, digging or other means, nor shall he cut or alter the work of any other such contractor without the consent of the designer and the affected contractor(s).

ARTICLE 40 - UTILITIES, STRUCTURES, SIGNS

- a. The GC shall provide necessary and adequate facilities for water, electricity, gas, oil, sewer, and other utility services, which may be necessary and required for completion of the project. If the Owner specifies that the GC is to pay all utilities, any permanent meters installed shall be listed in the GC's name until his work is fully accepted by the Owner. The Owner may: (1) pay utilities cost directly, (2) require the GC to pay all utilities cost, (3) or reimburse the GC for the actual cost of utilities. The Owner or GC, as applicable, may recover actual costs of metered utilities from the responsible party should delays occur

in project completion. Coordination of the work of the utility companies during construction is the sole responsibility of the GC.

- b. If applicable Meters shall be relisted in the Owner's name on the day following completion and acceptance of the GC's work, and the Owner shall pay for services used after that date.
- c. Prior to the operation of permanent systems, the GC will provide temporary power, lighting, water, and heat to maintain space temperature above freezing, as required for construction operations.
- d. The GC shall ensure that the permanent building systems are in sufficient readiness for furnishing temporary climatic control at the time a building is enclosed and secured. The HVAC systems shall maintain climatic control throughout the enclosed portion of the building sufficient to allow completion of the interior finishes of the building. A building shall be considered enclosed and secured when windows, doorways (exterior, mechanical, and electrical equipment rooms), and hardware are installed; and other openings have protection, which will provide reasonable climatic control. The appropriate time to start the mechanical systems and climatic condition shall be jointly determined by the GC and the designer. Use of the equipment in this manner shall in no way affect the warranty requirements of the GC.
- e. The GC shall coordinate the work so that the building's permanent power wiring distribution system shall be in sufficient readiness to provide power as required by the HVAC contractor for temporary climatic control.
- f. The GC shall coordinate the work so that the building's permanent lighting system shall be ready at the time interior painting and finishing begins and shall provide adequate lighting in those areas where interior painting and finishing is being performed.
- g. The GC shall be responsible for his permanently fixed service facilities and systems in use during progress of the work. The following procedures shall be strictly adhered to:
 - 1. Prior to acceptance of work by the Designer and Owner, the GC shall coordinate the removal and replacement of any parts of the permanent building systems damaged through use during construction.
 - 2. Temporary filters as recommended by the equipment manufacturer in order to keep the equipment and ductwork clean and free of dust and debris shall be installed in each of the heating and air conditioning units and at each return grille during construction. New filters shall be installed in each unit prior to the Owner's acceptance of the work.
 - 3. Extra effort shall be maintained to keep the building and the site adjacent to the building clean and under no circumstances shall air systems be operated if finishing and site work operations are creating dust in excess of what would be considered normal if the building were occupied.

4. It shall be understood that any warranty on equipment presented to the Owner shall extend from the day of final acceptance by the Owner. The cost of warranting the equipment during operation in the finishing stages of construction shall be borne by the contractor whose system is utilized.
5. The GC shall ensure that all lamps are in proper working condition at the time of final project acceptance.
- h. The GC shall provide, if required and where directed, a shed for toilet facilities and shall furnish and install in this shed all water closets required for a complete and adequate sanitary arrangement. These facilities will be available to other subcontractors on the job and shall be kept in a neat and sanitary condition at all times. Chemical toilets are acceptable.
- i. The GC shall, if required by Owner and where directed, erect a temporary field office, complete with lights, telephone, heat and air conditioning. A portion of this office shall be partitioned off, of sufficient size, for the use of a resident inspector, should the designer so direct.
- j. On multi-story construction projects, the GC shall either provide or ensure that temporary elevators, lifts, or other necessary special equipment is available for the general use of all contractors. The cost for such elevators, lifts or other special equipment and the operation thereof shall be included in the GC bid.
- k. The GC will erect one sign on the project if required. The sign shall be of sound construction, and shall be neatly lettered with black letters on white background. The sign shall bear the name of the project, and the GC's name, and the name of the designer and consultants. Directional signs may be erected on the Owner's property subject to approval of the Owner with respect to size, style and location of such directional signs. Such signs may bear the name of the contractor and a directional symbol. No other signs will be permitted except by permission of the Owner.

ARTICLE 41 - CLEANING UP

- a. The GC shall ensure that the building and surrounding area is reasonably free from rubbish at all times, and shall remove debris from the site on a timely basis or when directed to do so by the designer. The GC shall provide an on-site refuse container(s) for the use of all subcontractors. The GC shall ensure that each subcontractor removes their rubbish and debris from the building on a daily basis. The GC shall ensure that the building is broom cleaned as required to minimize dust and dirt accumulation.
- b. The GC shall provide and maintain suitable all-weather access to the building.
- c. Before final inspection and acceptance of the building, the GC shall ensure that all portions of the work are clean, including glass, hardware, fixtures, masonry, tile and marble (using no acid), clean and wax all floors as specified, and completely prepare the building for use by the Owner, with no cleaning required by the Owner.

ARTICLE 42 - GUARANTEE

- a. The GC shall unconditionally guarantee materials and workmanship against patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve (12) months following the date of final acceptance of the work or beneficial occupancy and shall replace such defective materials or workmanship without cost to the Owner.
- b. Where items of equipment or material carry a manufacturer's warranty for any period in excess of twelve (12) months, then the manufacturer's warranty shall apply for that particular piece of equipment or material. The GC shall replace such defective equipment or materials, without cost to the Owner, within the manufacturer's warranty period.
- c. Additionally, the Owner may bring an action for latent defects caused by the negligence of the GC, which is hidden or not readily apparent to the Owner at the time of beneficial occupancy or final acceptance, whichever occurred first, in accordance with applicable law.
- d. Guarantees for roof, equipment, materials, and supplies shall be stipulated in the specifications sections governing such roof, equipment, materials, or supplies.

ARTICLE 43 - CODES AND STANDARDS

Wherever reference is given to codes, standard specifications or other data published by regulating agencies including, but not limited to, national electrical codes, North Carolina State Building Codes, federal specifications, ASTM specifications, various institute specifications, etc., it shall be understood that such reference is to the latest edition including addenda published prior to the date of the contract documents.

ARTICLE 44 - INDEMNIFICATION

To the fullest extent permitted by law, the GC shall indemnify and hold harmless the Owner, the designer and the agents, consultants and employees of the Owner and designer, from and against all claims, damages, losses and expenses, including, but not limited to, attorneys' fees, arising out of or resulting from the performance or failure of performance of the work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including the loss of use resulting therefrom, and (2) is caused in whole or in part by any negligent act or omission of the GC, the GC's subcontractor, or the agents of either the GC or the GC's subcontractor. Such obligation shall not be construed to negate, abridge or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this article.

ARTICLE 45 - TAXES

- a. Federal excise taxes do not apply to materials entering into local government work.

- b. Federal transportation taxes do not apply to materials entering into local government work (Internal Revenue Code, Section 3475(b) as amended).
- c. North Carolina sales tax and use tax, as required by law, do apply to materials entering into local government work and such costs shall be included in the bid proposal and contract sum.
- d. Local option sales and use taxes, as required by law, do apply to materials entering into local government work as applicable and such costs shall be included in the bid proposal and contract sum.
- e. Accounting Procedures for Refund of County Sales & Use Tax Amount of county sales and use tax paid per GC's statements:

GC's performing contracts for local government agencies shall ensure that they and all subcontractors will provide information to give the local government agency for whose project the materials, supplies, fixtures and/or equipment was purchased a signed statement containing the information listed in N.C.G.S. 105-164.14(e).

The Department of Revenue has agreed that in lieu of obtaining copies of sales receipts from contractors, an agency may obtain a certified statement from the contractors setting forth the date, the type of property and the cost of the property purchased from each vendor, the county in which the vendor made the sale and the amount of local sales and use taxes paid thereon. If the property was purchased out-of-state, the county in which the property was delivered should be listed. The contractor should also be notified that the certified statement may be subject to audit.

In the event the contractors make several purchases from the same vendor, such certified statement must indicate the invoice numbers, the inclusive dates of the invoices, the total amount of the invoices, the counties, and the county sales and use taxes paid thereon.

Name of taxing county: The position of a sale is the retailer's place of business located within a taxing county where the vendor becomes contractually obligated to make the sale. Therefore, it is important that the county tax be reported for the county of sale rather than the county of use.

When property is purchased from out-of-state vendors and the county tax is charged, the county should be identified where delivery is made when reporting the county tax.

Such statement must also include the cost of any tangible personal property withdrawn from the contractor's warehouse stock and the amount of county sales or use tax paid thereon by the GC.

Contractors are not to include any tax paid on supplies, tools and equipment which they use to perform their contracts and should include only those building materials,

supplies, fixtures and equipment which actually become a part of or annexed to the building or structure.

ARTICLE 46 - EQUAL OPPORTUNITY CLAUSE

The non-discrimination clause contained in Section 202 (Federal) Executive Order 11246, as amended by Executive Order 11375, relative to equal employment opportunity for all persons without regard to race, color, religion, sex or national origin, and the implementing rules and regulations prescribed by the Secretary of Labor, are incorporated herein.

ARTICLE 47 - EMPLOYMENT OF INDIVIDUALS WITH DISABILITIES

The GC agrees not to discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant is qualified. The GC agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices.

ARTICLE 48 - ASBESTOS-CONTAINING MATERIALS (ACM)

The State of North Carolina has attempted to address all asbestos-containing materials that are to be disturbed in the project. However, there may be other asbestos-containing materials in the work areas that are not to be disturbed and do not create an exposure hazard. General Contractors are reminded of the requirements of instructions under General Conditions of the Contract, titled Examination of Conditions. Statute 130A, Article 19, amended August 3, 1989, established the Asbestos Hazard Management Program that controls asbestos abatement in North Carolina.

ARTICLE 49 - MINORITY BUSINESS PARTICIPATION

N.C.G.S. 143-128.2 establishes a ten percent (10%) goal for participation by minority businesses in total value of work for each State building project and requires documentation of good faith efforts for meeting that goal. The document, *Guidelines for Recruitment and Selection of Minority Businesses for Participation in State Construction Contracts* including Affidavits and Appendix F are hereby incorporated into and made a part of this contract.

ARTICLE 50 – CONTRACTOR EVALUATION

The GC's overall work performance on the project shall be fairly evaluated in accordance with the State Building Commission policy and procedures, for determining qualifications to compete for future capital improvement projects for institutions and agencies of the State of North Carolina. In addition to final evaluation, interim evaluation may be prepared during the progress of project. The document, General Contractor Evaluation Procedures, is hereby incorporated and made a part of this contract. The Owner may request the GC's comments to evaluate the designer.

ARTICLE 51 – GIFTS

Pursuant to N.C. Gen. Stat. § 133-32, it is unlawful for any vendor or contractor (i.e. architect, bidder, contractor, General Contractor, design professional, engineer, subcontractor, supplier,

vendor, etc.), to make gifts or to give favors to any County employee. This prohibition covers those vendors and contractors who: (1) have a contract with a governmental agency; or (2) have performed under such a contract within the past year; or (3) anticipate bidding on such a contract in the future. For additional information regarding the specific requirements and exemptions, vendors and contractors are encouraged to review G.S. Sec. 133-32.

During the construction of the Project, the Contractor is prohibited from making gifts to any of the Owner's employees, Owner's project representatives (architect, engineers, General Contractor and their employees), employees of the County that may have any involvement, influence, responsibilities, oversight, management and/or duties that pertain to and/or relate to the contract administration, financial administration and/or disposition of claims arising from and/or relating to the Contract and/or Project.

ARTICLE 52 – AUDITING-ACCESS TO PERSONS AND RECORDS

In accordance with N.C. General Statute 147-64.7, the State Auditor shall have access to Contractor's officers, employees, agents and/or other persons in control of and/or responsible for the Contractor's records that relate to this Contracts for purposes of conducting audits under the referenced statute. The Owner's internal auditors shall also have the right to access and copy the Contractor's records relating to the Contract and Project during the term of the Contract and within two years following the completion of the Project/close-out of the Contract to verify accounts, accuracy, information, calculations and/or data affecting and/or relating to Contractor's requests for payment, requests for change orders, change orders, claims for extra work, requests for time extensions, and related claims for delay/extended general conditions costs, claims for lost productivity, claims for loss efficiency, claims for idle equipment or labor, claims for price/cost escalation, pass-through claims of subcontractors and/or suppliers, and/or any other type of claim for payment or damages from Owner and/or its project representatives.

ARTICLE 53 – LEFT BLANK FOR NUMBERING PURPOSES

ARTICLE 54 – TERMINATION FOR CONVENIENCE

- a. Owner may at any time and for any reason terminate GC's services and work at Owner's convenience. Upon receipt of such notice, GC shall, unless the notice directs otherwise, immediately discontinue the work and placing of orders for materials, facilities and supplies in connection with the performance of this Agreement.
- b. Upon such termination, GC shall be entitled to payment only as follows: (1) the actual cost of the work completed in conformity with this Agreement; plus, (2) such other costs actually incurred by GC as are permitted by the prime contract and approved by Owner; (3) plus ten percent (10%) of the cost of the work referred to in subparagraph (1) above for overhead and profit. There shall be deducted from such sums as provided in this subparagraph the amount of any payments made to GC prior to the date of the termination of this Agreement. GC shall not be entitled to any claim or claim of lien against Owner for any additional compensation or damages in the event of such termination and payment.

SUPPLEMENTARY GENERAL CONDITIONS

Article 19 – Changes in the Work

Add the following to paragraph e, 3: Provide certified payroll if requested by the Designer or Owner.

Add the following to paragraph e, 6: All change orders shall be supported by a breakdown showing the method or arriving at net cost as defined above. Copies of invoices shall be provided to substantiate material costs, rental costs, and subcontractor costs.

Article 23 – Time of Completion, Delays, Extension of Time

The Contractor shall commence work to be performed under this Contract on a date to be specified in written order from the Designer/Owner and shall fully complete all work hereunder within **548** consecutive calendar days from the Notice to Proceed. For each day in excess of the above number of days, the Contractor shall pay the Owner the amount of **Two Hundred Fifty Dollars (\$250)** as liquidated damages reasonably estimated in advance to cover the losses to be incurred by the Owner should the Contractor fail to complete the Work within the time specified.

Article 31 – Certificates of Payment

In the first paragraph, the reference to delivery of invoices; invoices shall be sent to:

**McGill Associates, PA
Attn: Electrical Team
PO Box 2259
Asheville, NC 28802**

GUIDELINES FOR RECRUITMENT AND SELECTION OF MINORITY BUSINESSES FOR PARTICIPATION IN STATE CONSTRUCTION CONTRACTS

In accordance with G.S. 143-128.2 (effective January 1, 2002) these guidelines establish goals for minority participation in single-prime bidding, separate-prime bidding, construction manager at risk, and alternative contracting methods, on State construction projects in the amount of \$300,000 or more. The legislation provides that the State shall have a verifiable ten percent (10%) goal for participation by minority businesses in the total value of work for each project for which a contract or contracts are awarded. These requirements are published to accomplish that end.

SECTION A: INTENT

It is the intent of these guidelines that the State of North Carolina, as awarding authority for construction projects, and the contractors and subcontractors performing the construction contracts awarded shall cooperate and in good faith do all things legal, proper and reasonable to achieve the statutory goal of ten percent (10%) for participation by minority businesses in each construction project as mandated by GS 143-128.2. Nothing in these guidelines shall be construed to require contractors or awarding authorities to award contracts or subcontracts to or to make purchases of materials or equipment from minority-business contractors or minority-business subcontractors who do not submit the lowest responsible, responsive bid or bids.

SECTION B: DEFINITIONS

1. Minority - a person who is a citizen or lawful permanent resident of the United States and who is:
 - a. Black, that is, a person having origins in any of the black racial groups in Africa;
 - b. Hispanic, that is, a person of Spanish or Portuguese culture with origins in Mexico, South or Central America, or the Caribbean Islands, regardless of race;
 - c. Asian American, that is, a person having origins in any of the original peoples of the Far East, Southeast Asia and Asia, the Indian subcontinent, the Pacific Islands;
 - d. American Indian, that is, a person having origins in any of the original peoples of North America; or
 - e. Female
2. Minority Business - means a business:
 - a. In which at least fifty-one percent (51%) is owned by one or more minority persons, or in the case of a corporation, in which at least fifty-one percent (51%) of the stock is owned by one or more minority persons or socially and economically disadvantaged individuals; and
 - b. Of which the management and daily business operations are controlled by one or more of the minority persons or socially and economically disadvantaged individuals who own it.
3. Socially and economically disadvantaged individual - means the same as defined in 15 U.S.C. 637. "Socially disadvantaged individuals are those who have been subjected to racial or ethnic prejudice or cultural bias because of their identity as a member of a group without regard to their individual qualities". "Economically disadvantaged individuals are those socially disadvantaged individuals whose ability to compete in the free enterprise system has been impaired due to diminished capital and credit opportunities as compared to others in the same business area who are not socially disadvantaged".
4. Public Entity - means State and all public subdivisions and local governmental units.
5. Owner - The State of North Carolina, through the Agency/Institution named in the contract.
6. Designer – Any person, firm, partnership, or corporation, which has contracted with the State of North Carolina to perform architectural or engineering, work.
7. Bidder - Any person, firm, partnership, corporation, association, or joint venture seeking to be awarded a public contract or subcontract.

8. Contract - A mutually binding legal relationship or any modification thereof obligating the seller to furnish equipment, materials or services, including construction, and obligating the buyer to pay for them.
9. Contractor - Any person, firm, partnership, corporation, association, or joint venture which has contracted with the State of North Carolina to perform construction work or repair.
10. Subcontractor - A firm under contract with the prime contractor or construction manager at risk for supplying materials or labor and materials and/or installation. The subcontractor may or may not provide materials in his subcontract.

SECTION C: RESPONSIBILITIES

1. Office for Historically Underutilized Businesses, Department of Administration (hereinafter referred to as HUB Office).

The HUB Office has established a program, which allows interested persons or businesses qualifying as a minority business under G.S. 143-128.2, to obtain certification in the State of North Carolina procurement system. The information provided by the minority businesses will be used by the HUB Office to:

- a. Identify those areas of work for which there are minority businesses, as requested.
- b. Make available to interested parties a list of prospective minority business contractors and subcontractors.
- c. Assist in the determination of technical assistance needed by minority business contractors.

In addition to being responsible for the certification/verification of minority businesses that want to participate in the State construction program, the HUB Office will:

- (1) Maintain a current list of minority businesses. The list shall include the areas of work in which each minority business is interested.
- (2) Inform minority businesses on how to identify and obtain contracting and subcontracting opportunities through the State Construction Office and other public entities.
- (3) Inform minority businesses of the contracting and subcontracting process for public construction building projects.
- (4) Work with the North Carolina trade and professional organizations to improve the ability of minority businesses to compete in the State construction projects.
- (5) The HUB Office also oversees the minority business program by:
 - a. Monitoring compliance with the program requirements.
 - b. Assisting in the implementation of training and technical assistance programs.
 - c. Identifying and implementing outreach efforts to increase the utilization of minority businesses.
 - d. Reporting the results of minority business utilization to the Secretary of the Department of Administration, the Governor, and the General Assembly.

2. State Construction Office

The State Construction Office will be responsible for the following:

- a. Furnish to the HUB Office a minimum of twenty-one days prior to the bid opening the following:
 - (1) Project description and location;
 - (2) Locations where bidding documents may be reviewed;
 - (3) Name of a representative of the owner who can be contacted during the advertising period to advise who the prospective bidders are;
 - (4) Date, time and location of the bid opening.
 - (5) Date, time and location of prebid conference, if scheduled.
- b. Attending scheduled prebid conference, if necessary, to clarify requirements of the general statutes regarding minority-business participation, including the bidders' responsibilities.

- c. Reviewing the apparent low bidders' statutory compliance with the requirements listed in the proposal, that must be complied with, if the bid is to be considered as responsive, prior to award of contracts. The State reserves the right to reject any or all bids and to waive informalities.
- d. Reviewing of minority business requirements at Preconstruction conference.
- e. Monitoring of contractors' compliance with minority business requirements in the contract documents during construction.
- f. Provide statistical data and required reports to the HUB Office.
- g. Resolve any protest and disputes arising after implementation of the plan, in conjunction with the HUB Office.

3. Owner

Before awarding a contract, owner shall do the following:

- a. Develop and implement a minority business participation outreach plan to identify minority businesses that can perform public building projects and to implement outreach efforts to encourage minority business participation in these projects to include education, recruitment, and interaction between minority businesses and non-minority businesses.
- b. Attend the scheduled prebid conference.
- c. At least 10 days prior to the scheduled day of bid opening, notify minority businesses that have requested notices from the public entity for public construction or repair work and minority businesses that otherwise indicated to the Office for Historically Underutilized Businesses an interest in the type of work being bid or the potential contracting opportunities listed in the proposal. The notification shall include the following:
 - 1. A description of the work for which the bid is being solicited.
 - 2. The date, time, and location where bids are to be submitted.
 - 3. The name of the individual within the owner's organization who will be available to answer questions about the project.
 - 4. Where bid documents may be reviewed.
 - 5. Any special requirements that may exist.
- d. Utilize other media, as appropriate, likely to inform potential minority businesses of the bid being sought.
- e. Maintain documentation of any contacts, correspondence, or conversation with minority business firms made in an attempt to meet the goals.
- f. Review, jointly with the designer, all requirements of G.S. 143-128.2(c) and G.S. 143-128.2(f) – (i.e. bidders' proposals for identification of the minority businesses that will be utilized with corresponding total dollar value of the bid and affidavit listing good faith efforts, or affidavit of self-performance of work, if the contractor will perform work under contract by its own workforce) - prior to recommendation of award to the State Construction Office.
- g. Evaluate documentation to determine good faith effort has been achieved for minority business utilization prior to recommendation of award to State Construction Office.
- h. Review prime contractors' pay applications for compliance with minority business utilization commitments prior to payment.
- i. Make documentation showing evidence of implementation of Owner's responsibilities available for review by State Construction Office and HUB Office, upon request

4. Designer

Under the single-prime bidding, separate prime bidding, construction manager at risk, or alternative contracting method, the designer will:

- a. Attend the scheduled prebid conference to explain minority business requirements to the prospective bidders.
- b. Assist the owner to identify and notify prospective minority business prime and subcontractors of potential contracting opportunities.
- c. Maintain documentation of any contacts, correspondence, or conversation with minority business firms made in an attempt to meet the goals.
- d. Review jointly with the owner, all requirements of G.S. 143-128.2(c) and G.S.143-128.2(f) – (i.e. bidders' proposals for identification of the minority businesses that will be utilized with

corresponding total dollar value of the bid and affidavit listing Good Faith Efforts, or affidavit of self-performance of work, if the contractor will perform work under contract by its own workforce) - prior to recommendation of award.

- e. During construction phase of the project, review “MBE Documentation for Contract Payment” – (Appendix E) for compliance with minority business utilization commitments. Submit Appendix E form with monthly pay applications to the owner and forward copies to the State Construction Office.
- f. Make documentation showing evidence of implementation of Designer’s responsibilities available for review by State Construction Office and HUB Office, upon request.

5. Prime Contractor(s), CM at Risk, and Its First-Tier Subcontractors

Under the single-prime bidding, the separate-prime bidding, construction manager at risk and alternative contracting methods, contractor(s) will:

- a. Attend the scheduled prebid conference.
- b. Identify or determine those work areas of a subcontract where minority businesses may have an interest in performing subcontract work.
- c. At least ten (10) days prior to the scheduled day of bid opening, notify minority businesses of potential subcontracting opportunities listed in the proposal. The notification will include the following:
 - (1) A description of the work for which the subbid is being solicited.
 - (2) The date, time and location where subbids are to be submitted.
 - (3) The name of the individual within the company who will be available to answer questions about the project.
 - (4) Where bid documents may be reviewed.
 - (5) Any special requirements that may exist, such as insurance, licenses, bonds and financial arrangements.

If there are more than three (3) minority businesses in the general locality of the project who offer similar contracting or subcontracting services in the specific trade, the contractor(s) shall notify three (3), but may contact more, if the contractor(s) so desires.

- d. During the bidding process, comply with the contractor(s) requirements listed in the proposal for minority participation.
- e. Identify on the bid, the minority businesses that will be utilized on the project with corresponding total dollar value of the bid and affidavit listing good faith efforts as required by G.S. 143-128.2(c) and G.S. 143-128.2(f).
- f. Make documentation showing evidence of implementation of PM, CM-at-Risk and First-Tier Subcontractor responsibilities available for review by State Construction Office and HUB Office, upon request.
- g. Upon being named the apparent low bidder, the Bidder shall provide one of the following: (1) an affidavit (Affidavit C) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the applicable goal; (2) if the percentage is not equal to the applicable goal, then documentation of all good faith efforts taken to meet the goal. Failure to comply with these requirements is grounds for rejection of the bid and award to the next lowest responsible and responsive bidder.
- h. The contractor(s) shall identify the name(s) of minority business subcontractor(s) and corresponding dollar amount of work on the schedule of values. The schedule of values shall be provided as required in Article 31 of the General Conditions of the Contract to facilitate payments to the subcontractors.
- i. The contractor(s) shall submit with each monthly pay request(s) and final payment(s), “MBE Documentation for Contract Payment” – (Appendix E), for designer’s review.
- j. During the construction of a project, at any time, if it becomes necessary to replace a minority business subcontractor, immediately advise the owner, State Construction Office, and the Director of the HUB Office in writing, of the circumstances involved. The prime contractor shall make a good faith effort to replace a minority business subcontractor with another minority business subcontractor.

- k. If during the construction of a project additional subcontracting opportunities become available, make a good faith effort to solicit subbids from minority businesses.
- l. It is the intent of these requirements apply to all contractors performing as prime contractor and first tier subcontractor under construction manager at risk on state projects.

6. Minority Business Responsibilities

While minority businesses are not required to become certified in order to participate in the State construction projects, it is recommended that they become certified and should take advantage of the appropriate technical assistance that is made available. In addition, minority businesses who are contacted by owners or bidders must respond promptly whether or not they wish to submit a bid.

SECTION 4: DISPUTE PROCEDURES

It is the policy of this state that disputes that involves a person's rights, duties or privileges, should be settled through informal procedures. To that end, minority business disputes arising under these guidelines should be resolved as governed under G.S. 143-128(g).

SECTION 5: These guidelines shall apply upon promulgation on state construction projects. Copies of these guidelines may be obtained from the Department of Administration, State Construction Office, (physical address) 301 North Wilmington Street, Suite 450, NC Education Building, Raleigh, North Carolina, 27601-2827, (mail address) 1307 Mail Service Center, Raleigh, North Carolina, 27699-1307, phone (919) 807-4100, Website: www.nc-sco.com

SECTION 6: In addition to these guidelines, there will be issued with each construction bid package provisions for contractual compliance providing minority business participation in the state construction program.

MINORITY BUSINESS CONTRACT PROVISIONS (CONSTRUCTION)

APPLICATION:

The **Guidelines for Recruitment and Selection of Minority Businesses for Participation in State Construction Contracts** are hereby made a part of these contract documents. These guidelines shall apply to all contractors regardless of ownership. Copies of these guidelines may be obtained from the Department of Administration, State Construction Office, (physical address) 301 North Wilmington Street, Suite 450, NC Education Building, Raleigh, North Carolina, 27601-2827, (mail address) 1307 Mail Service Center, Raleigh, North Carolina, 27699-1307, phone (919) 807-4100, Website: <http://www.nc-sco.com>

MINORITY BUSINESS SUBCONTRACT GOALS:

The goals for participation by minority firms as subcontractors on this project have been set at 10%.

The bidder must identify on its bid, the minority businesses that will be utilized on the project with corresponding total dollar value of the bid and affidavit (Affidavit A) listing good faith efforts **or** affidavit (Affidavit B) of self-performance of work, if the bidder will perform work under contract by its own workforce, as required by G.S. 143-128.2(c) and G.S. 143-128.2(f).

The lowest responsible, responsive bidder must provide Affidavit C, that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the applicable goal.

OR

Provide Affidavit D, that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, **with documentation of Good Faith Effort, if the percentage is not equal to the applicable goal.**

OR

Provide Affidavit B, which includes sufficient information for the State to determine that the bidder does not customarily subcontract work on this type project.

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

MINIMUM COMPLIANCE REQUIREMENTS:

All written statements, affidavits or intentions made by the Bidder shall become a part of the agreement between the Contractor and the State for performance of this contract. Failure to comply with any of these statements, affidavits or intentions, or with the minority business Guidelines shall constitute a breach of the contract. A finding by the State that any information submitted either prior to award of the contract or during the performance of the contract is inaccurate, false or incomplete, shall also constitute a breach of the contract. Any such breach may result in termination of the contract in accordance with the termination provisions contained in the contract. It shall be solely at the option of the State whether to terminate the contract for breach.

In determining whether a contractor has made Good Faith Efforts, the State will evaluate all efforts made by the Contractor and will determine compliance in regard to quantity, intensity, and results of these efforts. Good Faith Efforts include:

- (1) Contacting minority businesses that reasonably could have been 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 or proposal date and notifying them of the nature and scope of the work to be performed.
- (2) Making 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 bid or proposals are due.
- (3) Breaking down or combining elements of work into economically feasible units to facilitate minority participation.
- (4) Working with minority trade, community, or contractor organizations identified by the Office for Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- (5) Attending any prebid meetings scheduled by the public owner.
- (6) Providing assistance in getting required bonding or insurance or providing alternatives to bonding or insurance for subcontractors.
- (7) Negotiating in good faith with interested minority businesses and not rejecting 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) Providing 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. Assisting minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- (9) Negotiating 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) Providing quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

APPENDIX E

MBE DOCUMENTATION FOR CONTRACT PAYMENTS

Prime Contractor/Architect: _____

Address & Phone: _____

Project Name: _____

Pay Application #: _____ Period: _____

The following is a list of payments made to Minority Business Enterprises on this project for the above-mentioned period.

MBE FIRM NAME	* INDICATE TYPE OF MBE	AMOUNT PAID THIS MONTH	TOTAL PAYMENTS TO DATE	TOTAL AMOUNT COMMITTED

*Minority categories: Black, African American (B), Hispanic (H), Asian American (A), American Indian (I), Female (F), Social and Economically Disadvantage (D)

Date: _____ Approved/Certified By: _____

Name

Title

Signature

SUBMIT WITH EACH PAY REQUEST & FINAL PAYMENT

TECHNICAL SPECIFICATIONS

Division	Section Title	Pages
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Buncombe County Courthouse – Electrical Upgrades

TECHNICAL SPECIFICATIONS GROUP

General Requirements Subgroup

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260529	HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS	4
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PART 1 - GENERAL**1.1 SUMMARY**

A. Section includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Coordination with occupants.
5. Work restrictions.
6. Specification and drawing conventions.

B. Related Section:

1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

A. Project Identification: Buncombe County Courthouse – Electrical Switchgear Replacement (McGill Associates Project No. 22.03516)

B. Project Locations:

1. Buncombe County Courthouse: 60 Court Plaza, Asheville, NC 28801

C. Owner: County of Buncombe, State of North Carolina.

1. Owner's Representative: Ronnie Lunsford

D. Designer: McGill Associates, PA, 55 Broad Street Asheville, NC 28801

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of the Project is defined by the Contract Documents and consists of the major work summarized as follows:

1. Remove existing 3000 A switchboard.
2. Provide 3000 A switchboard.
3. Provide two – 800 A panelboards.
4. Provide feeder breakers for 25 feeders supplied by switchboard and panelboards.

5. Provide conduit, boxes, and conductors to extend and rework feeders.
6. Provide work in phases to minimize duration of outages. All outages must happen outside of Buncombe County Courthouse business hours.
7. Provide temporary feeders to maintain power to all areas during normal business hours.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.4 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.5 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and existing building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
 1. Maintain access to existing driveways, walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct driveways, walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.6 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.

- B. On-Site Work Hours: There are no limits regarding work hours Monday through Sunday, unless otherwise indicated.
1. Lower Noise Construction Activity Hours: 8:30 AM until 5:00 PM, Monday through Friday: Activities that generate excessive noise that include, but are not necessarily limited to, concrete and masonry drilling and cutting, and hammering must be completed outside of these lower noise hours. Court is in session during these times and if a judge hears excessive noise they will send a bailiff to investigate the source of the noise and issue a cease and desist order. Any noisy activity undertaken by the Contractor during these hours is at their own risk. No additional time will be allowed for having to complete any noise-related activities outside of these hours.
 2. Hours for Utility Shutdowns: See "Existing Utility Interruptions", below.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by the Owner during hours of normal business operation. All full or partial outages must be taken outside of normal business hours as outlined below.
1. Notify Owner not less than 14 days in advance of proposed utility interruptions.
 2. Obtain Owner's written permission before proceeding with utility interruptions.
 3. Partial and full building outages are limited to the following times:
 - a. Weekday nights: 5:30 PM until 6:00 AM the following morning.
 - b. Weekends: 5:30 PM on Friday until 6:00 AM on Monday.
 - c. Holiday Weekends: 5:30 PM on the day before the holiday weekend begins until 6:00 AM on the first business day after the holiday.
 - d. Weekday Holidays (other than Monday or Friday): 5:30 PM on the day before the holiday until 6:00 AM on the first business day after the holiday.
 - e. Observed holidays:
 - 1) New Years Day
 - 2) Martin Luther King Jr. Birthday
 - 3) Good Friday
 - 4) Memorial Day
 - 5) Juneteenth
 - 6) Independence Day
 - 7) Labor Day
 - 8) Veterans Day
 - 9) Thanksgiving (2 days)
 - 10) Christmas (3 days)
- D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.

1. Notify Owner not less than two days in advance of proposed disruptive operations.
 2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Nonsmoking Building and Site: Smoking is not permitted within the building or site. This includes all County-owned property.
- F. Controlled Substances: Use of controlled substances on Project site is not permitted.
- G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- H. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
1. Maintain list of approved screened personnel with Owner's representative.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 46-division format and CSI/CSC's "Master Format" numbering system.
1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
 2. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood

may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

- a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
- C. Drawing Coordination: Requirements for materials and products identified on the Drawings are described in detail in the Specifications. One or more of the following are used on the Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by common industry abbreviations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

PART 1 - GENERAL**1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.2 MINOR CHANGES IN THE WORK

- A. Designer will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Designer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Designer are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to Designer.

- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Designer.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 7. Proposal Request Form: Use form acceptable to Designer.

1.4 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Designer will issue a Change Order for signatures of Owner and Contractor.

1.5 WORK CHANGE DIRECTIVE

- A. Work Change Directive: Designer may issue a Work Change Directive. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.
1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

PART 1 - GENERAL**1.1 SUMMARY**

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections:
 - 1. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 2. Division 01 Section "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.
 - 3. Division 01 Section "Submittal Procedures" for administrative requirements governing the preparation and submittal of the submittal schedule.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule. A cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the Schedule of Values.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's Construction Schedule.
 - 2. Submit the Schedule of Values to Designer at earliest possible date but no later than 7 days prior to the date scheduled for submittal of the initial Applications for Payment.
 - 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
 - 4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values correlated with each element.

- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values.
1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Designer.
 - c. Designer's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Dollar value as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide multiple line items for principal contract amounts as appropriate which include separate costs for items such as shop drawings, and project closeout items such as, but not limited to demobilization, project restoration and final cleanup, furnishing Operation and Maintenance manuals, punch list activities, equipment demonstration, operator training and Project Record Documents.
 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
 6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 7. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

- a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place shall be proportionately applied to other line items in the Schedule of Values.
8. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Designer and paid for by Owner.
 1. Initial Application for Payment and final Application for Payment involve additional requirements.
- B. Payment Application Times: Progress payments shall be submitted to Designer by a specific day of the month to be established at the pre-construction conference. The period covered by each Application for Payment is one month, ending on the specific day of the month that is established at the pre-construction conference.
- C. Application for Payment Forms: Use EJCDC Form C-620. A spreadsheet copy of the form is available from the Designer upon request.
- D. Application Preparation: Complete every entry on form. Execute by a person authorized to sign legal documents on behalf of Contractor. Designer will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts for all work completed since the previous Application for Payment by including amounts for all work completed on the project and subtracting those quantities included on previous Applications for Payment. Include only amounts for work completed through the cut-off date established at the pre-construction conference.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed.
 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.

2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Materials previously stored and included in previous Applications for Payment.
 - b. Work completed for this Application utilizing previously stored materials.
 - c. Additional materials stored with this Application.
 - d. Total materials remaining stored, including materials with this Application.
 4. Reimbursement for stored materials shall not exceed 50 percent of the unit price bid for the associated line item or as shown in the Schedule of Values for that portion of the work, unless otherwise agreed upon by the Designer and Owner.
- F. Retainage: The Owner may retain a portion of the amount otherwise due the Contractor. Except as provided elsewhere, the amount retained by the Owner shall be limited to the following:
1. Withholding of not more than 5 percent of the payment claimed until work is 50 percent complete.
 2. When the contract is 50 percent complete no further retainage shall be withheld from periodic payments. However, the Owner may reinstate retainage (up to 5 percent) if they feel the work is unsatisfactory. The Owner may withhold additional retainage as necessary from periodic payments in a sum necessary to maintain total retainage of 2.5 percent of contract cost through the completion of the project.
 3. When the work is substantially complete (operational or beneficial occupancy), the withheld amount shall be further reduced below 5 percent to only that amount necessary to assure completion.
 4. The Owner may accept securities negotiable without recourse, conditions or restrictions, a release of retainage bond or an irrevocable letter of credit provided by the Contractor in lieu of all or part of the cash retainage.
- G. Sales Tax Statement: When requested by the Owner, each request for progress payment submitted by the Contractor shall include a sales tax reimbursement statement. The Contractor shall utilize the form provided with the Contract Documents, or a similar form that provides the required information and certification.
- H. Transmittal: Submit three (3) signed and notarized original copies of each Application for Payment to Designer by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- I. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
 5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- J. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's construction schedule.
 4. Sales tax statement (as necessary)
 5. Combined Contractor's construction schedule incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
 6. Products list.
 7. Schedule of unit prices.
 8. Submittal schedule.
 9. List of Contractor's staff assignments.
 10. List of Contractor's principal consultants.
 11. Copies of building permits.
 12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 13. Any other requirements described in the Modified General Conditions of the Contract.
- K. Progress Applications for Payment: Administrative actions and submittals that must precede or coincide with submittal of each Progress Application for Payment include the following:
1. Updated Schedule of Values.
 2. Updated Contractor's construction schedule.
 3. Sales tax statements (as necessary).

4. Certified payroll statements (as necessary).
 5. Summary of stored materials.
 6. Any other requirements described in the Modified General Conditions of the Contract.
- L. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum (Final Adjusting Change Order issued by Designer).
 4. Contractor's Affidavit of Release of Liens.
 5. Consent of Surety to Final Payment.
 6. Evidence that claims have been settled.
 7. Final liquidated damages settlement statement.
 8. Record Documents.
 9. General warranty letter.
 10. Sales tax statements (as necessary).
 11. Any other requirements described in the General Conditions of the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Administrative and supervisory personnel.
 - 3. Requests for Information (RFIs).
 - 4. Project meetings.

- B. Related Sections:
 - 1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Division 01 Section "Execution Requirements" for procedures for coordinating general installation and field-designing services, including establishment of benchmarks and control points.
 - 3. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.2 DEFINITIONS

- A. RFI (Request for Information): Request from Contractor seeking information and clarification from the Designer during construction.

1.3 COORDINATION

- A. Coordination: The Contractor and each subcontractor shall coordinate its operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Make adequate provisions to accommodate items scheduled for later installation.
 - 3. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components.

- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's Construction Schedule.
 - 2. Preparation of the Schedule of Values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Startup and adjustment of systems.
 - 7. Project closeout activities.

1.4 KEY PERSONNEL

- A. Key Personnel Names: Within 15 days after the Notice to Proceed date, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
 - 1. Make copies of list available on site at all times for Owner's and Designer's use and keep list current at all times.

1.5 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately upon discovery of the need for additional information, interpretation, or clarification of the Contract Documents, Contractor shall prepare and submit an RFI.
 - 1. RFIs shall originate with Contractor. Designer will return RFIs submitted to Designer by other entities controlled by Contractor with no response.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name, including Owner.
 2. Date.
 3. Name of Contractor.
 4. Name of Designer.
 5. RFI number, numbered sequentially.
 6. RFI subject.
 7. Specification Section number and title and related paragraphs, as appropriate.
 8. Drawing number and detail references, as appropriate.
 9. Field dimensions and conditions, as appropriate.
 10. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 11. Contractor's signature.
 12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form acceptable to Designer.
- D. Designer's Action: Designer will review each RFI, determine action required, and respond. Allow seven (7) working days for Designer's response for each RFI. RFIs received by Designer after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Designer's actions on submittals.
 - f. Incomplete RFIs or inaccurately prepared RFIs.
 2. Designer's action may include a request for additional information, in which case Designer's time for response will date from time of receipt of additional information.
 3. Designer's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change

Proposal according to Division 01 Section "Contract Modification Procedures."

- a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Designer in writing within 10 days of receipt of the RFI response.
- E. Upon receipt of Designer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Designer within seven (7) days if Contractor disagrees with response.
 - F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Contractor shall be prepared to discuss the log and the status of pending RFIs at all Progress or Coordination Meetings.
 - G. Improper or Frivolous RFI: Improper and/or Frivolous RFI's shall be defined as RFI's that request information that is clearly indicated on or reasonably inferable from Contract Documents.
 1. Will be returned unanswered, will be removed from the Contractor's RFI log, and the number assigned will be assigned to subsequent RFI.
 2. At the Contractor's request, after notification by Designer that a RFI is improper or frivolous, the RFI will be processed with processing costs charged to Contractor as follows:
 - a. The Contractor shall reimburse the Owner for the Designer's account for time spent in processing improper or frivolous RFI's at the rate of the Designer's current standard hourly fee schedule for personnel and associated expenses.

1.6 PROJECT MEETINGS

- A. General: Designer will schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Designer of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Designer will record significant discussions and agreements achieved and distribute the meeting minutes to everyone concerned, including Owner and Contractor.
- B. Preconstruction Conference: Designer will schedule and conduct a preconstruction conference before starting construction, at a time convenient to

Owner and Designer, but no later than 15 days after execution of the Agreement.

1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner, Designer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress of the work.
4. Minutes: Designer will record and distribute meeting minutes.

C. Progress Meetings: Designer will conduct progress meetings on a monthly basis or as necessary.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Designer, each contractor, subcontractor, supplier, and other entity involved with current progress or planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Topics for discussion at these meetings will be determined as necessary based on the status of Project including, but limited to:
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present.
4. Minutes: Designer will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been

made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

PART 1 - GENERAL**1.1 REQUIREMENTS**

- A. This section specifies the methods and requirements for the submissions applicable to Shop drawings, Working drawings, Product data, Samples, Request for substitutions, Test procedures, and Construction and Submittal schedules. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Specification Sections, apply to this Section.
- B. All submittals shall be clearly identified by reference to the Specification Section, Paragraph, Drawing number, or Detail as applicable.
- C. All submittals shall be submitted by the Contractor and the Contractor shall be solely responsible for the coordination and management of all submittals. No submittals received directly from material/equipment suppliers or subcontractors will be accepted unless otherwise agreed upon by all parties. The Designer's review comments and markup submittals will be returned to the Contractor who shall promptly coordinate and return the comments and markup submittals to the appropriate parties.
- D. The Contractor shall submit to the Designer a detailed submittal schedule in accordance with the Modified General Conditions.
- E. The Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment, and method of work shall be as described in the submittal. Submittal documents shall be edited to clearly show only those items to be included in the contract. All extraneous materials shall be crossed out or otherwise obliterated. The Contractor shall be solely responsible for the coordination of submittals so that work will not be delayed. Different categories of submittals shall be scheduled so that one will not be delayed for lack of coordination or approval of another. No extensions of time will be allowed because of failure to properly schedule or manage submittals.

1.2 SUMMARY

- A. Related Sections:

1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
4. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
5. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Designer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals or those inferred by the work shown on the drawings or detailed in the project documents.
- B. Informational Submittals: Written and graphic information and physical samples that do not require Designer's responsive action. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals.
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.
- E. Time/Days: Where days are referenced as a measurement of time the unit shall be calendar days.

1.4 SUBMITTALS SCHEDULE

- A. Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Designer and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 2. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: Action, informational.
 - d. Name of subcontractor, if applicable.
 - e. Description of the Work covered.
 - f. Scheduled date for Designer's final release or approval.
 - g. Scheduled dates for purchasing.
 - h. Scheduled dates for installation.
 - i. Activity or event number from Construction Schedule.
- B. Submit revised submittal schedule as necessary to reflect changes in current status and timing for submittals.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Designer's Digital Data Files: Electronic copies of the Contract Drawings and project specifications may be provided by Designer for Contractor's use in preparing submittals only if detailed in other Sections of the Contract Documents. In cases where Designer provides electronic copies of these documents, Designer makes no representations as to the accuracy or completeness of digital data files as they relate to the Contract Drawings. Please refer to the Modified General Conditions for more details regarding the use of the Designer's digital data files.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
- C. Designer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Designer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Based on the complexity of the submittal, allow 7 to 21 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Designer will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Based on the complexity of the submittal, allow 7 to 21 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Designer's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
- E. Each submittal shall be accompanied by the transmittal cover contained in this section. The cover sheet shall be printed in a bright unique color of paper (color selected per project) and affixed to paper copies of each submittal. The information required for each submittal is contained on the cover sheet and shall be furnished for each submittal.
- F. Submittal Identification Number: A unique four (4) character number shall be assigned by the Contractor and shall be noted on the transmittal cover sheet accompanying each submittal. Submittal numbers shall have the following format:
1. The first character shall be a SD, W, S, or M, which represents Shop Drawing Data (SD), Working Drawing (W), Sample (S), or Operating/Maintenance Manual (M).
 2. The next digits shall be the specification section number.
 3. The next digits shall be a three digit number (001 – 999) assigned to sequentially number each submittal.
 4. The last character is a letter, A-Z, indicating the submission, or resubmission of the same data, i.e., A – 1st submittal, B- 2nd submittal, etc.

5. A typical submittal number would be:

SD-15800-013-A

where:

SD = shop drawing

15800 = technical specification section 15800

013 = contractor's submittal number 013

A = 1st submittal

- G. Deviations: All deviations from the Contract Documents shall be identified on submittals.
- H. Paper and Electronic Copies: Unless additional copies are required for final submittal, and unless Designer observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- I. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Designer will discard submittals received from sources other than Contractor.
- J. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with approval notation from Designer.
- K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- L. Use for Construction: Use only final submittals that are marked with approval notation from Designer.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Submittals: Submit two (2) paper copies and one electronic copy in a PDF format of each submittal, unless otherwise indicated. Designer will return one (1) copy.
 2. All submittals shall include a copy of the specification section, with addendum updates included, and all referenced and applicable sections, and each paragraph shall be check-marked to indicate that the submitted material is in compliance with the specification or marked to indicate requested deviations from the specified requirements. If deviations are noted and/or requested each deviation shall be underlined and denoted by a number in the margin to the right with a detailed description of the deviation on a separate sheet.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. Mark each copy of each submittal to show which products and options are applicable.
 2. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance or variations with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 3. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 4. Submit Product Data before or concurrent with Samples.
 5. Submit Product Data in the following format:
 - a. Submit two (2) paper copies and one electronic copy in a PDF format of each submittal, unless otherwise indicated. Designer will return one (1) copy.

- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance and variation with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional designer if specified.
 - 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
- D. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- E. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."
- F. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."
- G. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
 - 4. Submit subcontract list in the following format:
 - a. Submit two (2) paper copies and one electronic copy in a PDF format, unless otherwise indicated.
- H. Equipment Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that the manufacturer has reviewed the Contract drawings and specifications, including all addendums, and that the equipment and related accessories included in the shop drawing submittal are

suitable for installation in the applications proposed for the project. Include evidence of manufacturing experience where required.

- I. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- J. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Designer.
- B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section "Closeout Procedures."
- C. Submittal Transmittal: Contractor shall include with each submittal a transmittal form as contained at the end of this section. Include all information required by the form including Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 DESIGNER'S ACTION

- A. Designer will not review submittals that do not bear required cover sheet and ***Contractor's approval and signature*** and will return them without action.
- B. Designer will review each submittal, make marks to indicate corrections or modifications required, and return it. The transmittal form included in this section contains a copy of the review stamp to be completed by the Designer. The Designer will complete the stamp for each submittal and will mark stamp appropriately to indicate action.

- C. Informational Submittals: Designer will review each submittal and will not return it, or will return it if it does not comply with requirements. Designer will forward each submittal to appropriate party.
- D. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.
- F. Submittals will be returned to the Contractor under one of the following codes.

Code 1 – FURNISH AS SUBMITTED, No Exceptions – The review indicates that the material, equipment or work method complies with the project documents. In this event the contractor may begin to implement the work method or incorporate the material or equipment covered by the submittal.

Code 2 – FURNISH AS SUBMITTED, Make corrections noted – The review indicates that there are limited corrections required for the material, equipment or work method. In this event the contractor may begin to implement the work method or incorporate the material or equipment covered by the submittal in accordance with the noted corrections.

Code 3 – NOT APPROVED (See Notes), Revise and resubmit – The review indicates that the submittal is insufficient or contains incorrect data, copies or other information. Except at his own risk, the Contractor shall not undertake work covered by this submittal until such time as it is revised and meets the requirements of code 1 or 2.

Code 4 – NOT APPROVED, Rejected – The review indicates that the submittal does not comply with the project documents and is unacceptable for incorporation into the project. Except at his own risk, the Contractor shall not undertake work covered by this submittal until such time as it is revised and meets the requirements of code 1 or 2.

Code 5 – Receipt Acknowledged – The review indicates that the material is for information purposes only and the Designer has taken no action as none is required.

3.3 EFFECT OF REVIEW OF CONTRACTOR'S SUBMITTALS

- A. The Designer's review of submittal information provided by the Contractor based upon his review of the drawings, specifications, other project documents and proposed methods of work or information regarding materials or equipment shall not relieve the Contractor of his responsibility for errors therein and shall not be regarded as an assumption of risks or liability by the Owner or the Designer, or by any officer or employee thereof, and the Contractor shall have

no claim under the contract on the account of the failure, or partial failure, of the method of work, material, or equipment so reviewed. A mark of "No Exceptions" or "Make Corrections Noted" shall mean that the Owner has no objection to the Contractor, upon his own responsibility, using the plan or method of work proposed, or providing the materials or equipment proposed.

3.4 COSTS FOR REVIEW OF RESUBMITTALS

- A. The Contractor shall be responsible for the completeness of each submittal and identifying deviations from the project requirements. Any submittal that may require more than two (2) reviews by the Designer shall be assessed a review charge for time spent in processing shop drawings at the rate of the Designer's current standard hourly fee schedule for personnel assigned to the shop drawing review and associated expenses. This charge, covering the cost of designing and administration, shall be assessed against progress payments.

3.5 SUBMITTAL LOG

- A. Prepare, maintain, and submit a tabular log of submittals organized by the submittal number. Contractor shall be prepared to discuss the log and the status of pending submittals at all Progress or Coordination Meetings.

3.6 CONTRACTOR'S APPROVAL COVER SHEET

- A. To be printed on a bright unique color of paper selected for this project and used to designate a Shop Drawing or Informational Submittal and permanently attached or made a part of each submittal.

CONTRACTOR'S SUBMITTAL TRANSMITTAL
Submittal # _____

McGILL ASSOCIATES, P.A.

OWNER: _____

- 55 Broad Street, Asheville, NC 28801
- 1240 19th Street Lane NW, Hickory, NC 28601
- 3231 Middlebrook Pike, Knoxville, TN 37921
- 5 Regional Circle, Suite A, Pinehurst, NC 28374

ADDRESS: _____

Date:	Designer's Project No:
Project:	Spec. Reference:
Contractor:	Drawing Reference:

TO:	CONTRACTOR'S SUBMITTAL NO: (Check One): <input type="checkbox"/> An Original Submittal <input type="checkbox"/> A 2 nd Submittal of <i>(original Submittal No.)</i> <input type="checkbox"/> A _____ Submittal of <i>(original Submittal No.)</i> <input type="checkbox"/> Product Data for Information Only <input type="checkbox"/> An O&M Submittal for Information Only
ATTN: FROM:	

Item #	Subject of Submittal / Equipment Supplier	Equipment Designations(s) / Specification Section(s):

Complete Either (a) or (b) below:

(a) We have verified that the material, equipment or other information contained in this submittal meets all the requirements specified or shown (no exceptions).

(b) We have verified that the material, equipment or other information contained in this submittal meets all the requirements specified or shown, except for the following deviations (list deviations):

Notes/Comments:

By this submittal, I hereby represent that I have determined and verified all field measurements and dimensions, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable shop drawings, equipment, trades and all Contract requirements.

Signature of Contractor's Authorized Representative

Date

3.6 DESIGNER'S APPROVAL COVER SHEET

To be attached to each submittal.

SHOP DRAWING REVIEW

DESIGNER'S REVIEW	RESPONSE REQUIRED OF CONTRACTOR
<input type="checkbox"/> Furnish As Submitted, No Exceptions <input type="checkbox"/> Furnish As Submitted , Make Corrections <div style="padding-left: 40px;">Noted</div> <input type="checkbox"/> Not Approved (See Notes), Revise and <div style="padding-left: 40px;">Resubmit</div> <input type="checkbox"/> Not Approved, Rejected, See Notes	<input type="checkbox"/> Confirm <input type="checkbox"/> Resubmit
<input type="checkbox"/> Receipt Acknowledged (Not subject to Designer's Review or Approval)	

The Designer's review of this shop drawing is for general conformance with the design concept, contract documents, specifications and drawings. Markings or comments shall not be construed as relieving the Contractor from compliance with the project plans and specifications, nor departures there from, and does not relieve the Contractor from errors and omissions in the submittal or from the Contractor's responsibility of addressing any deviations from the contract documents, specifications and drawings. The Contractor remains solely responsible for details and accuracy, for confirming and correlating and verifying all quantities and dimensions at the jobsite, for selecting fabrication processes, for the means, methods, techniques, and sequence of construction, coordinating work with other trades, and performing all work in a safe manner. Designer's approval shall not relieve Contractor of its obligation to perform construction in accordance with the Contract Documents. Any approval by Designer shall not constitute an approved change or substitution unless Contractor has previously advised Designer in writing of such proposed change or substitution and obtained Designers written approval of such change or substitution.

McGill Associates, P. A.

By: _____

Date: _____

END OF SECTION 013300

PART 1 - GENERAL**1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Designer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Specific test and inspection requirements are not specified in this Section.

1.2 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

- D. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- E. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
- F. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- G. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Designer.

1.3 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Designer for direction before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Designer for a decision before proceeding.

1.4 ACTION SUBMITTALS

- A. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.5 INFORMATIONAL SUBMITTALS

- A. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
- B. Reports: Prepare and submit certified written reports and documents as specified.
- C. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.6 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, telephone number, and email address of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 11. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
 - 1. Name, address, telephone number, and email address of technical representative making report.
 - 2. Statement on condition of substrates and their acceptability for installation of product.

3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.

1.7 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- D. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

- E. **Manufacturer's Technical Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- F. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.8 QUALITY CONTROL

- A. **Contractor Responsibilities:** Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 - 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 - 2. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - 3. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- C. **Testing Agency Responsibilities:** Cooperate with Designer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1. Notify Designer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 - 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 - 6. Do not perform duties of Contractor.

- D. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- E. **Manufacturer's Technical Services:** Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- F. **Associated Contractor Services:** Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 7. Security and protection for samples and for testing and inspection equipment at Project site.
- G. **Coordination:** Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- H. **Schedule of Tests and Inspections:** Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses.
 - 1. **Distribution:** Distribute schedule to Owner, Designer, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Designer.
 - 4. Identification of testing agency or special inspector conducting test or inspection.

- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Designer's reference during normal working hours.
 - 1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

- B. Repair and protection are Contractor's responsibility.

END OF SECTION

PART 1 - GENERAL**1.1 DEFINITIONS**

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Designer's action on Contractor's submittals, applications, and requests, "approved" is limited to Designer's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Designer. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract

Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
 - 1. For standards referenced by applicable building codes, comply with dates of standards as listed in building codes.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.3 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Abbreviations and acronyms not included in this list shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States." The information in this list is subject to change and is believed to be accurate as of the date of the Contract Documents.
 - 1. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
 - 2. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
 - 3. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
 - 4. ABMA - American Boiler Manufacturers Association; www.abma.com.
 - 5. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.
 - 6. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
 - 7. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
 - 8. AI - Asphalt Institute; www.asphaltinstitute.org.
 - 9. AIA - American Institute of Architects (The); www.aia.org.
 - 10. AISC - American Institute of Steel Construction; www.aisc.org.
 - 11. AISI - American Iron and Steel Institute; www.steel.org.
 - 12. ANSI - American National Standards Institute; www.ansi.org.
 - 13. API - American Petroleum Institute; www.api.org.
 - 14. ASCE - American Society of Civil Engineers; www.asce.org.

15. ASCE/SEI - American Society of Civil Designers/Structural Designing Institute; (See ASCE).
16. ASME - ASME International; (American Society of Mechanical Designers); www.asme.org.
17. ASSP - American Society of Safety Professionals (The); www.assp.org.
18. ASTM - ASTM International; www.astm.org.
19. AWS - American Welding Society; www.aws.org.
20. BICSI - BICSI, Inc.; www.bicsi.org.
21. CE - Conformite Europeenne; www.ec.europa.eu/growth/single-market/ce-marking.
22. CFSEI - Cold-Formed Steel Designers Institute; www.cfsei.org.
23. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
24. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
25. CSA - CSA Group; www.csa-group.org.
26. CSI - Construction Specifications Institute (The); www.csiresources.org.
27. CTA - Consumer Technology Association; www.cta.tech.
28. ECA - Electronic Components Association; (See ECIA).
29. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
30. ECIA - Electronic Components Industry Association; www.ecianow.org.
31. EI – Energy Institute; www.energyinst.org
32. EIA - Electronic Industries Alliance; (See TIA).
33. EOS/ESD Association; (Electrostatic Discharge Association); www.esda.org.
34. ETL - Intertek (See Intertek); www.intertek.com.
35. FCI - Fluid Controls Institute; www.fluidcontrolsintitute.org.
36. FM Approvals - FM Approvals LLC; www.fmapprovals.com.
37. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
38. FSA - Fluid Sealing Association; www.fluidsealing.com.
39. HI - Hydraulic Institute; www.pumps.org.
40. ICBO - International Conference of Building Officials; (See ICC).
41. ICC - International Code Council; www.iccsafe.org.
42. ICEA - Insulated Cable Designers Association, Inc.; www.icea.net.
43. ICPA - International Cast Polymer Association; www.theicpa.com.
44. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
45. IEC - International Electrotechnical Commission; www.iec.ch.
46. IEEE - Institute of Electrical and Electronics Designers, Inc. (The); www.ieee.org.
47. IES - Illuminating Designing Society; (Formerly: Illuminating Designing Society of North America); www.ies.org.
48. IESNA - Illuminating Designing Society of North America; (See IES).
49. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
50. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
51. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.

52. ISO - International Organization for Standardization; www.iso.org.
53. LPI - Lightning Protection Institute; www.lightning.org.
54. MCA - Metal Construction Association; www.metalconstruction.org.
55. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
56. MPI - Master Painters Institute; www.paintinfo.com.
57. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
58. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
59. NACE - NACE International; (National Association of Corrosion Designers International); www.nace.org.
60. NECA - National Electrical Contractors Association; www.necanet.org.
61. NEMA - National Electrical Manufacturers Association; www.nema.org.
62. NETA - InterNational Electrical Testing Association; www.netaworld.org.
63. NFPA - National Fire Protection Association; www.nfpa.org.
64. NFPA - NFPA International; (See NFPA).
65. NRCA - National Roofing Contractors Association; www.nrca.net.
66. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
67. NSF - NSF International; www.nsf.org.
68. NSPE - National Society of Professional Engineers; www.nspe.org.
69. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
70. NWRA - National Waste & Recycling Association; www.wasterecycling.org.
71. PDI - Plumbing & Drainage Institute; www.pdionline.org.
72. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
73. SAE - SAE International; www.sae.org.
74. SCTE - Society of Cable Telecommunications Designers; www.scte.org.
75. SDI - Steel Deck Institute; www.sdi.org.
76. SEI/ASCE - Structural Designing Institute/American Society of Civil Engineers; (See ASCE).
77. SIA - Security Industry Association; www.siaonline.org.
78. SJI - Steel Joist Institute; www.steeljoist.org.
79. SSINA - Specialty Steel Industry of North America; www.ssina.com.
80. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
81. STI - Steel Tank Institute; www.steeltank.com.
82. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
83. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
84. UL - Underwriters Laboratories Inc.; www.ul.com.
85. UL LLC - UL LLC; www.ul.com.
86. USGBC - U.S. Green Building Council; www.usgbc.org.

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the

entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
2. ICC - International Code Council; www.iccsafe.org.
3. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
3. DOD - Department of Defense; www.quicksearch.dla.mil.
4. DOE - Department of Energy; www.energy.gov.
5. EPA - Environmental Protection Agency; www.epa.gov.
6. FG - Federal Government Publications; www.gpo.gov/fdsys.
7. GSA – General Services Administration; www.gsa.gov.
8. OSHA - Occupational Safety & Health Administration; www.osha.gov.

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.govinfo.gov.
2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
3. MILSPEC - Military Specification and Standards; (See DOD).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections:
 - 1. Division 1 Section "Summary" for limitations on utility interruptions and other work restrictions.
 - 2. Division 1 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
 - 3. Division 1 Section "Execution Requirements" for progress cleaning requirements.

1.2 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Price unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to Owner, Designer, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Water Service: Contractor may use Owner-furnished water available at the site for construction operations.
- C. Electric Power Service: Contractor may use Owner-furnished electricity available at the site for construction operations.

1.3 QUALITY ASSURANCE

- A. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10 mils minimum thickness, with flame-spread rating of 15 or less per ASTM E 84.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

3.2 TEMPORARY UTILITY INSTALLATION

- A. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Provide safety shower and eyewash facilities, if required by construction operations. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities. Keep facilities locked at all times when unattended or not being used.
- B. Electric Power Service: Contractor shall provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - 1. Connect temporary service to Owner's existing power source, as directed by Owner.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Maintain support facilities until Substantial Completion inspection is scheduled. Remove before Final Completion.
- B. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- C. Storage and Staging: Use designated areas of Project site for storage and staging needs.
- D. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution Requirements" for progress cleaning requirements.
- E. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Division 01 Section "Summary."
- B. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- C. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- D. Temporary Partitions: When necessary, provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
 1. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant treated plywood.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
 2. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
- E. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
- F. Exposed Electrical Installations: Provide adequate covers over all energized components at all times said components are unguarded by authorized and trained personnel.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.

- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of Contractor.
 2. At end of construction operations, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

PART 1 - GENERAL**1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Sections:
 - 1. Division 01 Section "References" for applicable industry standards for products specified.

1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named, including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 2. Form: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 - h. Identification of items that require early submittal approval for scheduled delivery date.
 3. Completed List: Within 30 days after date of commencement of the Work, submit copies of completed product list in accordance with Section 013300. Include a written explanation for omissions of data and for variations from Contract requirements.
 4. Designer's Action: Designer will respond in writing to Contractor as indicated in Section 013300. Designer's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Designer's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.
- B. Comparable Product Requests: Submit copies of each request for consideration in accordance with Section 013300. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Designer's Action: If necessary, Designer will request additional information or documentation for evaluation and notify Contractor of acceptance or rejection of proposed comparable product in accordance with Section 013300.

- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

- B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products upon delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

- C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, exposure to sunlight, and weather-protection requirements for storage.
5. Protect stored products from damage and liquids from freezing.
6. Provide a secure location and enclosure at Project site for storage of materials and equipment. Coordinate location with Owner.

7. Provide periodic rotation or movement of equipment as required by manufacturer.

1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by, or incorporated into, the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 3. Refer to Divisions 02 through 33. Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
5. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article below to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with

provisions in Part 2 "Comparable Products" Article below for consideration of an unnamed product by the other named manufacturers.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Designer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Designer may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents, and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of Designers and owners, if requested.
 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

PART 1 - GENERAL**1.1 SUMMARY**

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Installation of the Work.
 - 2. Cutting and patching.
 - 3. Progress cleaning.
 - 4. Starting and adjusting.
 - 5. Protection of installed construction.
 - 6. Correction of the Work.

- B. Related Sections:
 - 1. Division 01 Section "Submittal Procedures".
 - 2. Division 01 Section "Project Management and Coordination" for procedures for coordinating field designing with other construction activities.
 - 3. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.3 SUBMITTALS

- A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.4 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Designer of locations and details of cutting and await directions from the Designer before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety. Operational elements include, but are not limited to the following:
 - a. Primary operational systems and equipment.
 - b. Fire-suppression systems.
 - c. Mechanical systems piping and ducts.
 - d. Control systems.
 - e. Communication systems.
 - f. Conveying systems.
 - g. Electrical wiring systems.
 - h. Operating systems of special construction.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Equipment supports.
 - d. Piping, ductwork, vessels, and equipment.
 - e. Noise- and vibration-control elements and systems.
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Designer's opinion, reduce the structure's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.5 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to the Designer for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of all structures, underground utilities, mechanical and electrical systems, and other construction affecting the Work.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately upon discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to Designer according to requirements in Division 01 Section "Project Management and Coordination." Include a detailed description of

problem encountered, together with recommendations for changing the Contract Documents.

3.3 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Attachment: Provide blocking, attachment plates, anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Designer.
 - 2. Allow for structure movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

- H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Temporary Support: Provide temporary support of work to be cut.
- C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- D. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements of Division 01 Section "Summary."
- E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption of services.
- F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Mechanical and Electrical Services: Cut off pipe or conduit to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 5. Proceed with patching after construction operations requiring cutting are complete.

- G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 degrees F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

- a. Utilize containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Dispose of waste in a legal manner.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.8 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017000

PART 1 - GENERAL**1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
1. Pre-final procedures.
 2. Final completion procedures.
 3. Warranties.
 4. Final cleaning.
- B. Related Sections:
1. Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
 2. Division 1 Section "Execution Requirements" for progress cleaning of Project site.
 3. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 4. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 5. Division 1 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
 6. Divisions 2 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.2 PRE-FINAL PROCEDURES

- A. Preliminary Procedures: Before requesting a pre-final inspection, complete the following. List items below that are incomplete with request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 2. Advise Owner of pending insurance changeover requirements.
 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

5. Prepare and submit Project Record Documents, operation and maintenance manuals, property surveys, and similar final record information.
 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 7. Complete startup testing of systems.
 8. Submit test/adjust/balance records.
 9. Terminate and remove temporary facilities from Project site, along with construction tools, and similar elements.
 10. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 11. Complete final cleaning requirements, including touchup painting.
 12. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for pre-final inspection. Upon receipt of request, Designer will either proceed with inspection or notify Contractor of unfulfilled requirements. Designer will notify Contractor of items, either on Contractor's list or additional items identified by Designer, that must be completed or corrected.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for final completion.

1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting a pre-final inspection, complete the following. List items below that are incomplete with request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 2. Advise Owner of pending insurance changeover requirements.
 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Prepare and submit Project Record Documents, operation and maintenance manuals, property surveys, and similar final record information.
 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

7. Complete startup testing of systems.
 8. Terminate and remove temporary facilities from Project site, along with construction tools, and similar elements.
 9. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 10. Complete final cleaning requirements, including touchup painting.
 11. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Final Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Designer will either proceed with inspection or notify Contractor of unfulfilled requirements. Designer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 WARRANTIES

- A. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 4. Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide table of contents at beginning of document.
- B. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - d. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - e. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - f. Sweep floors broom clean.
 - g. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - h. Remove labels that are not permanent.
 - i. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be

satisfactorily repaired or restored or that already show evidence of repair or restoration.

- 1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.
 - j. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - k. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - l. Clean any and all ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter upon inspection.
 - m. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - n. Leave Project clean and ready for operation.
- B. Construction Waste Disposal: Comply with waste disposal requirements in the Modified General Conditions of this contract.

END OF SECTION 017700

PART 1 - GENERAL**1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Operational components of manuals for systems, subsystems, and equipment.
 - 3. Product maintenance components of manuals.
 - 4. Systems and equipment maintenance manuals.

- B. Related Sections:
 - 1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Division 1 Section "Closeout Procedures" for submitting operation and maintenance manuals.
 - 3. Division 1 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
 - 4. Divisions 2 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.2 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

- B. Subsystem: A portion of a system with characteristics similar to a system.

1.3 SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual specification sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Where applicable, clarify and update reviewed manual content to correspond to modifications and field conditions.

- B. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file of initial submittal and final submittal. Assemble each manual into a composite electronically-indexed file. Submit on digital media acceptable to Designer.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically-linked operation and maintenance directory.
 - b. Enable inserted reviewer comments on draft submittals.
 2. Paper copies (for final submittal only): Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves.
- C. Manual Submittal: Submit two (2) digital copies and three (3) paper copies of each manual in final form prior to requesting pre-final inspection and at least 15 days before commencing demonstration and training. Designer will return copy with comments.
1. Correct or modify each manual to comply with Designer's comments. Submit copies of each corrected manual within 15 days of receipt of Designer's comments and prior to commencing demonstration and training.

1.4 COORDINATION

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
 1. List of documents.
 2. List of systems.
 3. List of equipment.
 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each operation and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents.

2.2 REQUIREMENTS FOR OPERATION AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor.
 - 6. Name and contact information for Designer.
 - 7. Name and contact information for Equipment Manufacturer's Representative.
 - 8. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble

instructions for subsystems, equipment, and components of one system into a single binder.

- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 2. File Names and Bookmarks: Enable bookmarking of individual documents based upon file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel upon opening file.
- F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
1. Binders: Heavy-duty, vinyl-covered, binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name and subject matter of contents. Indicate volume number for multiple-volume sets.
 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose software storage media for computerized electronic equipment.
 4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

- a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
- b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 OPERATIONAL COMPONENTS OF MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Operating standards.
 3. Operating procedures.
 4. Operating logs.
 5. Wiring diagrams.
 6. Control diagrams.
 7. Precautions against improper use.
- B. Descriptions: Include the following:
 1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Designing data and tests.
 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
 1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Normal shutdown instructions.
 6. Seasonal and weekend operating instructions.
 7. Required sequences for electric or electronic systems.
 8. Special operating instructions and procedures.

- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- F. Emergency Procedures: Include the following, as applicable:
 - 1. Instructions on stopping.
 - 2. Shutdown instructions for each type of emergency.
 - 3. Operating instructions for conditions outside normal operating limits.

2.4 PRODUCT MAINTENANCE COMPONENTS OF MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Material and chemical composition.
 - 4. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Schedule for routine maintenance.
 - 3. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE COMPONENTS OF MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 1. Standard maintenance instructions and bulletins.
 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.

2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
 - G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
 - H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to operation, and maintenance manuals.
- B. Product Maintenance Components of Manuals: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operational Components of Manuals: Assemble a complete set of operational data indicating operation of each system, subsystem, and piece of equipment not part of a system.
 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
1. Do not use original Project Record Documents as part of operation and maintenance manuals.
 2. Comply with requirements of newly prepared Record Drawings in Division 01 Section "Project Record Documents."
- F. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

PART 1 - GENERAL**1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Miscellaneous record submittals.
- B. Related Sections:
 - 1. Division 01 Section "Closeout Procedures" for general closeout procedures.
 - 2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Divisions 2 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

1.2 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set of marked-up record prints and one digital copy as described below.
- B. Miscellaneous Record Submittals: Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy and one digital copy of each submittal as described below.

PART 2 - PRODUCTS**2.1 RECORD DRAWINGS**

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer,

subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

- a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
2. Content: Types of items requiring marking include, but are not limited to, the following:
- a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Revisions to routing of piping and conduits.
 - d. Revisions to electrical circuitry.
 - e. Actual equipment locations.
 - f. Changes made by Change Order or Work Change Directive.
 - g. Changes made following Designer's written orders.
 - h. Details not on the original Contract Drawings.
 - i. Field records for variable and concealed conditions.
 - j. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Change Order or Work Change Directive numbers, alternate numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before the pre-final inspection, review marked-up record prints with Designer. When authorized, prepare a digital copy of those Contract Drawings.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Provide information in the following formats:
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.

2. Record Digital Data Files on a disk: Organize digital data information into separate PDF electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
3. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Contractor.

2.2 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit three (3) paper copies and two (2) digital copies of all miscellaneous records.
 1. Include a miscellaneous record submittals directory organized by specification section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Designer's reference during normal working hours.

END OF SECTION 017839

PART 1 - GENERAL**1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
- B. Related Sections:
 - 1. Division 1 Section "Project Management and Coordination" for requirements for preinstruction conferences.
 - 2. Divisions 2 through 33 Sections for specific requirements for demonstration and training for products in those Sections.

1.2 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

PART 2 - PRODUCTS (Not Used)**PART 3 - EXECUTION****3.1 INSTRUCTION**

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Owner will furnish Contractor with names and positions of participants.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner through Designer with at least seven days' advance notice.

END OF SECTION 017900

PART 1 - GENERAL**1.1 SUMMARY****A. Section Includes:**

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.
4. Salvage Schedule at the end of this section.

B. Related Requirements:

1. Division 01 Section "Summary" for restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Division 1 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
3. Division 01 Section "Execution Requirements" for cutting and patching procedures.

1.2 DEFINITIONS

- A. Demolish: Completely remove and legally dispose of off-site.
- B. Recycle: Recovery of demolition waste for subsequent processing in preparation for reuse.
- C. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- D. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, allow for further use, and deliver to Owner ready for reuse.
- E. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- F. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Timber, steel and other merchantable goods and materials removed incidental to demolition shall remain the property of the Owner unless otherwise directed

1.4 PROJECT CONDITIONS

- A. Owner may operate portions of the facility immediately adjacent to selective demolition operations. Conduct selective demolition so Owner's operations will not be disrupted.
 - 1. Comply with requirements specified in Division 1 Section "Summary."
- B. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as far as practical.
- C. Notify Designer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Designer and Owner. Hazardous materials will be removed by the Contractor by way of a Change Order or by the Owner under a separate contract. If the removal of hazardous materials results in a delay to the Contractor's schedule an appropriate adjustment will be made to the Contract Time by way of Change Order.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.
- F. Storage or sale of removed items or materials on-site is not permitted.

1.5 SUBMITTALS

- A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property for environmental protection, dust control, and noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination for shutoff, capping, and continuation of utility services.
 4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- C. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.
- D. Predemolition Photographs or Video: Submit before Work begins.
- E. Warranties: Documentation indicated that any existing warranties remain in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.
- B. Landfill Records: Provide receipt for the acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.7 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor upon completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that all existing utilities have been disconnected, capped and/or de-energized before starting selective demolition operations.
- B. Review any available record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Designer.
- D. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs, preconstruction videotapes, and templates.
 - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs and/or video of conditions that might be misconstrued as damage caused by salvage operations.
 - 2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 - 1. Comply with requirements for existing services/systems interruptions specified in Division 01 Section "Summary."
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Comply with requirements for access and protection specified in Division 01 Section "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of structures.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Controls."
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Upon completion of all new work, completely remove any remaining existing construction. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to

remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner or indicated on Drawings.
5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Designer, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Hazardous Materials: If hazardous materials are encountered during selective demolition, obtain the services of a professional abatement firm to develop and carry-out procedures for removal of hazardous materials.

3.6 REPAIRS

- A. Promptly repair damage to adjacent improvements caused by demolition operations.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an approved landfill acceptable to authorities having jurisdiction.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.

3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.9 SALVAGE SCHEDULE

- A. All circuit breakers.

END OF SECTION 024119

PART 1 - GENERAL**1.1 SUMMARY**

- A. Section Includes:
1. Concrete masonry units.
 2. Mortar and grout materials.
 3. Mortar and grout mixes.

1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

PART 2 - PRODUCTS**2.1 UNIT MASONRY, GENERAL**

- A. Masonry Standard: Comply with TMS 602, except as modified by requirements in the Contract Documents.

2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes matching exposed faces of adjacent units unless otherwise indicated.
- B. CMUs: ASTM C90, normal weight.
 - 1. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C91/C91M.
- E. Mortar Cement: ASTM C1329/C1329M.
- F. Preblended Dry Mortar Mix: Packaged blend made from portland cement and hydrated lime masonry cement or mortar cement, sand, and admixtures and complying with ASTM C1714/C1714M.
- G. Aggregate for Mortar: ASTM C144.
- H. Aggregate for Grout: ASTM C404.
- I. Water: Potable.

2.4 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Use portland cement-lime, masonry cement or mortar cement mortar unless otherwise indicated.

- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
 - 1. For exterior, above-grade, load-bearing, nonload-bearing walls, and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type S.
- D. Grout for Unit Masonry: Comply with ASTM C476.
 - 1. Use grout of type (fine or coarse) that will comply with TMS 602 for dimensions of grout spaces and pour height.
 - 2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.1.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
 - 3. Provide grout with a slump of 8 to 11 inches as measured in accordance with ASTM C143/C143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates are free of substances that impair mortar bond.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to match existing wall thickness shown.
- B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

- C. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

3.3 MORTAR BEDDING AND JOINTING

- A. Lay CMUs as follows:
 - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 - 2. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.4 GROUTING FIELD CUT WALL OPENINGS

- A. For field cut openings in CMU walls, repair openings as follows:
 - 1. Place forms and grout all exposed cavities to provide a smooth, rough opening in wall.
 - 2. Vertical tolerance of finished opening from top to bottom shall be 0.125 inches.

3.5 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

2. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
4. Clean masonry with a proprietary acidic masonry cleaner applied according to manufacturer's written instructions.

3.6 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

PART 1: GENERAL**1.01 SCOPE OF WORK**

- A. This section includes preparation of all surfaces to be painted, all field painting, the repairs to the shop priming or finish coats of paint, and the furnishing and installation of pipe markers, signs and similar items. In general, all equipment furnished with standard shop finishes shall be field painted, except graphic panels, electrical equipment, instruments, and similar items with baked-on enamel finishes.

1.02 SYSTEM DESCRIPTION

A. General:

1. All field painting shall be under the direct and complete control of the Designer and only skilled painters shall be used in the work. All paint shall be applied in accordance with the manufacturer's recommendations and as directed. Film thickness of applied paint shall be at least equal to the value determined by the number of coats multiplied by the thickness per coat schedule on the plans for specific paint products. If other paint products are approved, the thickness per coat shall be as determined by the Designer. A film thickness indicator will be used by the Designer to determine compliance with the specifications. When field coats of paint are to be applied to shop painted or shop primed surfaces, care shall be taken to insure that only compatible paints are used.
2. Pans or pails of adequate capacity shall be used for mixing paints or similar materials. All paint shall be thoroughly stirred before being taken from the containers and all ready mixed paint shall be applied exactly as received from the manufacturer and no thinner or drier shall be added except as specified, permitted or directed by the Designer. Successive coats of paint shall be tinted so as to make each coat easily distinguishable from each other with the final undercoat tinted to the approximate shade of the finished coat.
3. All paint shall be at room temperature before applying and no painting shall be done when the temperature is below 50°F, or in dust laden air, or when rain or snow is falling, or during fog or until all traces of moisture have completely disappeared from the surfaces to be painted. Finished surfaces shall not show brush marks or other irregularities. Undercoats shall be thoroughly and

uniformly sanded with Number 00 sandpaper or equal to remove defects and provide a smooth even surface.

4. Painting shall be continuous and shall be accomplished in an orderly manner so as to facilitate inspection. Materials subject to weathering shall be prime coated as quickly as possible. Surfaces of exposed members that will be inaccessible after erection shall be cleaned and painted before erection.
5. All materials shall be brush painted unless spray painting is specifically approved by the Designer. All surfaces to be painted as well as the atmosphere in which painting is to be done shall be kept warm and dry by heating and ventilating if necessary until each coat of paint has hardened. Any defective paint shall be scraped off and repainted in accordance with the Designer's direction. Before final acceptance of the work, all damaged surfaces of paint shall be cleaned and repainted as directed by the Designer.
6. In general, aluminum, stainless steel, copper, and bronze work shall not be field painted. Care shall be taken not to paint shafts, grease fittings, nameplates, machined parts, sight glasses, etc.

1.03 QUALITY ASSURANCE

- A. All paint shall be manufactured by a reputable manufacturer with at least ten (10) years experience in the manufacture of industrial grade coatings. Paint shall be as manufactured by Thnemec or equal.

1.04 SUBMITTALS

- A. The Contractor shall submit six (6) copies of complete shop drawings to the Designer for approval. Shop drawings shall include a coating schedule, manufacturer's data sheets for all coatings, and color charts. All colors shall be selected by the Owner.

1.05 DELIVERY AND STORAGE

- A. All materials to be used in the work, including paints, stains, varnishes, thinners, etc. shall be delivered to the site in their original unbroken containers. All ingredients shall be prepared, packed, labeled, and guaranteed by the manufacturer. Painting materials shall be stored at the site in a place and in the manner approved by the Designer. Paint storage space shall be kept clean at all times and every precaution shall be taken to avoid fire hazards.

1.06 WARRANTY

- A. All paints shall be warranted to be free from defects for one (1) year after final acceptance of application.

PART 2: PRODUCTS

2.01 MATERIALS

- A. Selection of Colors and Samples: All finish colors shall be selected by the Owner prior to application by the Contractor. Color chips shall be submitted to the Designer for color selection. From time to time, as the Designer may direct analyses of paint and oil, or pigment samples may be made and any samples that are found not complying with these specifications may be cause for rejection of the paint. The cost of the analyses and the cost of supplying paint that complies with these specifications shall be at the Contractor's expense.
- B. All products shall be from a single manufacturer. The coatings listed in the general paint schedule included in this section are based on coatings manufactured by Tnemec for the purpose of specifying the coating system, not to limit competition. Paint shall be as manufactured by Tnemec, Glidden, Koppers or equal.

PART 3: EXECUTION

3.01 PREPARATION OF SURFACES

- A. All surfaces to be painted shall be prepared as specified below and shall be dry before painting:
1. Ferrous Metals: All rust, loose scale, oil, grease, and dirt shall be removed by the use of a commercial blast in accordance with SSPC-SP3.
 2. Galvanized Surfaces: Remove contaminants with a combination of water, detergent and solvents. Allow the metal to dry then power or hand abrade to remove oxides.
 3. Concrete and Masonry Surfaces:
 - a. Prior to painting, all concrete and masonry surfaces shall be thoroughly cleaned with a wire brush; concrete surfaces shall be finished as shown or required; and masonry walls shall be pointed up and excess mortar removed.
 - b. Other surfaces shall be cleaned of dirt and debris and any scratches, cracks, or other defects shall be filled flush with adjacent surfaces and sanded smooth. Fillers used shall be of an approved type and shall be dry before painting.

3.02 APPLICATION

- A. All coats herein specified are in addition to shop or other coats specified to be applied by other trades.
- B. General:
1. In general, equipment previously shop painted with the Manufacturer's standard paint system shall be repainted with colors to suit the area of installation. The DESIGNER may, at his option, require that certain equipment not be painted. The Contractor shall verify that all field coatings are compatible with the shop coatings.
 2. Imperfections and scratches on equipment not repainted shall be touched up with matching paint provided by the Equipment Manufacturer.

3. Where more than one coat of paint is required, the undercoats shall be a shade lighter than succeeding coats to insure complete coverage.
4. Colors shall be as selected by the OWNER.
5. Aluminum and stainless steel surfaces shall not be painted unless specifically indicated in the specifications or drawings.
6. Bronze and brass shall not be painted unless specifically required or requested by the DESIGNER. Galvanized metal and the other metals, which require painting shall receive one (1) coat of a vinyl wash primer before prime painting.

3.03 PAINT SCHEDULE

- A. NOTE: Paint shown in schedule is Tnemec for the purpose of specifying the coating system, not to limit competition. Approved equal systems may be utilized if approved by the Designer.
- B. Masonry:
 1. All interior and exterior exposed concrete block walls above and below grade shall be painted.
 - a. Surface Preparation: Clean, dry, no cracks or nailheads.
 - b. First Coat: 54-660 Masonry filler at 75 SF/gallon
 - c. Second and Third Coats: Series 66 Hi-Build Epoxoline at 4.0-6.0 dry film thickness.
- C. Metals: All interior, exterior and submerged ferrous and galvanized metal surfaces, including, but not limited to, piping, machinery, railings, lintels, doors, ducts, equipment and other miscellaneous items.
 1. Steel:
 - a. Exterior:
 - i. Surface Preparation: Blast clean per SSPC - SP6.
 - ii. First Coat: Series 66 Hi-Build Epoxoline at 4.0-6.0 mils dry film thickness.

- iii. Second and Third Coats: Series 73 Endura-shield at 3.0 mils dry film thickness.
- b. Interior:
 - i. Surface Preparation: Blast clean per SSPC-SP6 all surfaces except those with factory prime coat.
 - ii. First Coat: Series 66 Hi-Build Epoxoline at 3.0-5.0 mils dry film thickness.
 - iii. Second Coat: Series 66 Hi-Build Epoxoline at 4.0-6.0 mils dry film thickness.
- D. Factory Primed Steel (equipment, metal buildings, etc.):
 - 1. Surface Preparation: Clean and dry
 - 2. Prime Coat: None (factory coat); touch up.
 - 3. Second Coat: Series 27 F.C. Typoxy at 2.0-3.0 mils dry film thickness.
 - 4. Third Coat: Series 73 Endura-shield at 2.0-3.0 mils dry film thickness.

3.03 SPARE PAINT

- A. The Contractor shall furnish one (1) gallon of all types and colors of paint to the Owner for future touch-up painting.

END OF SECTION

SECTION 260010 - SUPPLEMENTAL REQUIREMENTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Supplemental requirements generally applicable to the Work specified in Division 26. This Section is also referenced by related Work specified in other Divisions.

B. Related Requirements:

1. Section 260011 "Facility Performance Requirements for Electrical" for field conditions applicable to Work specified in this Section.

1.2 REFERENCES

A. Abbreviations and Acronyms for Electrical Terms and Units of Measure:

1. A: Ampere, unit of electrical current.
2. AC or ac: Alternating current.
3. AIC: Ampere interrupting capacity.
4. AL, Al, or ALUM: Aluminum.
5. AWG: American wire gauge; see ASTM B258.
6. BIL: Basic impulse insulation level.
7. CAD: Computer-aided design or drafting.
8. CB: Circuit breaker.
9. cd: Candela, the SI fundamental unit of luminous intensity.
10. CO/ALR: Copper-aluminum, revised.
11. CU or Cu: Copper.
12. CU-AL or AL-CU: Copper-aluminum.
13. EGC: Equipment grounding conductor.
14. EMF: Electromotive force.
15. EMI: Electromagnetic interference.
16. fc: Footcandle, an internationally recognized unit of illuminance equal to one lumen per square foot or 10.76 lx. The simplified conversion 1 fc = 10 lx in the Specifications is common practice and considered adequate precision for building construction activities. When there are conflicts, lux is the primary unit; footcandle is specified for convenience.
17. FLC: Full-load current.
18. ft: Foot.

19. ft-cd: Foot-candle, the antiquated U.S. Standard unit of illuminance, equal to one international candle measured at a distance of one foot, that was superseded in 1948 by the unit "footcandle" after the SI unit candela (cd) replaced the international candle; see "fc,"
20. GEC: Grounding electrode conductor.
21. GFCI: Ground-fault circuit interrupter.
22. GFPE: Ground-fault protection of equipment.
23. GND: Ground.
24. HACR: Heating, air conditioning, and refrigeration.
25. HID: High-intensity discharge.
26. HP or hp: Horsepower.
27. HVAC: Heating, ventilating, and air conditioning.
28. Hz: Hertz.
29. inch: Inch. To avoid confusion, the abbreviation "in." is not used.
30. IR: Infrared.
31. kAIC: Kiloampere interrupting capacity.
32. kcmil or MCM: One thousand circular mils.
33. kV: Kilovolt.
34. kVA: Kilovolt-ampere.
35. kVA_r or kVAR: Kilovolt-ampere reactive.
36. kW: Kilowatt.
37. kWh: Kilowatt-hour.
38. lb: Pound (weight).
39. lbf: Pound (force).
40. LED: Light-emitting diode.
41. Li-ion: Lithium-ion.
42. lm: Lumen, the SI derived unit of luminous flux.
43. LRC: Locked-rotor current.
44. lx: Lux, the SI derived unit of illuminance equal to one lumen per square meter.
45. m: Meter.
46. MCC: Motor-control center.
47. MLO: Main lugs only.
48. MV: Medium voltage.
49. MVA: Megavolt-ampere.
50. mW: Milliwatt.
51. MW: Megawatt.
52. MWh: Megawatt-hour.
53. NC: Normally closed.
54. Ni-Cd: Nickel-cadmium.
55. Ni-MH: Nickel-metal hydride.
56. NO: Normally open.
57. NPT: National (American) standard pipe taper.
58. OCPD: Overcurrent protective device.
59. PF or pf: Power factor.
60. PV: Photovoltaic.

61. PVC: Polyvinyl chloride.
62. RFI: (electrical) Radio-frequency interference; (contract) Request for interpretation.
63. RMS or rms: Root-mean-square.
64. RPM or rpm: Revolutions per minute.
65. SPD: Surge protective device.
66. sq.: Square.
67. SWD: Switching duty.
68. TEFC: Totally enclosed fan-cooled.
69. TVSS: Transient voltage surge suppressor.
70. UL: (standards) Underwriters Laboratories, Inc.; (product categories) UL, LLC.
71. UL CCN: UL Category Control Number.
72. V: Volt, unit of electromotive force.
73. V(ac): Volt, alternating current.
74. V(dc): Volt, direct current.
75. VA: Volt-ampere, unit of complex electrical power.
76. VAR: Volt-ampere reactive, unit of reactive electrical power.
77. W: Watt, unit of real electrical power.
78. Wh: Watt-hour, unit of electrical energy usage.
79. WR: Weather resistant.

B. Abbreviations and Acronyms for Electrical Raceway Types:

1. EMT: Electrical metallic tubing.
2. EMT-S: Steel electrical metallic tubing.
3. PVC: Rigid PVC conduit.
4. PVC-40: Schedule 40 rigid PVC conduit.

C. Abbreviations and Acronyms for Electrical Single-Conductor and Multiple-Conductor Cable Types:

1. THHN: Thermoplastic, heat-resistant cable with nylon jacket outer sheath.
2. THHW: Thermoplastic, heat- and moisture-resistant cable.
3. THWN: Thermoplastic, moisture- and heat-resistant cable with nylon jacket outer sheath.

D. Definitions:

1. Basic Impulse Insulation Level (BIL): Reference insulation level expressed in impulse crest voltage with a standard wave not longer than 1.5 times 50 microseconds and 1.5 times 40 microseconds.
2. Cable: In accordance with NIST NBS Circular 37 and IEEE standards, in the United States for the purpose of interstate commerce, the definition of "cable" is (1) a conductor with insulation, or a stranded conductor with or without insulation (single-conductor cable); or (2) a combination of conductors insulated from one another (multiple-conductor cable).

3. Conductor: In accordance with NIST NBS Circular 37 and IEEE standards, in the United States for the purpose of interstate commerce, the definition of "conductor" is (1) a wire or combination of wires not insulated from one another, suitable for carrying an electric current; (2) (National Electrical Safety Code) a material, usually in the form of wire, cable, or bar, suitable for carrying an electric current; or (3) (general) a substance or body that allows a current of electricity to pass continuously along it.
4. Enclosure: The case or housing of an apparatus, or the fence or wall(s) surrounding an installation, to prevent personnel from accidentally contacting energized parts or to protect the equipment from physical damage. Types of enclosures and enclosure covers include the following:
 - a. Cabinet: An enclosure that is designed for either surface mounting or flush mounting and is provided with a frame, mat, or trim in which a swinging door or doors are or can be hung.
 - b. Concrete Box: A box intended for use in poured concrete.
 - c. Conduit Body: A means for providing access to the interior of a conduit or tubing system through one or more removable covers at a junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.
 - d. Conduit Box: A box having threaded openings or knockouts for conduit, EMT, or fittings.
 - e. Cutout Box: An enclosure designed for surface mounting that has swinging doors or covers secured directly to and telescoping with the walls of the enclosure.
 - f. Device Box: A box with provisions for mounting a wiring device directly to the box.
 - g. Extension Ring: A ring intended to extend the sides of an outlet box or device box to increase the box depth, volume, or both.
 - h. Junction Box: A box with a blank cover that joins different runs of raceway or cable and provides space for connection and branching of the enclosed conductors.
 - i. Outlet Box: A box that provides access to a wiring system having pryout openings, knockouts, threaded entries, or hubs in either the sides or the back, or both, for the entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting an outlet box cover, but without provisions for mounting a wiring device directly to the box.
 - j. Pedestal Floor Box Cover: A floor box cover that, when installed as intended, provides a means for typically vertical or near-vertical mounting of receptacle outlets above the floor's finished surface.
 - k. Pull Box: A box with a blank cover that joins different runs of raceway and provides access for pulling or replacing the enclosed cables or conductors.
 - l. Ring: A sleeve, which is not necessarily round, used for positioning a recessed wiring device flush with the plaster, concrete, drywall, or other wall surface.

- m. Ring Cover: A box cover, with raised center portion to accommodate a specific wall or ceiling thickness, for mounting wiring devices or luminaires flush with the surface.
 - n. Termination Box: An enclosure designed for installation of termination base assemblies consisting of bus bars, terminal strips, or terminal blocks with provision for wire connectors to accommodate incoming or outgoing conductors, or both.
5. Emergency Systems: Those systems legally required and classed as emergency by municipal, state, federal, or other codes, or by any governmental agency having jurisdiction that are designed to ensure continuity of lighting, electrical power, or both, to designated areas and equipment in the event of failure of the normal supply for safety to human life.
6. Fault Limited: Providing or being served by a source of electrical power that is limited to not more than 100 W when tested in accordance with UL 62368-1.
- a. The term "fault limited" is intended to encompass most Class 1, 2, and 3 power-limited sources complying with Article 725 of NFPA 70; Class ES1 and ES2 electrical energy sources that are Class PS1 electrical power sources (e.g., USB); and Class ES3 electrical energy sources that are Class PS1 and PS2 electrical power sources (e.g., PoE). See UL 62368-1 for discussion of classes of electrical energy sources and classes of electrical power sources.
7. Jacket: A continuous nonmetallic outer covering for conductors or cables.
8. Luminaire: A complete lighting unit consisting of a light source such as a lamp, together with the parts designed to position the light source and connect it to the power supply. It may also include parts to protect the light source or the ballast or to distribute the light.
9. Plenum: A compartment or chamber to which one or more air ducts are connected and that forms part of the air distribution system.
10. Receptacle: A fixed connecting device arranged for insertion of a power cord plug. Also called a power jack.
11. Receptacle Outlet: One or more receptacles mounted in a box with a suitable protective cover.
12. Sheath: A continuous metallic covering for conductors or cables.
13. UL Category Control Number (CCN): An alphabetic or alphanumeric code used to identify product categories covered by UL's Listing, Classification, and Recognition Services.
14. Voltage Class: For specified circuits and equipment, voltage classes are defined as follows:
- a. Control Voltage: Having electromotive force between any two conductors, or between a single conductor and ground, that is

supplied from a battery or other Class 2 or Class 3 power-limited source.

- b. Line Voltage: (1) (controls) Designed to operate using the supplied low-voltage power without transformation. (2) (transmission lines, transformers, SPDs) The line-to-line voltage of the supplying power system.
 - c. Low Voltage (LV): Having electromotive force between any two conductors, or between a single conductor and ground, that is rated above 30 V but not exceeding 1000 V.
 - d. Medium Voltage (MV): Having electromotive force between any two conductors, or between a single conductor and ground, that is rated about 1 kV but not exceeding 69 kV.
15. Wire: In accordance with NIST NBS Circular 37 and IEEE standards, in the United States for the purpose of interstate commerce, the definition of "wire" is a slender rod or filament of drawn metal. A group of small wires used as a single wire is properly called a "stranded wire." A wire or stranded wire covered with insulation is properly called an "insulated wire" or a "single-conductor cable." Nevertheless, when the context indicates that the wire is insulated, the term "wire" will be understood to include the insulation.

1.3 COORDINATION

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions:
 - 1. Notify Owner no fewer than seven days in advance of proposed interruption of electrical service.
 - 2. Do not proceed with interruption of electrical service without Owner's written permission.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Electrical Installation Schedule: At preconstruction meeting, and periodically thereafter as dates change, provide schedule for electrical installation Work to Owner and Designer including, but not limited to, milestone dates for the following activities:
1. Submission of action submittals specified in Division 26.
 2. Orders placed for major electrical equipment.
 3. Arrival of major electrical equipment on-site.
 4. Electrical system outages.
 5. Electrical system inspection and activation.
 6. System startup, testing, and commissioning activities for major electrical equipment.
 7. Requests for inspections by authorities having jurisdiction
- B. Coordination Drawings for Bus Assembly Routing: Floor plans and sections, drawn to scale, on which the following items are shown and coordinated with each other:
1. Scaled bus-assembly layouts and relationships between components and adjacent structural, mechanical, and electrical elements.
 2. Vertical and horizontal enclosed bus-assembly runs, offsets, and transitions.
 3. Clearances for access above and to the side of enclosed bus assemblies.
 4. Vertical elevation of enclosed bus assemblies above the floor or bottom of structure.
 5. Support locations, type of support, and weight on each support.
 6. Location of adjacent existing elements including luminaires, HVAC and plumbing equipment, fire sprinklers and piping, signal and control devices, and other equipment.

3.2 INSTALLATION OF ELECTRICAL WORK

- A. Unless more stringent requirements are specified in the Contract Documents or manufacturers' written instructions, comply with NFPA 70 and NECA NEIS 1 for installation of Work specified in Division 26. Consult Designer for resolution of conflicting requirements.

3.3 FIELD QUALITY CONTROL

- A. Administrant for Low-Voltage Electrical Tests and Inspections:
 - 1. Administer and perform tests and inspections with assistance of factory-authorized service representative.

3.4 CLOSEOUT ACTIVITIES

- A. Training: Train Owner's maintenance personnel on the following topics:
 - 1. How to operate normal and emergency electrical systems.
 - 2. How to adjust, operate, and maintain switchboards, overcurrent protective devices, instrumentation, and accessories, and to use and reprogram microprocessor-based trip, monitoring, and communication units specified in Section 262413 "Switchboards."

END OF SECTION

SECTION 260011 - FACILITY PERFORMANCE REQUIREMENTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Field conditions and other facility performance requirements applicable to Work specified in Division 26.

1.2 FIELD CONDITIONS

A. Altitude:

1. Sea level to 2200 ft.

B. Ambient Temperature:

1. Range: 40 deg F to 105 deg F.

C. Temperature Variation: Allow for thermal movements from the following differential temperatures:

1. Ambient Temperature Differential: 85 deg F.
2. Material Surface Temperature Differential: 100 deg F.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY****A. Section Includes:**

1. Copper building wire.
2. Fire-alarm wire and cable.
3. Connectors and splices.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for field conditions applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS**A. Product Data:**

1. Copper building wire.
2. Connectors and splices.

1.3 INFORMATIONAL SUBMITTALS**A. Field quality-control reports.****PART 2 - PRODUCTS****2.1 COPPER BUILDING WIRE****A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.****B. Standards:**

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- C. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
- D. Conductor Insulation:
 1. Type THHN and Type THWN-2. Comply with UL 83.

2.2 FIRE-ALARM WIRE AND CABLE

- A. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.
- B. Non-Power-Limited Circuits: Solid-copper conductors with 600 V rated, 75 deg C, color-coded insulation NFPA 70 permits wire sizes down to No. 18 AWG.
 1. Low-Voltage Circuits: No. 14 AWG, minimum, in raceway.

2.3 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
 1. Material: Copper or Bronze.
 2. Type: One or two hole, as applicable, with long barrels.
 3. Termination: Compression.
- C. Cable Splices: Irreversible cable-to-cable compression splices with heat shrink insulation.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders and Branch Circuits:

1. Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.
- B. Exposed Branch Circuits, Including in Crawlspace: Type THHN/THWN-2, single conductors in raceway.

3.3 INSTALLATION, GENERAL

- A. Complete raceway installation between conductor and cable termination points in accordance with Section 260533.13 "Conduits for Electrical Systems" prior to pulling conductors and cables.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

3.4 INSTALLATION OF FIRE-ALARM WIRE AND CABLE

- A. Comply with NFPA 72.
- B. Wiring Method: Install wiring in raceway.
- C. Color-Coding: Match color of existing conductors.

3.5 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 1. Use oxide inhibitor in each splice, termination, and tap for existing aluminum conductors.

2. Use irreversible compression splices for all conductor splices. Bolted splices are NOT acceptable.
- C. Fire Alarm Connections: Provide terminal strips for all fire alarm wiring connections. Do NOT use wirenuts.

3.6 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

3.7 FIELD QUALITY CONTROL

- A. Tests and Inspections:
1. After installing conductors and cables and before electrical circuitry has been energized, test feeder conductors for compliance with requirements.
 2. Perform each of the following visual and electrical tests:
 - a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
 - b. Test bolted connections for high resistance using one of the following:
 - 1) A low-resistance ohmmeter.
 - 2) Calibrated torque wrench.
 - 3) Thermographic survey.
 - c. Inspect compression-applied connectors for correct cable match and indentation.
 - d. Inspect for correct identification.
 - e. Inspect cable jacket and condition.
 - f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500 V(dc) for 300 V rated cable and 1000 V(dc) for 600 V rated cable for a one-minute duration.
 - g. Continuity test on each conductor and cable.
 3. Initial Infrared Scanning: After Substantial Completion, but before Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.
 - a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

- b. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
 - 4. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
- B. Cables will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports to record the following:
 - 1. Procedures used.
 - 2. Results that comply with requirements.
 - 3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

A. Section Includes:

1. Grounding and bonding conductors.
2. Grounding and bonding bushings.
3. Grounding and bonding hubs.
4. Grounding and bonding connectors.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" specifies additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" specifies field conditions applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS**2.1 GROUNDING AND BONDING CONDUCTORS**

A. Equipment Grounding Conductor:

1. General Characteristics: 600 V, THHN/THWN-2 or THWN-2, copper wire or cable, green color, in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. ASTM - Bare Copper Grounding and Bonding Conductor:

1. Referenced Standards: Complying with one or more of the following:
 - a. Soft or Annealed Copper Wire: ASTM B3.
 - b. Concentric-Lay Stranded Copper Conductor: ASTM B8.
 - c. Tin-Coated Soft or Annealed Copper Wire: ASTM B33.

- d. 19-Wire Combination Unilay-Stranded Copper Conductor:
ASTM B787/B787M.

2.2 GROUNDING AND BONDING BUSHINGS

- A. Description: Bonding bushings connect conduit fittings, tubing fittings, threaded metal conduit, and unthreaded metal conduit to metal boxes and equipment enclosures, and have one or more bonding screws intended to provide electrical continuity between bushing and enclosure. Grounding bushings have provision for connection of bonding or grounding conductor and may or may not also have bonding screws.
- B. Source Limitations: Obtain products from single manufacturer.
- C. Performance Criteria:
 - 1. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
 - 2. Listing Criteria:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
- D. UL KDER - Bonding Bushing:
 - 1. General Characteristics: Threaded bushing with insulated throat.
- E. UL KDER - Grounding Bushing:
 - 1. General Characteristics: Threaded bushing with insulated throat and mechanical-type wire terminal.

2.3 GROUNDING AND BONDING HUBS

- A. Description: Hubs with certified grounding or bonding locknut.
- B. Source Limitations: Obtain products from single manufacturer.
- C. Performance Criteria:
 - 1. Regulatory Requirements:

- a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
- 2. Listing Criteria:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
- D. UL KDER - Grounding and Bonding Hub:
 - 1. General Characteristics: Insulated, gasketed, watertight hub with mechanical-type wire terminal.

2.4 GROUNDING AND BONDING CONNECTORS

- A. Source Limitations: Obtain products from single manufacturer.
- B. Performance Criteria:
 - 1. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
 - 2. Listing Criteria:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
- C. UL KDER - Pressure-Type Grounding and Bonding Busbar Cable Connector:
 - 1. General Characteristics: Copper or copper alloy, for compression bonding of one or more conductor directly to copper busbar. Listed for direct burial.
- D. UL KDER - Crimped Lug Pressure-Type Grounding and Bonding Busbar Terminal:
 - 1. General Characteristics: Cast silicon bronze, solderless compression-type wire terminals; with long barrel and two holes spaced on 5/8 or 1 inch centers for two-bolt connection to busbar.
- E. UL KDER - Split-Bolt Service-Post Pressure-Type Grounding and Bonding Busbar Terminal:
 - 1. General Characteristics: Bolts that surround cable and bond to cable under compression when nut is tightened after assembly is screwed into busbar opening.

- F. UL KDER - Crimped Pressure-Type Grounding and Bonding Cable Connector:
 - 1. General Characteristics: Crimp-and-compress connectors that bond to conductor when connector is compressed around conductor.
 - a. Copper, C and H shaped.
- G. UL KDER - Split-Bolt Pressure-Type Grounding and Bonding Cable Connector:
 - 1. General Characteristics: Bolts that surround cable and bond to cable under compression when nut is tightened.
 - a. Copper.

PART 3 - EXECUTION

3.1 SELECTION OF GROUNDING AND BONDING PRODUCTS

- A. Grounding and Bonding Conductors:
 - 1. Provide solid conductor for 8 AWG and smaller, and stranded conductors for 6 AWG and larger unless otherwise indicated.
- B. Grounding and Bonding Connectors:
 - 1. Equipment Grounding Conductor Terminations: Bolted connectors.

3.2 INSTALLATION OF GROUNDING AND BONDING

- A. Comply with manufacturer's published instructions.
- B. Special Techniques:
 - 1. Grounding and Bonding Conductors:
 - a. Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
 - 2. Grounding and Bonding Connectors: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.

- a. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
 - b. Make connections with clean, bare metal at points of contact.
 - c. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
 - d. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1) Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate adjacent parts.
 - 2) Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Equipment Grounding and Bonding:
- a. Install insulated equipment grounding conductors with feeders and branch circuits.

3.3 FIELD QUALITY CONTROL FOR GROUNDING AND BONDING

A. Tests and Inspections:

- 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
- 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with calibrated torque wrench in accordance with manufacturer's published instructions.

B. Nonconforming Work:

- 1. Grounding system will be considered defective if it does not pass tests and inspections.
- 2. Remove and replace defective components and retest.

3.4 PROTECTION

- A. After installation, protect grounding and bonding cables and equipment from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY****A. Section Includes:**

1. Support, anchorage, and attachment components.
2. Fabricated metal equipment support assemblies.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS**A. Product Data:**

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Slotted support systems, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - d. Sockets.
 - e. Eye nuts.
 - f. Fasteners.
 - g. Anchors.
 - h. Saddles.
 - i. Brackets.
2. Include rated capacities and furnished specialties and accessories.

B. Shop Drawings: For fabrication and installation details for electrical hangers and support systems.

1. Hangers. Include product data for components.
2. Slotted support systems.

3. Equipment supports.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32 inch diameter holes at a maximum of 8 inch on center in at least one surface.
 1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 2. Material for Channel, Fittings, and Accessories: Galvanized steel.
 3. Channel Width: Selected for applicable load criteria.
 4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
- B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 2. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
 3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
 4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325.
 5. Toggle Bolts: All steel springhead type.
 6. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 SELECTION

- A. Comply with the following standards for selection and installation of hangers and supports, except where requirements on Drawings or in this Section are stricter:

1. NECA NEIS 101
- B. Comply with requirements for raceways specified in Section 260533.13 "Conduits for Electrical Systems."
- C. Comply with requirements for boxes specified in Section 260533.16 "Boxes and Covers for Electrical Systems."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT as required by NFPA 70. Minimum rod size must be 1/4 inch in diameter.
- E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 1. Secure raceways to these supports with one-bolt conduit clamps as indicated on drawing detail.

3.2 INSTALLATION OF SUPPORTS

- A. Comply with NECA NEIS 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA NEIS 1, EMT may be supported by openings through structure members, in accordance with NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination must be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 1. To Wood: Fasten with lag screws or through bolts.
 2. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 3. To Existing Concrete: Expansion anchor fasteners.
 4. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
 5. To Light Steel: Sheet metal screws.
 6. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures,

pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inch larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000 psi, 28-day compressive-strength concrete.
- C. Anchor equipment to concrete base as follows:
 - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.4 PAINTING

- A. Touchup:
 - 1. Comply with requirements in Section 099000 "Painting" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

A. Section Includes:

1. Type EMT-S duct raceways and elbows.
2. Type PVC duct raceways and fittings.
3. Fittings for conduit, tubing, and cable.
4. Solvent cements.

B. Products Installed, but Not Furnished, under This Section:

1. See Section 260553 "Identification for Electrical Systems" for electrical equipment labels.

C. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for field conditions applicable to Work specified in this Section.
3. Section 260519 "Low-Voltage for Electrical Power Conductors and Cables" for nonmetallic underground conduit with conductors (Type NUCC).

1.2 DEFINITIONS

A. Conduit: A structure containing one or more duct raceways.

B. Duct Raceway: A single enclosed raceway for conductors or cable.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Type EMT-S duct raceways and elbows.
2. Type PVC duct raceways and fittings.
3. Fittings for conduit, tubing, and cable.
4. Electrically conductive corrosion-resistant compounds for threaded conduit.
5. Solvent cements.

1.4 INFORMATIONAL SUBMITTALS

- A. Manufacturers' Published Instructions:
 - 1. Type EMT-S duct raceways and elbows.
 - 2. Type PVC duct raceways and fittings.
 - 3. Fittings for conduit, tubing, and cable.
 - 4. Solvent cements.

PART 2 - PRODUCTS

2.1 TYPE EMT-S DUCT RACEWAYS AND ELBOWS

- A. Performance Criteria:
 - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
 - 2. Listing Criteria: UL CCN FJMX; including UL 797.
- B. Source Quality Control:
 - 1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
 - 2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.
- C. UL FJMX - Steel Electrical Metal Tubing (EMT-S) and Elbows:
 - 1. Material: Steel.
 - 2. Options:
 - a. Exterior Coating: Zinc.
 - b. Interior Coating: Zinc.
 - c. Minimum Trade Size: Metric designator 21 (trade size 3/4).
 - d. Colors: As indicated on Drawings.

2.2 TYPE PVC DUCT RACEWAYS AND FITTINGS

- A. Performance Criteria:
 - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by

- authorities having jurisdiction, and marked for intended location and application.
 - 2. Listing Criteria: UL CCN DZYR; including UL 651.
- B. Source Quality Control:
- 1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
 - 2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.
- C. UL DZYR - Schedule 40 Rigid PVC Conduit (PVC-40) and Fittings:
- 1. Dimensional Specifications: Schedule 40.
 - 2. Options:
 - a. Minimum Trade Size: Metric designator 21 (trade size 3/4).
 - b. Markings: For use with maximum 90 deg C wire.

2.3 FITTINGS FOR CONDUIT, TUBING, AND CABLE

- A. Performance Criteria:
- 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.
- B. Source Quality Control:
- 1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
 - 2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.
- C. UL FKAV - Fittings for Type EMT Duct Raceways:
- 1. Listing Criteria: UL CCN FKAV; including UL 514B.
 - 2. Options:
 - a. Material: Steel.
 - b. Coupling Method: Setscrew coupling. Setscrew couplings with only single screw per conduit are unacceptable.

2.4 SOLVENT CEMENTS

- A. Performance Criteria:
 - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
 - 2. Listing Criteria: UL CCN DWTT; including UL 514B.
- B. UL DWTT - Solvent Cements for Type PVC Duct Raceways and Fittings:

PART 3 - EXECUTION

3.1 SELECTION OF CONDUITS FOR ELECTRICAL SYSTEMS

- A. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NFPA 70 for selection of duct raceways. Consult Designer for resolution of conflicting requirements.
- B. Indoors:
 - 1. Exposed and Not Subject to Physical Damage: EMT.
- C. Grounding Conductor Only Conduits:
 - 1. PVC-40.

3.2 INSTALLATION OF CONDUITS FOR ELECTRICAL SYSTEMS

- A. Comply with manufacturer's published instructions.
- B. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:
 - 1. Type EMT-S: Article 358 of NFPA 70 and NECA NEIS 101.
 - 2. Type PVC: Article 356 of NFPA 70 and NECA NEIS 111.
- C. Special Installation Techniques:
 - 1. General Requirements for Installation of Duct Raceways:
 - a. Install no more than equivalent of three 90-degree bends in conduit run except for control wiring conduits, for which no more than

equivalent of two 90-degree fewer bends are permitted. Support within 12 inch of changes in direction.

- b. Make bends in duct raceway using large-radius preformed ells except for parallel bends. Field bending must be in accordance with NFPA 70 minimum radii requirements. Provide only equipment specifically designed for material and size involved.
 - c. Support conduit within 12 inch of enclosures to which attached.
 - d. Keep duct raceways at least 6 inch away from parallel runs of flues and steam or hot-water pipes. Install horizontal duct raceway runs above water and steam piping.
 - e. Cut conduit perpendicular to the length. For conduits metric designator 53 (trade size 2) and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.
 - f. Install duct raceways square to the enclosure.
2. Duct Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines.
- a. EMT: Provide setscrew, steel fittings. Comply with NEMA FB 2.10.

D. Interfaces with Other Work:

- 1. Coordinate with Section 260529 "Hangers and Supports for Electrical Systems" for installation of conduit hangers and supports.

3.3 **PROTECTION**

A. Protect coatings, finishes, and cabinets from damage and deterioration.

- 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY****A. Section Includes:**

1. Metallic outlet boxes, device boxes, rings, and covers.
2. Junction boxes and pull boxes.

B. Products Installed, but Not Furnished, under This Section:

1. See Section 260553 "Identification for Electrical Systems" for electrical equipment labels.

C. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for field conditions applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS**A. Product Data:**

1. Metallic outlet boxes, device boxes, rings, and covers.
2. Junction boxes and pull boxes.

1.3 INFORMATIONAL SUBMITTALS**A. Manufacturers' Published Instructions:**

1. Metallic outlet boxes, device boxes, rings, and covers.
2. Junction boxes and pull boxes.

PART 2 - PRODUCTS

2.1 METALLIC OUTLET BOXES, DEVICE BOXES, RINGS, AND COVERS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN QCIT; including UL 514A.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL QCIT - Metallic Outlet Boxes and Covers:

1. Description: Box having pryout openings, knockouts, threaded entries, or hubs in either the sides of the back, or both, for entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting outlet box cover, but without provisions for mounting wiring device directly to box.
2. Options:
 - a. Material: Sheet steel.
 - b. Sheet Metal Depth: Minimum 2 inch.

D. UL QCIT - Metallic Conduit Bodies:

1. Description: Means for providing access to interior of conduit or tubing system through one or more removable covers at junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.

E. UL QCIT - Metallic Device Boxes:

1. Description: Box with provisions for mounting wiring device directly to box.
2. Options:
 - a. Material: Sheet steel.
 - b. Sheet Metal Depth: minimum 2 inch.

2.2 JUNCTION BOXES AND PULL BOXES

- A. Performance Criteria:
 - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
 - 2. Listing Criteria: UL CCN BGUZ; including UL 50 and UL 50E.
- B. Source Quality Control:
 - 1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
 - 2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.
- C. UL BGUZ - Indoor Sheet Metal Junction and Pull Boxes:
 - 1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
 - 2. Options:
 - a. Degree of Protection: Type 1.

PART 3 - EXECUTION

3.1 SELECTION OF BOXES AND COVERS FOR ELECTRICAL SYSTEMS

- A. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NFPA 70 for selection of boxes and enclosures. Consult Designer for resolution of conflicting requirements.
- B. Degree of Protection:
 - 1. Indoors:
 - a. Type 1 unless otherwise indicated.

3.2 INSTALLATION OF BOXES AND COVERS FOR ELECTRICAL SYSTEMS

- A. Comply with manufacturer's published instructions.
- B. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:

1. Outlet, Device, Pull, and Junction Boxes: Article 314 of NFPA 70.

C. Special Installation Techniques:

1. Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures.
2. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.
3. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to ensure a continuous ground path.
4. Identification: Provide labels for boxes and associated electrical equipment.
 - a. Identify field-installed conductors, interconnecting wiring, and components.
 - b. Label each box with engraved metal or laminated-plastic nameplate.

3.3 CLEANING

- A. Remove construction dust and debris from boxes before installing covers.

3.4 PROTECTION

- A. After installation, protect boxes from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION

SECTION 260553 IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Labels.
2. Tapes and stencils.
3. Tags.
4. Signs.
5. Cable ties.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for field conditions applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Identification Schedule: For each piece of electrical equipment and electrical system components to be index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

PART 2 - PRODUCTS

2.1 LABELS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN PGDQ2 for components; including UL 969.

- B. UL PGDQ2 - Self-Adhesive Labels: Polyester, thermal, transfer-printed, 3 mil thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.

- 1. Minimum Nominal Size:
 - a. 1-1/2 by 6 inch for raceway and conductors.
 - b. 3-1/2 by 5 inch for equipment.
 - c. As required by authorities having jurisdiction.

2.2 TAPES AND STENCILS

- A. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mil thick by 1 to 2 inch wide; compounded for outdoor use.
- B. Floor Marking Tape: 2 inch wide, 5 mil pressure-sensitive vinyl tape, with yellow and black stripes and clear vinyl overlay.

2.3 TAGS

- A. Nonmetallic Preprinted Tags: Polyethylene tags, 0.023 inch thick, color-coded for phase and voltage level, with factory printed permanent designations; punched for use with self-locking cable tie fastener.

2.4 SIGNS

- A. Laminated Acrylic or Melamine Plastic Signs:
 - 1. Engraved legend.
 - 2. Thickness:
 - a. For signs up to 20 sq. inch, minimum 1/16 inch thick.
 - b. For signs larger than 20 sq. inch, 1/8 inch thick.
 - c. Engraved legend with black letters on white face.
 - d. Punched or drilled for mechanical fasteners with 1/4 inch grommets in corners for mounting.

2.5 CABLE TIES

- A. Performance Criteria:
 - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria: UL CCN ZODZ; including UL 1565 or UL 62275.
- B. UL ZODZ - General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
1. Minimum Width: 3/16 inch.
 2. Tensile Strength at 73 deg F in accordance with ASTM D638: 12,000 psi.
 3. Temperature Range: Minus 40 to plus 185 deg F.
 4. Color: Black, except where used for color-coding.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 SELECTION OF COLORS AND IDENTIFICATION MARKINGS

- A. Comply with 29 CFR 1910.144 for color identification of hazards, and the following:
1. Ceiling-mounted hangers, supports, cable trays, and raceways must be finished, painted, or suitably marked safety yellow where less than 7.7 ft above finished floor.
- B. Color-Coding for Phase- and Voltage-Level Identification, 1000 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.
1. Color must be factory applied or field applied for sizes larger than 6 AWG when permitted by authorities having jurisdiction.
 2. Colors for 208Y/120 V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 3. Color for Neutral (Grounded Conductor): White.
 4. Color for Equipment Ground: Green.
- C. Accessible Fittings for Raceways: Identify cover of junction and pull box of the following systems with wiring system legend and system voltage. System legends must be as follows:
1. "EMERGENCY POWER."

- D. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- E. Pull and Junction Boxes, 1000 V or Less: For conductors in pull and junction boxes:
 - 1. Use self-adhesive vinyl tape to identify phase.
 - 2. For boxes containing more than one circuit, for each circuit, group phases and neutral together and tag with circuit designation.
- F. Workspace Indication: Apply floor marking tape to finished surfaces. Show working clearances in direction of access to live parts. Workspace must comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated.
- G. Equipment Identification Labels:
 - 1. Black letters on white field.
 - 2. Indoor Equipment: Laminated acrylic or melamine plastic sign.
 - 3. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in location provided by panelboard manufacturer. Panelboard identification must be in form of engraved, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Switchboards: Switchboard identification must be in form of engraved, laminated acrylic or melamine label.
 - 1) Provide similar identification label for each feeder.
- H. Cable Ties: General purpose, for attaching tags.

3.3 SELECTION OF SIGNS AND HAZARD MARKINGS

- A. Comply with 29 CFR 1910.145 for danger, caution, warning, and safety instruction signs.
- B. Signs, labels, and tags required for personnel safety must comply with the following standards:
 - 1. Safety Colors: NEMA Z535.1.
 - 2. Facility Safety Signs: NEMA Z535.2.
 - 3. Safety Symbols: NEMA Z535.3.
 - 4. Product Safety Signs and Labels: NEMA Z535.4.
 - 5. Safety Tags and Barricade Tapes for Temporary Hazards: NEMA Z535.5.

- C. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive labels.
 - 1. Apply to exterior of door, cover, or other access.

3.4 INSTALLATION

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes typical for electrical equipment environments specified in Section 260011 "Facility Performance Requirements for Electrical."
- C. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
- D. Fasteners for Labels and Signs: Self-tapping, stainless steel screws or stainless steel machine screws with nuts and flat and lock washers.
- E. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- F. Verify identity of item before installing identification products.
- G. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- H. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- I. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from floor.
- J. Self-Adhesive Vinyl Tape: Secure tight to surface at location with high visibility and accessibility.
 - 1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for minimum distance of 6 inch where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- K. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.

- L. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's instructions.
- M. Nonmetallic Preprinted Tags:
 - 1. Place in location with high visibility and accessibility.
 - 2. Secure using general-purpose cable ties.
- N. Laminated Acrylic or Melamine Plastic Signs: Attach signs that are not self-adhesive type with mechanical fasteners appropriate to location and substrate.

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

A. Section Includes:

1. Low-voltage drawout switchboards.
2. Surge protection devices.
3. Overcurrent protective devices.
4. Instrumentation.
5. Control power.
6. Accessory components and features.

B. Related Requirements

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for field conditions applicable to Work specified in this Section.

1.2 COORDINATION

- A. Coordinate layout and installation of switchboards and components with other construction including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.3 DEFINITIONS

- A. ERMS: Energy reduction maintenance setting.
- B. LVDO: Low-voltage drawout.
- C. SPD: Surge protective device.
- D. SWBD: Switchboard

1.4 ACTION SUBMITTALS

- A. Product Data:

1. Switchboards.
2. Overcurrent protective devices.
3. Surge protection devices.
4. Accessories.
5. Other components.
6. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

B. Shop Drawings: For each switchboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types for types other than UL 50E, Type 1.
3. Detail bus configuration, current, and voltage ratings.
4. Detail short-circuit current rating of switchboards and overcurrent protective devices.
5. Include descriptive documentation of optional barriers specified for electrical insulation and isolation.
6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
7. Include time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.
8. Include diagram and details of proposed mimic bus.
9. Include schematic and wiring diagrams for power, signal, and control wiring.

C. Field Quality-Control Submittals:

1. Field Quality-Control Reports:
 - a. Test procedures used.
 - b. Test results that comply with requirements.
 - c. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.5 INFORMATIONAL SUBMITTALS

- A. Manufacturers' Published Instructions: Record copy of official installation and testing instructions issued to Installer by manufacturer for the following:
1. Handling, storing, and providing temporary heat.
 2. Mounting accessories and anchoring devices.
 3. Testing and adjusting overcurrent protective devices.

- B. Sample warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data:

1. Provide detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.
 - a. Include manufacturer, supplier, support, and repair center contact information.
 - b. Include manufacturer's standard operation and maintenance data assembled for each size and type of equipment furnished.
 - c. Include contact information for parts stocking location closest to Owner.
 - d. Identify critical spare parts associated with long lead times and/or those critical to unit operation.
 - e. Identify maintenance spare parts required to regularly perform scheduled equipment maintenance including, but not limited to, consumable parts required to be exchanged during scheduled maintenance periods.
2. Digital Record Keeping:
 - a. Provide maintenance logbook application/website available on PC/mobile device to assist in compliance with NFPA 70B.
 - b. Include access to manufacturer's standard documentation, equipment serial number, as-built drawings, assembly and testing results, device settings, and spare parts list.
 - c. Provide password-protected access to Owner.
 - d. Provide access via scannable QR code on front face of equipment.

- B. Warranty documentation.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Special Tools: Furnish to Owner proprietary equipment, keys, and software required to operate, maintain, repair, adjust, or implement future changes to switchboards, that are packaged with protective covering for storage on-site and identified with labels describing contents. Include the following:
 1. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

2. Portable Test Set: For testing functions of solid-state trip devices without removing from switchboard. Include relay and meter test plugs suitable for testing switchboard meters and switchboard class relays.
3. Portable Circuit-Breaker Lifting Device: Floor-supported, roller-based, elevating carriage arranged for movement of circuit breakers in and out of compartments for present and future circuit breakers.
4. Remote Racking Device: Provides ability to operate racking mechanism of a low-voltage draw-out circuit breaker from a remote location. Designed to help you reduce the arc flash safety hazard for personnel during installation, startup and maintenance procedures by allowing maintenance personnel the ability to “rack” a low voltage draw-out circuit breaker from a location outside of the arc flash boundary.
5. Equipment Configuration Software: PC-based or mobile device application; provide one of each different communication interface cable required to connect computer/device configuration and programming.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Prior to delivery to project site, verify suitable storage space is available to store materials in well-ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity, and corrosive atmospheres.
- B. Protect materials during delivery and storage and maintain within manufacturer's written storage requirements. At minimum, store indoors in clean, dry space with uniform temperature to prevent condensation and protect electronics from potential damage from electrical and magnetic energy.
- C. Deliver materials to project site in supplier's or manufacturer's original wrappings and containers, labeled with supplier's or manufacturer's name, material or product brand name, and equipment tag number or service name as identified in Contract Documents.
- D. Inspect products and report concealed damage or violation of delivery, storage, and handling requirements to Designer.
- E. Deliver switchboards in sections or lengths that can be moved past obstructions in delivery path.
- F. Remove loose packing and flammable materials from inside switchboards and to prevent condensation.
- G. Handle and prepare switchboards for installation in accordance with NEMA PB 2.1.

1.9 QUALITY ASSURANCE

- A. Comply with the following:
 - 1. NFPA 70.
 - 2. Requirements of local authorities having jurisdiction.
 - 3. Applicable local codes.
- B. Manufacturer Qualifications:
 - 1. Firm engaged in manufacture of specified products of types and sizes required, and whose products have been in satisfactory use in similar service for minimum of 15 years.
 - 2. Certified in accordance with ISO 9001 with applicable quality assurance system regularly reviewed and audited by third-party registrar. Develop and control manufacturing, inspection, and testing procedures under guidelines of quality assurance system.
 - 3. Service, repair, and technical support services available 24 hours per day, 7 days per week from manufacturer or their representative.
 - 4. Certified in accordance with ISO 14001, with product environmental profiles (PEPs) for specified products.
- C. Installer Qualifications: Firm with minimum 10 years experience with equipment of similar type and scope.
- D. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 SWITCHBOARDS

- A. Basis-of-Design Product: Square D; Schneider Electric USA Type QED-6 Power-Style.
- B. Other Manufacturers: Subject to compliance with requirements, in addition to the Basis-of-Design Product, a product provided by one of the following manufacturers is acceptable:
 - 1. ABB, Electrification Business.
 - 2. Eaton.
 - 3. Other manufacturers will be considered provide approval is requested 14 days prior to the receipt of bids. Any other approved manufacturers will be identified by addendum.

- C. Source Limitations: Obtain switchboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.
- D. Product Selection for Restricted Space: Drawings indicate maximum dimensions for switchboards including clearances between switchboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- E. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
- F. Comply with NEMA PB 2.
- G. Comply with NFPA 70.
- H. Comply with UL 891.
- I. Front- and Rear-Accessible Switchboards:
 - 1. Main Devices: Fixed main busway termination without switch or circuit breaker.
 - 2. Branch Devices: Individually compartmented and drawout mounted.
 - 3. Sections front and rear aligned.
- J. Nominal System Voltage: 208Y/120 V.
- K. Main-Bus Continuous: 3000 A.
- L. Indoor Enclosures: Steel, UL 50E, Type 1.
 - 1. Sprinkler Resistant: Provide enclosure with gasketing, driphoods, louvers over ventilation holes, covers over circuit breaker and other potential points of water entry.
- M. Enclosure Finish for Indoor Units: Factory-applied finish in manufacturer's standard gray finish over rust-inhibiting primer on treated metal surface.
- N. Barriers: Between adjacent switchboard sections.
- O. Insulation and isolation for main bus of main section and main and vertical buses of feeder sections.
- P. Customer Metering Compartment: Separate customer metering compartment and section with front hinged door, and section with front hinged door, for indicated metering, and current transformers for each meter. Current

transformer secondary wiring must be terminated on shorting-type terminal blocks.

- Q. Removable, Hinged Rear Doors and Compartment Covers: Secured by captive thumb screws, for access to rear interior of switchboard.
- R. Hinged Front Panels: Allow access to circuit breaker, metering, accessory, and blank compartments.
- S. Buses and Connections: Three phase, four wire unless otherwise indicated.
 - 1. Provide phase bus arrangement A, B, C from front to back, top to bottom, and left to right when viewed from front of switchboard.
 - 2. Phase- and Neutral-Bus Material:
 - a. Hard-drawn copper of 98 percent conductivity, silver-plated.
 - 3. Copper feeder circuit-breaker line connections.
 - 4. Load Terminals: Insulated, rigidly braced, runback bus extensions, of same material as through buses, equipped with compression connectors for outgoing circuit conductors. Provide load terminals for future circuit-breaker positions at full-ampere rating of circuit-breaker position.
 - 5. Ground Bus: Minimum-size required by UL 891, hard-drawn copper of 98 percent conductivity, equipped with compression connectors for feeder and branch-circuit ground conductors.
 - 6. Main-Phase Buses and Equipment-Ground Buses: Uniform capacity for entire length of switchboard's main and distribution sections. Provide for future extensions from both ends.
 - 7. Disconnect Links:
 - a. Isolate neutral bus from incoming neutral conductors.
 - 8. Neutral Buses: 100 percent of ampacity of phase buses unless otherwise indicated, equipped with compression connectors for outgoing circuit neutral cables. Brace bus extensions for busway feeder neutral bus.
 - 9. Isolation Barrier Access Provisions: Permit checking of bus-bolt tightness.
- T. Future Devices: Equip compartments with mounting brackets, supports, bus connections, and appurtenances at full rating of circuit-breaker compartment.
- U. Bus-Bar Insulation: Factory-applied, flame-retardant, tape wrapping of individual bus bars or flame-retardant, spray-applied insulation. Minimum insulation temperature rating of 105 deg C.

2.2 SURGE PROTECTION DEVICES

- A. SPDs: Listed and labeled in accordance with UL 1449.

- B. Features and Accessories:
 - 1. Integral disconnect switch.
 - 2. Internal thermal protection that disconnects SPD before damaging internal suppressor components.
 - 3. Indicator light display for protection status.
 - 4. Surge counter.
- C. Peak Surge Current Rating: Minimum single-pulse surge current withstand rating per phase may not be less than 240 kA per phase. Peak surge current rating must be arithmetic sum of ratings of individual MOVs in each mode.
- D. Protection modes and UL 1449 VPR for grounded wye circuits with 208Y/120 V, three-phase, four-wire circuits may not exceed the following:
 - 1. Line to Neutral: 700 V for 208Y/120 V.
 - 2. Line to Ground: 1200 V for 208Y/120 V.
 - 3. Line to Line: 1000 V for 208Y/120 V.
- E. SCCR: Equal or exceed 100 kA.
- F. Nominal Rating: 20 kA.

2.3 OVERCURRENT PROTECTIVE DEVICES

- A. Insulated-Case Circuit Breaker (ICCB): 100 percent rated, sealed, insulated-case power circuit breaker with interrupting capacity rating to meet available fault current.
 - 1. Drawout circuit-breaker mounting.
 - 2. Manually-operated, two-step, stored-energy closing.
 - 3. Electronic Trip Units:
 - a. Full-function, microprocessor-based trip units with interchangeable rating plug, trip indicators, and the following field-adjustable settings:
 - 1) Instantaneous trip.
 - 2) Time adjustments for long- and short-time pickup.
 - b. Digital Modules:
 - 1) Provide capability to upgrade trip unit functions by uploading digital modules without requiring replacement/modification of hardware.
 - 2) Electronically manage trip unit protection functions independently of measurement functions by dedicated application-specific integrated circuit (ASIC).

- 3) Support uploading of digital modules to trip unit without removing power from circuit breaker.
- c. Provide local and remote trip indication with cause of trip (e.g., overload, short circuit, or ground fault).
- d. Visually indicate circuit breaker operating status (normal, warnings, alarms, energy reduction maintenance setting) via color-changing backlit display.
- e. Provide capability to set breaker locally via smart mobile device, or remotely through communications.
- f. Provide sealable door to block use of local display for deterrence of unwanted protection setting changes.
- g. Support extraction of trip cause data from trip unit and adjustment of protection settings without 24 VDC power supply or when main circuit breaker is OFF using portable power supply connected through USB port, including battery back, smart mobile device (USB OTG), or laptop PC.
- h. Provide true RMS sensing through 40th harmonic; indicate long-time pickup with LEDs.
- i. Coils: Provide status, self-diagnostics (functionality and number of coil operations), and wiring diagnostics. Coils without these features to be provided with separate system to communicate status/alarms to remote monitoring system.
- j. Where indicated on drawings, provide electronic trip units with the following field-adjustable protection settings.

1) Long-Time:

- a) Pickup: Adjustable from 40 to 100 percent of nominal current rating in 1 A increments; where 1 A increments are not possible, provide complete set of rating plugs for each breaker.
- b) Delay: Adjustable from 0.5 to 24 seconds at 600 percent of long-time pickup in 0.5-second increments.

2) Short-Time:

- a) Pickup: Adjustable from 150 to 1,000 percent of long-time pickup in increments of 1 percent.
- b) Delay: Adjustable from 10 to 40 percent of I₂t for ON and 0 to 40 percent of I₂t for OFF in increments of 0.1 second.

3) Instantaneous:

- a) Pickup: Adjustable from 150 percent to 1,500 percent of nominal current rating.

- b) Provide OFF setting where short-time pickup is also provided.
 - c) Selectable Breaking Times:
 - i. Standard: For selective coordination.
 - ii. Fast: For limiting let-thru energy; between 25 and 30 milliseconds.
- k. Where required for selective coordination as determined by power system study, provide inverse definite minimum time lag (IDMTL) to enable adjustment of long-time delay protection slope.
- l. Provide active power function to trip circuit breaker when active power is negative and exceeds settings.
- m. Provide dual trip curve settings for each protection function (LSIG) with separate settings for utility, generator set, or grid sources; selectable by digital input through I/O module, Ethernet, or local display.
- n. Provide communication/test port to check electronic and trip mechanism operation without requiring special hardware tool.
- o. Provide wireless communication interface to support protection settings and health checks using near field communications (NFC) and Bluetooth low energy (BLE) protocols.
- p. Measurement and Analysis Functions:
 - 1) Provide trip unit embedded measurement for real-time metering. Where trip unit embedded measurement is not available, provide external meter for specified functions.
 - 2) Metering Accuracy:
 - a) Current and Voltage: 0.5 percent.
 - b) Power and Energy: 1 percent.
 - c) Specified accuracies are for total measurement system, including CT and meter.
 - d) Full scale over range of 10 to 120 percent of long-term pickup.
 - 3) Energy Measurement:
 - a) Imported and exported energy on each phase of power system network.
 - b) Active, reactive, and apparent energy, per phase and total.
 - 4) Harmonic Analysis and Waveform Capture: Individual harmonics of voltages and currents up to 40th harmonic, calculated every 200 milliseconds in accordance with IEC 61000-4-30.

- 5) Support display of measurements on breaker HMI display, smart mobile device via Bluetooth, connected remote operator interface terminal, or remote monitoring system via Modbus TCP/IP.
- 6) Event Management:
 - a) Provide notification of alarms and traceability, including event history of trips, protection setting changes, diagnostics, metering, configuration, and operation.
 - b) Record date and time entry was made and user ID associated with change.
 - c) Support alarm activation based on measurement or counters.
 - d) Support availability of events by communication via Bluetooth and Modbus TCP/IP or by software design tool.
- 7) Internal Monitored Functions:
 - a) Circuit Breaker: Circuit breaker closing time, circuit breaker closing and opening counter, circuit breaker time stamp closing and opening history log.
 - b) Trip Unit: Internal sensor continuity (CTs), external sensor disconnection (ENCT, ground-fault sensor, I/O modules), internal failure discrimination (ASIC, sensor plugs, internal battery, trip solenoid), wireless communication failure (Bluetooth low energy, Ethernet).
- q. Smart Mobile Device App:
 - 1) Communicate trip cause information to smart mobile device without requiring power to trip unit.
 - 2) Display circuit breaker event information, potential causes, list of additional investigations needed to determine if power can be restored, and recommendations for power restoration.
- r. Auto-Test Function: Monitor and communicate trip unit state, battery state, contact state, circuit breaker remaining life estimate (algorithm based), and spring charging function; indicate by health state LED, embedded HMI display, and smart mobile device app.
4. Communication Capability: Web enabled integral Ethernet communication module and embedded Web server with factory-configured Web pages (HTML file format).

2.4 INSTRUMENTATION

- A. Instrument Transformers: NEMA EI 21.1, and the following:
 - 1. Current Transformers: NEMA EI 21.1; 5 A, 60 Hz, secondary; bar or window type; single secondary winding and secondary shorting device. Burden and accuracy must be consistent with connected metering and relay devices.
 - 2. Control-Power Transformers: Dry type, mounted in separate compartments for units larger than 3 kVA.

- B. Multifunction Digital-Metering Monitor: Microprocessor-based unit suitable for three- or four-wire systems and with the following features:
 - 1. Switch-selectable digital display of the following values with maximum accuracy tolerances as indicated:
 - a. Phase Currents, Each Phase: Plus or minus 0.5 percent.
 - b. Phase-to-Phase Voltages, Three Phase: Plus or minus 0.5 percent.
 - c. Phase-to-Neutral Voltages, Three Phase: Plus or minus 0.5 percent.
 - d. Megawatts: Plus or minus 1 percent.
 - e. Megavars: Plus or minus 1 percent.
 - f. Power Factor: Plus or minus 1 percent.
 - g. Frequency: Plus or minus 0.1 percent.
 - h. Accumulated Energy, Megawatt Hours: Plus or minus 1 percent; accumulated values unaffected by power outages up to 72 hours.
 - i. Megawatt Demand: Plus or minus 1 percent; demand interval programmable from five to 60 minutes.
 - j. Contact devices to operate remote impulse-totalizing demand meter.

 - 2. Mounting: Display and control unit flush or semiflush mounted in instrument compartment door.

2.5 CONTROL POWER

- A. Control Circuits:
 - 1. 120 V(ac), supplied through secondary disconnecting devices from control-power transformer.

- B. Control Wiring: Factory installed, with bundling, lacing, and protection included. Provide flexible conductors for 8 AWG and smaller, for conductors across hinges, and for conductors for interconnections between shipping units.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Receive, inspect, handle, and store switchboards in accordance with NEMA PB 2.1.
 - 1. Lift or move switchboards with spreader bars and manufacturer-supplied lifting straps following manufacturer's published instructions.
 - 2. Use rollers, slings, or other manufacturer-approved methods if lifting straps are not furnished.
 - 3. Protect from moisture, dust, dirt, and debris during storage and installation.
 - 4. Install temporary heating during storage in accordance with manufacturer's published instructions.
- B. Examine switchboards before installation. Reject switchboards that are moisture damaged or physically damaged.
- C. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance of the Work or that affect performance of equipment.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Installation Pathway: Remove and replace doors, lift-out panels, and structures to provide pathway for moving switchboards into place.

3.3 INSTALLATION

- A. Comply with manufacturer's published instructions.
- B. Reference Standards:
 - 1. Switchboards and Accessories: Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NEMA PB 2.1.
 - 2. Consult Designer for resolution of conflicting requirements.
- C. Special Techniques:
 - 1. Equipment Mounting: Install switchboards on floor.

- a. For supported equipment, install epoxy-coated anchor bolts that anchor into structural concrete floor.
 - b. Place and secure anchorage devices. Use setting drawings, templates, diagrams, published instructions, and directions furnished with items to be embedded.
 - c. Install anchor bolts to elevations required for proper attachment to switchboards.
- 2. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, straps and brackets, and temporary blocking of moving parts from switchboard units and components.
 - 3. Operating Instructions: Frame and mount printed basic operating instructions for switchboards. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.
 - 4. Install overcurrent protective devices, surge protection devices, and instrumentation.
 - a. Set field-adjustable switches and circuit-breaker trip ranges.

3.4 CONNECTIONS

- A. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."
- B. Terminate grounding and bonding conductors on common equipment grounding terminal on switchboard enclosure. Install supplemental terminal bars, lugs, and bonding jumpers as required to accommodate number of conductors for termination.
- C. Complete switchgear grounding and surge-protector connections prior to making other electrical connections.
- D. Comply with requirements for terminating source and feeder bus specified in Section 262500 "Enclosed Bus Assemblies." Drawings indicate general arrangement of bus, fittings, and terminations.
- E. Support and secure conductors within switchboard in accordance with NFPA 70.
- F. Extend insulated equipment grounding cable to busway ground connection and support cable at intervals in vertical run.

3.5 PROTECTION

- A. Protect installed switchboards from subsequent construction operations.

3.6 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Switchboard Nameplates: Label each switchboard compartment with nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- C. Device Nameplates: Label each disconnecting and overcurrent protective device and each meter and control device mounted in compartment doors with nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- D. Mimic Bus:
 - 1. Entire single-line switchboard bus work, as depicted on factory record drawing, on engraved minimum 0.0625 inch thick laminated-plastic (Gravoply) nameplate, located at eye level on front cover of switchboard incoming service section.

3.7 FIELD QUALITY CONTROL

- A. Field tests and inspections must be witnessed by Designer and Owner.
- B. Tests and Inspections:
 - 1. Comply with provisions of "Testing and Test Methods" Chapter in NFPA 70B and NETA ATS.
 - 2. After installing switchboard and after electrical circuitry has been energized, test for compliance with requirements.
 - 3. Perform visual and mechanical inspections and electrical tests stated in NETA ATS. Certify compliance with test parameters.
 - 4. Visual and Mechanical Inspection:
 - a. Verify that circuit-breaker sizes and types correspond to Drawings.
 - b. Verify that current and voltage transformer ratios correspond to Drawings.
 - c. Inspect bolted electrical connections for high resistance using one of the following two methods:
 - 1) Use low-resistance ohmmeter to compare bolted-connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of lowest value.

- 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS, Table 100.12. Bolt-torque levels must be in accordance with manufacturer's published data. In absence of manufacturer's published data, use NETA ATS, Table 100.12.
- d. Confirm correct operation and sequencing of electrical and mechanical interlock systems.
 - 1) Attempt closure on locked-open devices. Attempt to open locked-closed devices.
 - 2) Make key exchange with devices operated in off-normal positions.
 - e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
 - f. Inspect insulators for evidence of physical damage or contaminated surfaces.
 - g. Verify correct barrier and shutter installation and operation.
 - h. Exercise active components.
 - i. Inspect mechanical indicating devices for correct operation.
 - j. Verify that filters are in place and that vents are clear.
 - k. Perform visual and mechanical inspection of instrument transformers in accordance with "Instrument Transformer Field Tests" Paragraph.
 - l. Inspect control power transformers.
 - 1) Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.
 - 2) Verify that primary and secondary circuit-breaker ratings match Drawings.
 - 3) Verify correct functioning of drawout disconnecting and grounding contacts and interlocks.
5. Electrical Tests:
- a. Perform DC voltage insulation-resistance tests on bus sections, phase-to-phase and phase-to-ground, for one minute. If bus temperature is other than plus or minus 20 deg C, adjust resulting resistance as provided in NETA ATS, Table 100.11.
 - 1) Insulation-resistance values of bus insulation must be in accordance with manufacturer's published data. In absence of manufacturer's published data, comply with NETA ATS, Table 100.1. Investigate and correct values of insulation

- resistance less than manufacturer's published instructions or NETA ATS, Table 100.1.
- 2) Do not proceed to dielectric withstand voltage tests until insulation-resistance levels are raised above minimum values.
- b. Perform dielectric withstand voltage test on bus sections, phase-to-ground with phases not under test grounded, in accordance with manufacturer's published data. If manufacturer has no recommendation for this test, it must be conducted in accordance with NETA ATS, Table 100.2. Apply test voltage for one minute.
- 1) If no evidence of distress or insulation failure is observed by end of total time of voltage application during dielectric withstand test, test specimen is considered to have passed test.
- c. Perform insulation-resistance tests on control wiring for ground. Applied potential must be 500 V(dc) for 300 V rated cable and 1000 V(dc) for 600 V rated cable. Test duration must be one minute. For units with solid-state components or control devices that cannot tolerate applied voltage, follow manufacturer's published instruction.
- 1) Minimum insulation-resistance values of control wiring may not be less than 2 MΩ.
- d. Control Power Transformers:
- 1) Perform insulation-resistance tests. Perform measurements from winding-to-winding and windings-to-ground. Insulation-resistance values of winding insulation must be in accordance with manufacturer's published data. In absence of manufacturer's published data, comply with NETA ATS, Table 100.1. Investigate and correct values of insulation resistance less than manufacturer's published instructions or NETA ATS, Table 100.1.
 - 2) Perform secondary wiring integrity test. Disconnect transformer at secondary terminals and connect secondary wiring to rated secondary voltage source. Verify correct potential at devices.
 - 3) Verify correct secondary voltage by energizing primary winding with system voltage. Measure secondary voltage with secondary wiring disconnected.
- e. Perform system function tests in accordance with "System Function Tests" Paragraph.
- f. Perform phasing checks to ensure correct bus phasing from source.

C. Circuit-Breaker Field Tests:

1. Visual and Mechanical Inspection:
 - a. Inspect physical and mechanical condition.
 - b. Inspect anchorage, alignment, and grounding.
 - c. Verify that maintenance devices are available for servicing and operating breaker.
 - d. Verify unit is clean.
 - e. Verify that arc chutes are intact.
 - f. Inspect moving and stationary contacts for condition and alignment.
 - g. Verify that primary and secondary contact wipe and other dimensions vital to satisfactory operation of breaker are correct.
 - h. Perform mechanical operator and contact alignment tests on both breaker and its operating mechanism in accordance with manufacturer's published data.
 - i. Verify cell fit and element alignment.
 - j. Verify racking mechanism operation.
 - k. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
 - l. Perform adjustments for final protective-device settings as directed by the Designer.

2. Electrical Tests:
 - a. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to ground with switch closed, and across open poles. Apply voltage in accordance with manufacturer's published data. In absence of manufacturer's published data, use NETA ATS, Table 100.1. Insulation-resistance values must be in accordance with manufacturer's published data. In absence of manufacturer's published data, comply with NETA ATS, Table 100.1. Values of insulation resistance less than Table 100.1 or manufacturer's published instructions must be investigated.
 - b. Measure contact resistance across power contacts of circuit breakers. Drop values for $\mu\Omega$ or mV(dc) may not exceed high levels of normal range as indicated in manufacturer's published data. In absence of manufacturer's published data, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of lowest value.
 - c. Determine long-time pickup and delay by primary current injection. Long-time pickup values must be as specified, and trip characteristic may not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors. If manufacturer's curves are unavailable, trip times may not exceed value shown in NETA ATS, Table 100.7.
 - d. Determine short-time pickup and delay by primary current injection. Short-time pickup values must be as specified, and trip characteristic

may not exceed manufacturer's published time-current tolerance band.

- e. Determine instantaneous pickup value by primary current injection. Instantaneous pickup values must be as specified and within manufacturer's published tolerances. In absence of manufacturer's published data, comply with NETA ATS, Table 100.8.
- f. Verify correct operation of auxiliary features, such as trip and pickup indicators, zone interlocking, electrical close and trip operation, trip-free operation, and trip-unit battery condition. Reset trip logs and indicators. Auxiliary features must operate in accordance with manufacturer's published data.

D. Instrument Transformer Field Tests:

1. Visual and Mechanical Inspection:

- a. Verify that equipment nameplate data complies with Contract Documents.
- b. Inspect physical and mechanical condition.
- c. Verify correct connection of transformers with system requirements.
- d. Verify that adequate clearances exist between primary and secondary circuit wiring.
- e. Verify that unit is clean.
- f. Inspect bolted electrical connections for high resistance using one of the following two methods:
 - 1) Use low-resistance ohmmeter to compare bolted-connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of lowest value.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS, Table 100.12. Bolt-torque levels must be in accordance with manufacturer's published data. In absence of manufacturer's published data, use NETA ATS, Table 100.12.
- g. Verify that required grounding and shorting connections provide contact.
- h. Verify correct operation of transformer withdrawal mechanism and grounding operation.
- i. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.

2. Electrical Tests of Current Transformers:

- a. Perform insulation-resistance test of current transformers and secondary wiring for ground at 1000 V(dc) for one minute. For units with solid-state components that cannot tolerate applied voltage, follow manufacturer's published instructions. Investigate and correct values of insulation resistance less than manufacturer's published instructions or NETA ATS, Table 100.5.
- b. Perform polarity test on current transformers in accordance with IEEE C57.13.1. Polarity results must agree with transformer markings.
- c. Perform ratio-verification test using voltage or current method in accordance with IEEE C57.13.1. Ratio errors must be in accordance with IEEE C57.13.
- d. Measure current circuit burdens at transformer terminals in accordance with IEEE C57.13.1. Measured burdens must be compared to, and must match, instrument transformer ratings.
- e. Perform power-factor or dissipation-factor tests in accordance with test equipment manufacturer's published data.
- f. Verify that current transformer secondary circuits are grounded and have only one grounding point in accordance with IEEE C57.13.3.

E. Ground-Resistance Test:

1. Visual and Mechanical Inspection:

- a. Verify that ground system complies with Contract Documents and with Article 250, "Grounding and Bonding," in NFPA 70.
- b. Inspect physical and mechanical condition. Grounding system electrical and mechanical connections must be free of corrosion.
- c. Inspect bolted electrical connections for high resistance using one of the following two methods:
 - 1) Use low-resistance ohmmeter to compare bolted-connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of lowest value.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS, Table 100.12. Bolt-torque levels must be in accordance with manufacturer's published data. In absence of manufacturer's published data, use NETA ATS, Table 100.12.
- d. Inspect anchorage.

2. Electrical Tests:

- a. Perform point-to-point tests to determine resistance between main grounding system and major electrical equipment frames, system neutral, and derived neutral points. Investigate point-to-point resistance values that exceed 0.5 Ω . Compare equipment nameplate data with the Contract Documents.
- b. Inspect physical and mechanical condition.
- c. Inspect bolted electrical connections for high resistance using one of the following two methods:
 - 1) Use low-resistance ohmmeter to compare bolted-connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of lowest value.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS, Table 100.12. Bolt-torque levels must be in accordance with manufacturer's published data. In absence of manufacturer's published data, use NETA ATS, Table 100.12.

F. Metering Devices Field Tests:

1. Visual and Mechanical Inspection:

- a. Inspect physical and mechanical condition.
- b. Inspect bolted electrical connections for high resistance using one of the following two methods:
 - 1) Use low-resistance ohmmeter to compare bolted-connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of lowest value.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS, Table 100.12. Bolt-torque levels must be in accordance with manufacturer's published data. In absence of manufacturer's published data, use NETA ATS, Table 100.12.
- c. Verify that unit is clean.

2. Electrical Tests:

- a. Verify accuracy of meters at cardinal points. Meter accuracy must be in accordance with manufacturer's published data.
- b. Verify instrument multipliers. Instrument multipliers must be in accordance with system design specifications.

- c. Verify that current transformer and voltage secondary circuits are intact. Test results must confirm integrity of secondary circuits of current transformers.
- G. Manufacturer Services:
- 1. Engage factory-authorized service representative to supervise field tests and inspections.
- H. Nonconforming Work:
- 1. Switchboard will be considered defective if it does not pass tests and inspections.
 - 2. Remove and replace defective units and retest.
- I. Collect, assemble, and submit test and inspection reports, including certified report that identifies switchboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.8 MAINTENANCE

- A. Infrared Inspection: Perform survey during periods of maximum possible loading. Remove covers prior to inspection.
- 1. After Substantial Completion, but not more than 60 days after Final Acceptance, perform infrared inspection of electrical power connections of switchboard.
 - 2. Instrument: Inspect distribution systems with imaging equipment capable of detecting minimum temperature difference of 1 deg C at 30 deg C.
 - 3. Record of Infrared Inspection: Prepare certified report that identifies testing technician and equipment used and that lists results as follows:
 - a. Description of equipment to be tested.
 - b. Discrepancies.
 - c. Temperature difference between area of concern and reference area.
 - d. Probable cause of temperature difference.
 - e. Areas inspected. Identify inaccessible and unobservable areas and equipment.
 - f. Identify load conditions at time of inspection.
 - g. Provide photographs and thermograms of deficient area.
 - 4. Act on inspection results in accordance with recommendations in NETA ATS, Table 100.18. Correct possible and probable deficiencies as soon as Owner's operations permit. Retest until deficiencies are corrected.

5. Follow-up Infrared Scanning: Perform additional follow-up infrared scan of switches 11 months after date of Substantial Completion.

3.9 TRAINING

- A. Train Owner's personnel on operation and maintenance of system.
 1. Accommodate minimum of six attendees.
 2. Provide one session with four hours of classroom and hands-on training.
 3. Training Reference: Provide manuals and documentation for each participant.
 4. Instructor: Factory-trained manufacturer's representative.
 5. Location: Project site.

- B. Provide sufficient time and detail to cover the following at minimum:
 1. Operation theory.
 2. Major equipment components.
 3. Equipment operation.
 4. Equipment configurations.
 5. Maintenance, troubleshooting, and repair.
 6. Component-level parts replacement.

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

A. Section Includes:

1. Power panelboards.
2. Overcurrent protective devices.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for field conditions applicable to Work specified in this Section.

1.2 DEFINITIONS

A. MCCB: Molded-case circuit breaker.

B. VPR: Voltage protection rating.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Power panelboards.
2. Overcurrent protective devices.
3. Include materials, overcurrent protective devices, accessories, and components indicated.
4. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details.
2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.
3. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
4. Detail bus configuration, current, and voltage ratings.

5. Short-circuit current rating of panelboards and overcurrent protective devices.
6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
7. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device. Include Internet link for electronic access to downloadable PDF of coordination curves.

C. Field Quality-Control Submittals:

1. Field quality-control reports.

1.4 INFORMATIONAL SUBMITTALS

- A. Panelboard Schedules: For installation in panelboards.
- B. Manufacturers' Published Instructions: Record copy of official installation and testing instructions issued to Installer by manufacturer for the following:
 1. Recommended procedures for installing panelboards.
 2. Recommended torque settings for bolted connections on panelboards.
 3. Recommended temperature range for energizing panelboards.
- C. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Warranty documentation.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Spare Parts: Furnish to Owner spare parts, for repairing panelboards, that are packaged with protective covering for storage on-site and identified with labels describing contents. Include the following:
 1. Keys: Two spares for each type of panelboard cabinet lock.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.

- B. Handle and prepare panelboards for installation in accordance with NEMA PB 1.

PART 2 - PRODUCTS

2.1 PANELBOARDS COMMON REQUIREMENTS

- A. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- B. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing agency recognized by authorities having jurisdiction, and marked for intended location and application.
- C. Comply with NEMA PB 1.
- D. Comply with NFPA 70.
- E. Enclosures: Surface-mounted, dead-front cabinets.
 - 1. Rated for environmental conditions at installed location.
 - a. Indoor, Area Protected by Fire Sprinklers: UL 50E, Type 3R.
 - 2. Height: 7.25 ft maximum.
 - 3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims must cover live parts and may have no exposed hardware.
 - 4. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims must cover live parts and may have no exposed hardware.
 - 5. Finishes:
 - a. Panels and Trim: Steel and galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
 - b. Back Boxes: Same finish as panels and trim.
- F. Incoming Mains:
 - 1. Location: As required for application.
- G. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.
 - a. Plating must run entire length of bus.
 - b. Bus must be fully rated for entire length.
 2. Interiors must be factory assembled into unit. Replacing switching and protective devices may not disturb adjacent units or require removing main bus connectors.
 3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
 4. Full-Sized Neutral: Mount electrically isolated from enclosure.
 5. Do not mount neutral bus in gutter.
- H. Conductor Connectors: Suitable for use with conductor material and sizes.
1. Material: Hard-drawn copper, 98 percent conductivity.
 2. Terminations must allow use of 75 deg C rated conductors without derating.
 3. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.
 4. Main and Neutral Lugs: Compression type, with lug on neutral bar for each pole in panelboard.
 5. Ground Lugs and Bus-Configured Terminators: Compression type, with lug on bar for each pole in panelboard.
 6. Feed-Through Lugs: Compression type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
- I. Future Devices: Panelboards must have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- J. Panelboard Short-Circuit Current Rating:
1. Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed, by qualified electrical testing laboratory recognized by authorities having jurisdiction, for 100 percent interrupting capacity.

2.2 POWER PANELBOARDS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
1. [ABB, Electrification Business.](#)
 2. [Eaton.](#)
 3. [Square D; Schneider Electric USA.](#)

4. Other manufacturers will be considered provide approval is requested 14 days prior to the receipt of bids. Any other approved manufacturers will be identified by addendum.
- B. Listing Criteria: NEMA PB 1, distribution type.
- C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
 1. For doors more than 36 inch high, provide two latches, keyed alike.
- D. Mains: Lugs only.
- E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
- F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers.

2.3 OVERCURRENT PROTECTIVE DEVICES

- A. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.
 1. Thermal-Magnetic Circuit Breakers:
 - a. Inverse time-current element for low-level overloads.
 - b. Instantaneous magnetic trip element for short circuits.
 2. Electronic Trip Circuit Breakers:
 - a. RMS sensing.
 - b. Field-replaceable rating plug or electronic trip.
 - c. Digital display of settings, trip targets, and indicated metering displays.
 - d. Multi-button keypad to access programmable functions and monitored data.
 - e. Ten-event, trip-history log. Each trip event must be recorded with type, phase, and magnitude of fault that caused trip.
 - f. Integral test jack for connection to portable test set or laptop computer.
 - g. Field-Adjustable Settings:
 - 1) Instantaneous trip.
 - 2) Long- and short-time pickup levels.
 - 3) Long and short time adjustments.
 3. MCCB Features and Accessories:

- a. Standard frame sizes, trip ratings, and number of poles.
- b. Breaker handle indicates tripped status.
- c. Lugs: Compression style, suitable for number, size, trip ratings, and conductor materials.
- d. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.
- e. Rating Plugs: Three-pole breakers with ampere ratings greater than 150 A must have interchangeable rating plugs or electronic adjustable trip units.
- f. Multipole units enclosed in single housing with single handle.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.
- B. Receive, inspect, handle, and store panelboards in accordance with NEMA PB 1.1.
- C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.
- D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's published instructions.
- B. Reference Standards:
 - 1. Panelboards: Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NEMA PB 1.1.
 - 2. Consult Designer for resolution of conflicting requirements.
- C. Special Techniques:
 - 1. Equipment Mounting:

- a. Install panelboards on cast-in-place concrete equipment bases or metal strut framing system stand, as indicated.
 - b. Even if floor or stand mounted, all panelboard cabinets must still be securely attached to a vertical wall or surface.
 - c. Mount surface-mounted panelboards to steel slotted supports 5/8 inch in depth. Orient steel slotted supports vertically.
2. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.
 3. Mount top of trim 7.5 ft above finished floor unless otherwise indicated.
 4. Mount panelboard cabinet plumb and rigid without distortion of box.
 5. Install overcurrent protective devices and controllers not already factory installed.
 - a. Set field-adjustable, circuit-breaker trip ranges.
 - b. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver in accordance with manufacturer's published instructions.
 6. Make grounding connections. Make connections to grounding electrodes and connections to separate ground bars.
 7. Install filler plates in unused spaces.
 8. Arrange conductors in gutters into groups and bundle and wrap with wire ties.
- D. Interfaces with Other Work:
1. Coordinate layout and installation of panelboards and components with other construction including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems."
- B. Panelboard Nameplates: Label each panelboard with nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- C. Device Nameplates: Label each branch circuit device in power panelboards with nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

- D. Install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems" identifying source of remote circuit.
- E. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles must be located on interior of panelboard door.
- F. Breaker Labels: Faceplate must list current rating, UL and IEC certification standards, and AIC rating.
- G. Circuit Directory:
 - 1. Provide directory card inside panelboard door, mounted in metal frame with transparent protective cover.
 - a. Circuit directory must identify specific purpose with detail sufficient to distinguish it from other circuits.

3.4 FIELD QUALITY CONTROL

- A. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- B. Field tests and inspections must be witnessed by Designer.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers stated in NETA ATS, Paragraph 7.6 Circuit Breakers. Do not perform optional tests. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 3. Perform the following infrared scan tests and inspections and prepare reports:
 - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
 - b. Follow-up Infrared Scanning: Perform additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
 - c. Instruments and Equipment:

- 1) Use infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

D. Nonconforming Work:

1. Panelboards will be considered defective if they do not pass tests and inspections.
2. Remove and replace defective units and retest.

E. Collect, assemble, and submit test and inspection reports, including certified report that identifies panelboards included and that describes scanning results, with comparisons of two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

F. Manufacturer Services:

1. Engage factory-authorized service representative to supervise field tests and inspections.

3.5 **ADJUSTING**

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as directed by the Designer.

END OF SECTION

SECTION 262500 LOW-VOLTAGE ENCLOSED BUS ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Enclosed bus assemblies.

B. Existing Busway:

1. The enclosed bus specified in the section connects to, extends, and shall be compatible with the following existing busway.
 - a. 3000 A busway: 600 V, 3P/4W, 100% Neutral, 100 KA (3s) short circuit rated, Square D, I-Line II Aluminum Feeder Busway, Catalog No. AF2530G and associated fittings.
 - b. 1350 A busway: 277/480 V, 3P/4W, 100% Neutral, Square-D Series 3, I-Line Aluminum Feeder Busway, Catalog No. AF-513 and associated fittings.

C. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for field conditions applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Shop Drawings: For each type of product.

1. Show fabrication and installation details for enclosed bus assemblies. Include plans, elevations, and sections of components. Designate components and accessories, including clamps, brackets, hanger rods, connectors, straight lengths, and fittings.
2. Show fittings, materials, fabrication, and installation methods.
3. Indicate required clearances, method of field assembly, and location and size of each field connection.
4. Detail connections to switchboards and existing busways.

1.3 **INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

1.4 **DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, and handle enclosed bus assemblies according to NEMA BU 1.1, "General Instructions for Handling, Installation, Operation, and Maintenance of Busway Rated 600 Volts or Less."

PART 2 - PRODUCTS

2.1 **ASSEMBLY DESCRIPTIONS**

- A. Source Limitations: Obtain enclosed bus assemblies from single source from single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with UL 857.

2.2 **ENCLOSED BUS ASSEMBLIES**

- A. Feeder-Bus Assemblies: Low-impedance bus assemblies in totally enclosed, nonventilated housing; single-bolt joints; ratings as indicated.
- B. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1. **ABB, Electrification Business.**
 - 2. **Eaton.**
 - 3. **Square D; Schneider Electric USA.**
 - 4. Other manufacturers will be considered provide approval is requested 10 days prior to the receipt of bids. Any other approved manufacturers will be identified by addendum.
 - 5. Electrical Characteristics:
 - a. Voltage: 120/208 V.
 - b. Phase: Three; 4 wire.
 - c. Percent of Neutral Capacity: 100.
 - 6. Short-Circuit Interrupting Rating: 100 symmetrical kAIC.

7. Temperature Rise: 55 deg C above 40 deg C ambient maximum for continuous rated current.
8. Bus Materials: Current-carrying aluminum conductors, fully insulated with Class 130C insulation except at joints; plated surface at joints.
9. Voltage Drop:
 - a. Measure voltage drop at 30 deg C ambient with bus thermally stabilized at full rated load.
 - b. Three-phase, line-to-line voltage drop less than 3.1 V per 100 ft. at 40 percent power factor.
10. Ground: 50 percent capacity, internal bus bar of material matching bus material.
11. Enclosure: Steel, with manufacturer's standard finish.
 - a. IP54 rated for protection against damage from fire protection sprinkler systems.
12. Fittings and Accessories: Manufacturer's standard.
13. Mounting: Arranged flat, edgewise, or vertically without derating. Rated for hanger spacing of up to 10 ft. for horizontally mounted runs and up to 16 ft. for vertically mounted runs.

C. Joints:

1. Busway joints must use one high-strength steel bolt with Belleville washers.
2. Bolts must be torque indicating type and at ground potential.
3. Bolts must be two-headed design to indicate when proper torque has been applied and require only a standard long handle wrench to be properly activated.
4. Access must be required to only one side of the busway for tightening joint bolts.
5. Joint connection assemblies must be removable without disturbing adjacent busway lengths.
6. Joint connection assemblies that rely on the joint cover to provide ground continuity are unacceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Coordinate layout and installation of enclosed bus assemblies and suspension system with other existing and proposed construction.

- B. Support bus assemblies independent of supports for other elements such as equipment enclosures at connections to switchboards, pipes, conduits, ceilings, and ducts.
 - 1. Design each fastener and support to carry 200 lb or 4 times the weight of bus assembly, whichever is greater.
 - 2. Support bus assembly to prevent twisting from eccentric loading.
 - 3. Support bus assembly with not less than 3/8 inch steel rods. Install side bracing to prevent swaying or movement of bus assembly. Modify supports after completion to eliminate strains and stresses on bus bars and housings.
 - 4. Fasten supports securely to building structure according to Section 260529 "Hangers and Supports for Electrical Systems."
 - 5. Bolts and nuts that are loosened for any reason after tightening to manufacturer's recommended torque setting must be discarded and replaced with new bolts and nuts.
- C. Coordinate bus-assembly terminations to equipment enclosures to ensure proper phasing, connection, and closure.
- D. Tighten bus-assembly joints with torque wrench or similar tool recommended by bus-assembly manufacturer. Tighten joints again after bus assemblies have been energized for 30 days.

3.2 CONNECTIONS

- A. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- B. Terminate to switchboard enclosures with matching bus assemblies according to Section 262413 "Switchboards."

3.3 FIELD QUALITY CONTROL

- A. Field tests must be witnessed by Designer.
- B. Tests and Inspections:
 - 1. After installing equipment, test for compliance with requirements according to NETA ATS.
 - 2. Visual and Mechanical Inspection:
 - a. Compare equipment nameplate data with Drawings and Specifications.
 - b. Inspect physical and mechanical condition.
 - c. Inspect anchorage, alignment, and grounding.

- d. Verify correct connection according to single-line diagram.
 - e. Inspect bolted electrical connections for high resistance using one or more of the following methods:
 - 1) Use of low-resistance ohmmeter.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data.
 - 3) Perform thermographic survey.
3. Electrical Tests:
- a. Perform insulation resistance measurements through bolted connections and bus joints with low-resistance ohmmeter.
 - b. Perform insulation resistance tests of each busway, phase to phase, and phase to ground.
 - c. Perform a dielectric withstand voltage test on each busway, phase to ground with phases not under test grounded for one minute.
 - d. Measure resistance of assembled busway sections on insulated busway and compare values with adjacent phases.
 - e. Perform phasing test on each busway tie section energized by separate sources.
 - f. Verify operation of busway space heaters.
- C. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.
- 1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - 2. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
 - 3. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
- D. Test Labeling: On completion of satisfactory testing of each unit, attach a dated and signed "Satisfactory Test" label to tested component.
- E. Nonconforming Work:
- 1. Enclosed bus assemblies will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports.

3.4 ADJUSTING

- A. Set field-adjustable, circuit-breaker trip ranges and overload relay trip settings as indicated.

3.5 CLEANING

- A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

3.6 PROTECTION

- A. Provide final protection to ensure that moisture does not enter bus assembly.

END OF SECTION

FORM OF PROPOSAL

Buncombe County Courthouse Electrical Upgrades

Contract: _____

Buncombe County, North Carolina

Bidder: _____

Date: _____

The undersigned, as bidder, hereby declares that the only person or persons interested in this proposal as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this proposal or in the contract to be entered into; that this proposal is made without connection with any other person, company or parties making a bid or proposal; and that it is in all respects fair and in good faith without collusion or fraud. The bidder further declares that he has examined the site of the work and the contract documents relative thereto, and has read all special provisions furnished prior to the opening of bids; that he has satisfied himself relative to the work to be performed. The bidder further declares that he and his subcontractors have fully complied with NCGS 64, Article 2 in regards to E-Verification as required by Section 2.(c) of Session Law 2013-418, codified as N.C. Gen. Stat. § 143-129(j).

The Bidder proposes and agrees if this proposal is accepted to contract with Buncombe County, North Carolina in the form of contract specified below, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the construction of the Buncombe County Courthouse Electrical Upgrades including demolition of electrical switchboard, relocation of branch circuits and feeders, providing switchboard and panelboards, providing wire, conduit and appurtenances necessary to provide a complete and operational main switchboard and feeders in complete accordance with the plans, specifications and contract documents, to the full and entire satisfaction of Buncombe County and McGill Associates with a definite understanding that no money will be allowed for extra work except as set forth in the General Conditions and the contract documents, for the sum of:

SINGLE PRIME ELECTRICAL CONSTRUCTION CONTRACT:

Base Bid:

_____ Dollars(\$)

General Subcontractor:

Plumbing Subcontractor:

_____ Lic _____

_____ Lic _____

Mechanical Subcontractor:

Electrical Subcontractor:

_____ Lic _____

_____ Lic _____

GS143-128(d) requires all single prime bidders to identify their subcontractors for the above subdivisions of work. 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.

MINORITY BUSINESS PARTICIPATION REQUIREMENTS

Provide with the bid - Under GS 143-128.2(c) the undersigned bidder shall identify **on its bid** (Identification of Minority Business Participation Form) the minority businesses that it will use on the project with the total dollar value of the bids that will be performed by the minority businesses. **Also** list the good faith efforts (Affidavit **A**) made to solicit minority participation in the bid effort.

NOTE: A contractor that performs all of the work with its own workforce may submit an Affidavit (**B**) to that effect in lieu of Affidavit (**A**) required above. The MB Participation Form must still be submitted even if there is zero participation.

After the bid opening - The Owner will consider all bids and alternates and determine the lowest responsible, responsive bidder. Upon notification of being the apparent low bidder, the bidder shall then file within 72 hours of the notification of being the apparent lowest bidder, the following:

An Affidavit (**C**) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the 10% goal established. This affidavit shall give rise to the presumption that the bidder has made the required good faith effort and Affidavit **D** is not necessary;

*** OR ***

If less than the 10% goal, Affidavit (**D**) of its good faith effort to meet the goal shall be provided. The document must include evidence of all good faith efforts that were implemented, including any advertisements, solicitations and other specific actions demonstrating recruitment and selection of minority businesses for participation in the contract.

Note: Bidders must always submit **with their bid** the Identification of Minority Business Participation Form listing all MB contractors, vendors and suppliers that will be used. If there is no MB participation, then enter none or zero on the form. Affidavit **A** **or** Affidavit **B**, as applicable, also must be submitted with the bid. Failure to file a required affidavit or documentation with the bid or after being notified apparent low bidder is grounds for rejection of the bid.

Proposal Signature Page

The undersigned further agrees that in the case of failure on his part to execute the said contract and the bonds within ten (10) consecutive calendar days after being given written notice of the award of contract, the certified check, cash or bid bond accompanying this bid shall be paid into the funds of the owner's account set aside for the project, as liquidated damages for such failure; otherwise the certified check, cash or bid bond accompanying this proposal shall be returned to the undersigned.

Respectfully submitted this day of _____

(Name of firm or corporation making bid)

WITNESS:

(Proprietorship or Partnership)

By: _____
Signature

Name: _____
Print or type

Title _____
(Owner/Partner/Pres./V.Pres)

Address _____

ATTEST:

By: _____

Title: _____
(Corp. Sec. or Asst. Sec. only)

License No. _____

Federal I.D. No. _____

Email Address: _____

(CORPORATE SEAL)

Addendum received and used in computing bid:

Addendum No. 1 _____ Addendum No. 3 _____ Addendum No. 5 _____ Addendum No. 6 _____

Addendum No. 2 _____ Addendum No. 4 _____ Addendum No. 6 _____ Addendum No. 7 _____

State of North Carolina AFFIDAVIT A – Listing of Good Faith Efforts

County of _____

(Name of Bidder)

Affidavit of _____

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

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

- 1 – (10 pts)** Contacted minority businesses that reasonably could have been 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 --(10 pts)** 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 – (15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- 4 – (10 pts)** 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 businesses.
- 5 – (10 pts)** Attended prebid meetings scheduled by the public owner.
- 6 – (20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- 7 – (15 pts)** 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 – (25 pts)** 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 – (20 pts)** 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 - (20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) 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: _____



State of _____, 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 _____

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 Bidder agrees to make a Good Faith Effort to utilize minority suppliers where possible.

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: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20__

Notary Public _____

My commission expires _____

State of North Carolina - AFFIDAVIT C - Portion of the Work to be Performed by HUB Certified/Minority Businesses

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the portion of the work to be executed by HUB certified/minority businesses as defined in GS143-128.2(g) and 128.4(a),(b),(e) is equal to or greater than 10% of the bidders total contract price, then the bidder must complete this affidavit.
 This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

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

_____ (Project Name)
 Project ID# _____ Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. Attach additional sheets if required

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

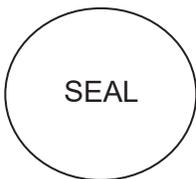
Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

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: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

State of North Carolina AFFIDAVIT D – Good Faith Efforts

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the goal of 10% participation by HUB Certified/ minority business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

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

Project ID# _____ (Project Name) Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with HUB certified/ minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. (Attach additional sheets if required)

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Examples of documentation that may be required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

- A. Copies of solicitations 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 of 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: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS THAT _____
_____ as
principal, and _____, as surety, who is
duly licensed to act as surety in North Carolina, are held and firmly bound unto the County
of Buncombe, State of North Carolina through
_____ as obligee, in the penal sum of
_____ DOLLARS, lawful money of the United States of
America, for the payment of which, well and truly to be made, we bind ourselves, our heirs,
executors, administrators, successors and assigns, jointly and severally, firmly by these
presents.

Signed, sealed and dated this ____ day of ____ 20__

WHEREAS, the said principal is herewith submitting proposal for Buncombe County
Courthouse Electrical Upgrades,

and the principal desires to file this bid bond in lieu of making the cash deposit as
required by G.S. 143-129.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION is such, that
if the principal shall be awarded the contract for which the bid is submitted and shall
execute the contract and give bond for the faithful performance thereof within ten days after
the award of same to the principal, then this obligation shall be null and void; but if the
principal fails to so execute such contract and give performance bond as required by G.S.
143-129, the surety shall, upon demand, forthwith pay to the obligee the amount set forth in
the first paragraph hereof. Provided further, that the bid may be withdrawn as provided by
G.S. 143-129.1

_____(SEAL)

_____(SEAL)

_____(SEAL)

_____(SEAL)

_____(SEAL)

FORM OF SINGLE PRIME CONSTRUCTION CONTRACT

THIS AGREEMENT, made the __day of _____ in the year of 20__ by and between _____, hereinafter called the Party of the First Part (the “Contractor”), and Buncombe County, a body politic and corporate organized under the laws of the state of North Carolina, hereinafter called the Party of the Second Part (the “Owner”).

WITNESSETH:

That the Party of the First Part and the Party of the Second Part for the consideration herein named agree as follows:

- 1. Scope of Work: This agreement concerns _____ to be performed by The Party of the First Part. The Party of the First Part shall furnish and deliver all materials, and perform all of the work in the manner and form as provided by the approved design drawings and specifications from the preconstruction phase, and those items not on the approved design to ensure the project is functional and complete. These plans, specifications and documents to be titled “_____,” are attached hereto and made a part hereof as if fully contained herein (*such documents may include: advertisements; Instructions to Bidders; General Conditions; Supplementary General Conditions; specifications; accepted proposal; contract; performance bond; payment bond; power of attorney; workmen’s compensation; public liability; property damage and builder’s risk insurance certificates*):
 - i. **Scope of Work**
 - ii. **Buncombe County Construction Contract General Conditions of the Contract**
 - iii. **Buncombe County’s Invitation for Construction Bids**
 - iv. **Responsive Bid Bond**
 - v. **RFP Bidder Info Workbook**
 - vi. **Certificate of Insurance**
 - vii. **Performance and Payment Bonds**

Project Name: _____

- 2. That the Party of the First Part shall commence work to be performed under this agreement on a date to be specified in a written order of the Party of the Second Part and shall fully complete all work hereunder within ___consecutive calendar days from said date. For each day in excess thereof, liquidated damages shall be as stated in General and Supplementary General Conditions. The Party of the First Part, as one of the considerations for the awarding of this contract, shall furnish to the Party of the Second Part a construction schedule setting forth planned progress of the project broken down by the various divisions or part of the work and by calendar days as outlined in Article 14 of the General Conditions of the Contract.

3. The Party of the Second Part hereby agrees to pay to the Party of the First Part for the faithful performance of this agreement, subject to additions and deductions as provided in the specifications or proposal, in lawful money of the United States as follows:

_____dollars and 00/100 Dollars (\$_____)

4. In accordance with Article 31 and Article 32 of the General Conditions of the Contract, the Party of the Second Part shall review, and if approved, process the Party of the First Party's pay request within 30 days upon receipt. The Party of the Second Part, after reviewing and approving said pay request, shall make payments to the Party of the First Part on the basis of a duly certified and approved estimate of work performed during the preceding calendar month by the First Party, less five percent (5%) of the amount of such estimate which is to be retained by the Second Party until all work has been performed strictly in accordance with this agreement and until such work has been accepted by the Second Party. The Second Party may elect to waive retainage requirements after 50 percent of the work has been satisfactorily completed on schedule as referred to in Article 31 of the General Conditions.
5. The Party of the First Part shall perform the work associated with this Agreement in such a manner as not to void any warranties, including those for labor, materials, or parts, that are held by the Owner and/or schools systems, colleges, and/or their respective governing bodies, and/or that are applicable to the property on which any activities under this contract occur, and/or that remain in effect on any of the locations at which the Party of the First Part is performing work associated with this Agreement. The Owner and/or schools systems, colleges, and/or their respective governing bodies upon whose property any activities under this contract occur, may allow for the issuer of any such warranties to inspect the drawings, specifications, and/or the work performed by the Party of the First Part to ensure that any such warranties remain valid for their remaining term. The Owner of the property on which the work is being performed shall be responsible for providing notice to the issuers of any warranties, unless such property is occupied by a schools system, college, and/or its respective governing body, in which case the school system, college, or its respective governing bodies for which the work is being performed shall be responsible for providing such notice.
6. Upon submission by the First Party of evidence satisfactory to the Second Party that all payrolls, material bills and other costs incurred by the First Party in connection with the construction of the work have been paid in full, final payment on account of this agreement shall be made within thirty (30) days after the completion by the First Party of all work covered by this agreement and the acceptance of such work by the Second Party.
7. It is further mutually agreed between the parties hereto that if at any time after the execution of this agreement and the surety bonds hereto attached for its faithful performance, the Second Party shall deem the surety or sureties upon such bonds to be unsatisfactory, or if, for any reason, such bonds cease to be adequate to cover the performance of the work, the First Party shall, at its expense, within five (5) days after the receipt of notice from the Second Party so to do, furnish an additional bond or bonds in such form and amount, and

with such surety or sureties as shall be satisfactory to the Second Party. In such event no further payment to the First Party shall be deemed to be due under this agreement until such new or additional security for the faithful performance of the work shall be furnished in manner and form satisfactory to the Second Party.

8. The Party of the First Part attests that it and all of its subcontractors have fully complied with all requirements of NCGS 64 Article 2 in regards to E-Verification as required by Section 2.(c) of Session Law 2013-418, codified as N.C. Gen. Stat. § 143-129(j).

{Signature Pages Follow}

NOW THEREFORE, the parties hereby make, agree, and execute this Contract by the below signatures of duly authorized officials or agents.

CONTRACTOR

By: _____
(Signature)

(Printed Name)

(Title)

(Date)

STATE OF _____
COUNTY OF _____

I, _____, a Notary Public of the county and State aforesaid, do hereby certify that _____ personally appeared before me this day and voluntarily acknowledged the due execution of the foregoing instrument.

Witness my hand and notarial seal this _____ day of _____, 20____

My commission expires: _____

Notary Public

BUNCOMBE COUNTY

By: _____
(Signature)

(Printed Name)

(Title)

(Date)

STATE OF _____
COUNTY OF _____

I, _____, a Notary Public of the county and State aforesaid, do hereby certify that _____ personally appeared before me this day and voluntarily acknowledged the due execution of the foregoing instrument.

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

My commission expires: _____

Notary Public

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

Buncombe County Finance Director

FORM OF PERFORMANCE BOND

Date of Contract: _____

Date of Execution: _____

Name of Principal (Contractor): _____

Name of Surety: _____

Name of Contracting Body: Buncombe County, a body politic and Corporate

Amount of Bond: _____

Project: _____

KNOW ALL MEN BY THESE PRESENTS, that we, the principal and surety, a surety company authorized to do business in North Carolina, above named, are held and firmly bound unto the above named contracting body, hereinafter called 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, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the contracting body, identified 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 well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements 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 this 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.

{Signature Pages Follow}

NOW THEREFORE, the parties hereby make, agree, and execute this Performance Bond by the below signatures of duly authorized officials or agents.

CONTRACTOR

WITNESS

By: _____
(Signature)

(Printed Name)

(Title)

(Date)

(Signature)

(Printed Name)

(Title)

(Date)

SURETY COMPANY

WITNESS

_____,
A Company Licensed to do Business in N.C.

By: _____
(Signature)

(Printed Name)

(Title)

(Date)

(Signature)

(Printed Name)

(Title)

(Date)

(Surety Corporate Seal)

REGISTERED AGENT

(An authorized agent of the Surety Company who is licensed to do business in North Carolina must Countersign)

(Signature)

(Printed Name)

(Title)

(Date)

Sheet for Attaching Insurance Certificates

FORM OF PAYMENT BOND

Date of Contract: _____
Date of Execution: _____
Name of Principal
(Contractor) _____
Name of Surety: _____
Name of Contracting
Body: _____
Amount of Bond: _____
Project _____

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 called 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, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the contracting body identified as shown above and hereto attached:

NOW, THEREFORE, if the principal shall promptly make payment to all persons supplying labor/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 this 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.

Executed in _____ counterparts.

Witness:

(Proprietorship or Partnership)

Attest: (Corporation)

By: _____

Title: _____
(Corp. Sec. or Asst. Sec.. only)

(Corporate Seal)

Witness:

Countersigned:

(N.C. Licensed Resident Agent)

Name and Address-Surety Agency

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

Contractor: (Trade or Corporate Name)

By: _____

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

(Surety Company)

By: _____

Title: _____
(Attorney in Fact)

(Surety Corporate Seal)

Sheet for Attaching Power of Attorney

STATE OF NORTH CAROLINA
 COUNTY SALES AND USE TAX REPORT
 SUMMARY TOTALS AND CERTIFICATION

CONTRACTOR: _____

Page 1 of _____

PROJECT: _____

FOR PERIOD: _____

	TOTAL FOR COUNTY OF:	TOTAL ALL COUNTIES				
CONTRACTOR						
SUBCONTRACTOR(S)*						
COUNTY TOTAL						

* Attach subcontractor(s) report(s)
 ** Must balance with Detail Sheet(s)

I certify that the above figures do not include any tax paid on supplies, tools and equipment which were used to perform this contract and only includes those building materials, supplies, fixtures and equipment which actually became a part of or annexed to the building or structure. I certify that, to the best of my knowledge, the information provided here is true, correct, and complete.

Sworn to and subscribed before me,

This the _____ day of _____, 20_____

Signed

Notary Public

My Commission Expires: _____

Print or Type Name of Above

Seal

NOTE:
 This certified statement may be subject to audit.

SECTION 316

CONTRACTOR'S
AFFIDAVIT OF
RELEASE OF LIENS

Owner
Designer
Contractor
Surety
Other

TO: (OWNER)

CONTRACT FOR:

CONTRACT DATE:

PROJECT INFORMATION:
(Name & Location)

State of:

County of:

The undersigned, pursuant to Article 36 of the General Conditions of the Contract, hereby certifies that to the best of his knowledge, information and belief, the Releases or Waivers of Lien attached hereto include the contractor, all subcontractors, all suppliers of materials and equipment, and all performers of work, labor or services who have or may have liens against any property of the owner arising in any manner out of the performance of the contract referenced above.

SUPPORTING DOCUMENTS

ATTACHED HERETO:

CONTRACTOR:

Address:

By

Subscribed and sworn to before me
this day of 20

Signature Notary Public:

Printed Name of Notary Public:

My Commission Expires:

**CONTRACTOR'S
AFFIDAVIT OF PAYMENT
OF DEBTS AND CLAIMS**

- Owner
- Designer
- Contractor
- Surety
- Other

TO (OWNER)

CONTRACT FOR:

CONTRACT DATE:

PROJECT INFORMATION:
Name & Location:

State of:

County of:

The undersigned, pursuant to Article 36 of the General Conditions of the Contract, hereby certifies that, he has paid in full or has otherwise satisfied all obligations for all materials and equipment furnished, for all work, labor and services performed, and for all known indebtedness and claims against the contractor for damages arising in any manner in connection with the performance of the contract referenced above for which the owner or his property might in any way be held responsible.

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Consent of Surety to Final Payment. Whenever surety is involved, Consent of Surety is required. Indicate attachment: (yes) (no).
The following supporting documents should be attached hereto if required by the owner:
 - a. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
 - b. Separate Releases or Waivers of Liens from subcontractors and material and equipment suppliers to the extent required by the owner, accompanied by a list thereof.
 - c. Contractor's Affidavit of Release of Liens.

CONTRACTOR:
Address:

By:
Subscribed and sworn to before me this ___ day of _____ 20__

Signature of Notary Public:

Printed Name of Notary Public:

My Commission Expires:

Owner

Designer

Contractor

Surety

Other

CONSENT OF SURETY

COMPANY TO FINAL

PAYMENT

PROJECT Name & Location: _____

TO: (OWNER)

[Empty rectangular box for owner information]

CONTRACT FOR:

CONTRACT DATE:

CONTRACTOR:

In accordance with the provisions of the contract between the owner and the contractor as indicated above, the (here insert name and address of surety company)

SURETY COMPANY

on bond of (here insert name and address of contractor)

CONTRACTOR

hereby approves of the final payment to the contractor, and agrees that final payment to the contractor shall not relieve the surety company of any of its obligations to (here insert name and address of owner)

OWNER

as set forth in said surety company's bond.

IN WITNESS WHEREOF,
the surety company has hereunto set its hand this day of 20

Surety Company

Signature of Authorized Representative

Attest:

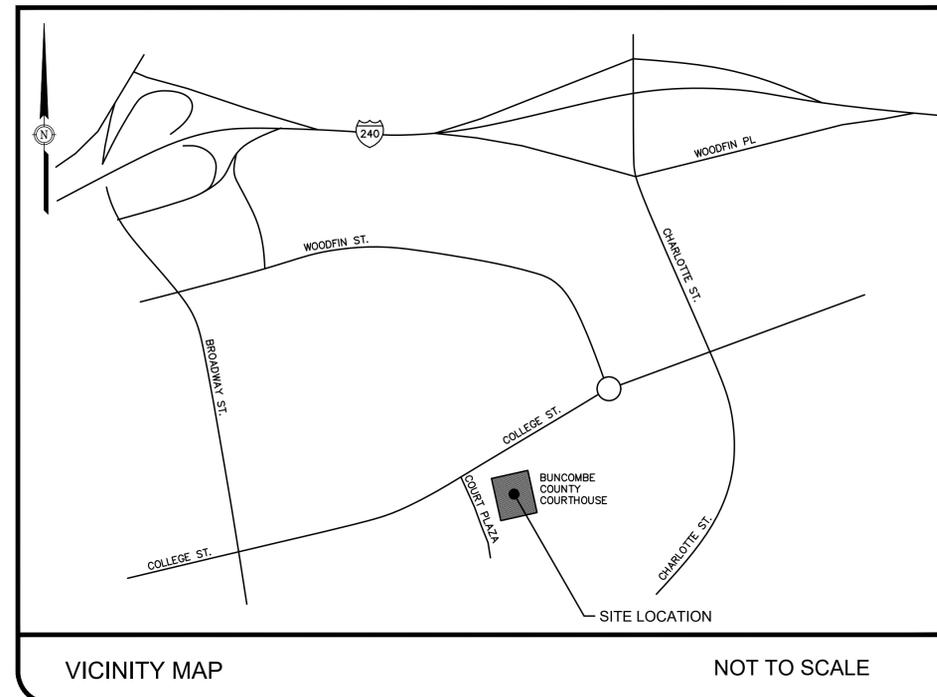
Title

(Visible Seal):

BUNCOMBE COUNTY COURTHOUSE ELECTRICAL UPGRADES

BUNCOMBE COUNTY

ASHEVILLE, NORTH CAROLINA



SCHEDULE OF DRAWINGS

G-001	COVER SHEET
G-002	APPENDIX B BUILDING CODE SUMMARY
G-003	APPENDIX B BUILDING CODE SUMMARY
E-001	ELECTRICAL LEGEND, ABBREVIATIONS, AND NOTES
E-101	BASEMENT ELECTRICAL PLAN
E-102	SWITCHGEAR ELECTRICAL PLANS PHASE 1
E-103	SWITCHGEAR ELECTRICAL PLANS PHASE 2
E-104A	SWITCHGEAR ELECTRICAL PLAN PHASE 3
E-104B	SWITCHGEAR ELECTRICAL PLAN PHASE 3
E-501	ELECTRICAL DETAILS
E-601	ELECTRICAL ONE-LINES AND SCHEDULES



NOVEMBER 2023

APPENDIX B
2018 BUILDING CODE SUMMARY
FOR ALL COMMERCIAL PROJECTS
(EXCEPT ONE- AND TWO-FAMILY DWELLINGS AND TOWNHOUSES)

Name of Project: BUNCOMBE COUNTY COURTHOUSE ELECTRICAL UPGRADES
Address: 60 COURT PLAZA, ASHEVILLE, NC Zip Code 28801
Owner/Authorized Agent: RONNIE LUNSFORD Phone # (828)250-4235 Email ronold.lunsford@buncombecounty.org
Owned By: City/County Private State
Code Enforcement Jurisdiction: City ASHEVILLE County BUNCOMBE State

DESIGNER	FIRM	NAME	LICENSE #	TELEPHONE #	EMAIL
Architectural					
Civil					
Electrical	MCGILL ASSOCIATES, P.A.	PHILLIP A. FISHER	18684	(828)252-0575	Phil.Fisher@mcgillassociates.com
Fire Alarm					
Plumbing					
Mechanical					
Sprinkler-Standpipe					
Structural					
Retaining Walls > 5' High					
Other					

2018 NC BUILDING CODE: New Building Shell/Core 1st Time Interior Completions
 Addition Phased Construction-Shell Core
2018 NC EXISTING BUILDING CODE: Prescriptive Alteration Level I Historic Property
(check all that apply) Repair Alteration Level II Change of Use
 Chapter 14 Alteration Level III

CONSTRUCTED: (date) 1929 CURRENT USE(S) (Ch. 3): COURTHOUSE
RENOVATED: (date) PROPOSED USE(S) (Ch. 3):
OCCUPANCY CATEGORY (Table 1604.5): Current: Proposed:

BASIC BUILDING DATA

Construction Type: I-A II-A III-A IV V-A
(check all that apply) I-B II-B III-B V-B
Sprinklers: No Partial NFPA 13 NFPA 13R NFPA 13D
Standpipes: No Class I II III Wet Dry
Primary Fire District: No Yes Flood Hazard Area: No Yes
Special Inspections Required: No Yes

Floor	GROSS BUILDING AREA TABLE		Subtotal
	Existing (sq ft)	New (sq ft)	
BASEMENT	22,304	0	22,304
GROUND	19,065	0	19,065
1ST FLOOR	18,203	0	18,203
2ND FLOOR	16,985	0	16,985
3RD FLOOR	18,203	0	18,203
4TH FLOOR	16,472	0	16,472
5TH FLOOR	16,472	0	16,472
6TH FLOOR	13,000	0	13,000
7TH FLOOR	10,880	0	10,880
8TH FLOOR	10,880	0	10,880
9TH FLOOR	8,100	0	8,100
10TH FLOOR	7,366	0	7,366
11TH FLOOR	7,366	0	7,366
12TH FLOOR	7,366	0	7,366
13TH FLOOR	7,366	0	7,366
14TH FLOOR	7,447	0	7,447
PENTHOUSE	1,065	0	1,065
TOTAL	215,818	0	215,818

ALLOWABLE AREA

Primary Occupancy Classification(s):
Assembly A-1 A-2 A-3 A-4 A-5
Business
Educational
Factory F-1 Moderate F-2 Low
Hazardous H-1 Detonate H-2 Deflagrate H-3 Combust H-4 Health H-5 HPM
Institutional I-1 I-2 I-3 I-4
I-3 Condition 1 2
I-2 Condition 1 2
I-3 Condition 1 2 3 4 5
Mercantile
Residential R-1 R-2 R-3 R-4
Storage S-1 Moderate S-2 Low High-piled Enclosed Repair Garage
 Parking Garage Open Enclosed Repair Garage
Utility and Miscellaneous

Accessory Occupancy Classification(s): A-3 COURTROOMS, S-2 STORAGE IN BASEMENT, I-3 AS ACCESSORY USE (LESS THAN 10% OF FLOOR AREA) ON THE GROUND LEVEL ONLY.

Incidental Uses (Table 509):
This separation is not exempt as a Nonseparated Use (see exceptions).

Special Uses (Chapter 4 - List Code Sections): 403

Special Provisions (Chapter 5 - List Code Sections):

Mixed Occupancy: No Yes Separation: 0 Hr. Exception: 508.3.1

Non-separated Use (508.3)

Separated Use (508.4) - See below for area calculations for each story, the area of the occupancy shall be such that the sum of the ratios of the actual floor area of each use divided by the allowable floor area for each use shall not exceed 1.

Select one
$$\frac{\text{Actual Area of Occupancy A}}{\text{Allowable Area of Occupancy A}} + \frac{\text{Actual Area of Occupancy B}}{\text{Allowable Area of Occupancy B}} \leq 1$$

STORY NO.	DESCRIPTION AND USE	(A) BLDG AREA PER STORY (ACTUAL)	(B) TABLE 506.2.4 AREA	(C) AREA FOR FRONTAGE INCREASE 1.5	(D) ALLOWABLE AREA PER STORY OR UNLIMITED 2.3
BASEMENT	S-2 BOILER ROOM MECH. RMS ELEC. RMS	22,304 SF	UL	NA	UL
GROUND	A-3, B, I-3	19,065 SF	UL	NA	UL
1	B	18,203 SF	UL	NA	UL
2	A-3, B	16,985 SF	UL	NA	UL
3	A-3, B	18,203 SF	UL	NA	UL
4	A-3, B	16,472 SF	UL	NA	UL
5	A-3, B	16,472 SF	UL	NA	UL
6	A-3, B	13,000 SF	UL	NA	UL
7	A-3, B	10,880 SF	UL	NA	UL
8	A-3, B	10,880 SF	UL	NA	UL
9	A-3, B	8,100 SF	UL	NA	UL
10	B	7,366 SF	UL	NA	UL
11	B	7,366 SF	UL	NA	UL
12	B	7,366 SF	UL	NA	UL
13	B	7,366 SF	UL	NA	UL
14	B	7,447 SF	UL	NA	UL
15	-	0	UL	NA	UL
PENTHOUSE	MECH. RMS	1,065 SF	UL	NA	UL

- Frontage area increases from Section 506.2 are computed thus:
 - Perimeter which fronts a public way or open space having 20 feet minimum width - (P)
 - Total Building Perimeter = (P)
 - Ratio (F/P) = (F/P)
 - W = Minimum width of public way = (W)
- Unlimited area applicable under conditions of Section 507.
- Maximum Building Area = total number of stories in the building X D (maximum 3 stories) (506.2).
- The maximum area of open parking garages must comply with Table 406.5.4. The maximum area of air traffic control towers must comply with Table 412.3.1.
- Frontage increase is based on the unsprinklered area value in Table 506.2.

ALLOWABLE HEIGHT

	ALLOWABLE	SHOWN ON PLANS	CODE REFERENCE
Building Height in Feet (Table 504.3)	210	--	--
Building Height in Stories (Table 504.4)	18	STORIES	--

1. Provide code reference if the "Shown on Plans" quantity is not base on Table 504.3 or 504.4.

FIRE PROTECTION REQUIREMENTS (N/A)							
BUILDING ELEMENT	FIRE SEPARATION DISTANCE (feet)	RATING		DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	SHEET # FOR RATED PENETRATION	SHEET # FOR RATED JOINTS
		REQD	PROVIDED (W/ REDUCTION)				
Structural Frame Including columns, girders, trusses							
Bearing Walls							
Exterior							
North							
East							
West							
South							
Interior							
Nonbearing walls and partitions							
Exterior walls							
North							
East							
West							
South							
Interior walls and partitions							
Floor Construction Including supporting beams and joists							
Floor Ceiling Assembly							
Columns Supporting Floors							
Roof Construction, including supporting beams and joists							
Roof Ceiling Assembly							
Columns Supporting Roof							
Shaft Enclosures - Exit							
Shaft Enclosures - Other							
Corridor Separation							
Occupancy/Fire Barrier Separation							
Party/Fire Wall Separation							
Smoke Barrier Separation							
Smoke Partition							
Tenant/Dwelling Unit/ Sleeping Unit Separation							
Incidental Use Separation							

PERCENTAGE OF WALL OPENING CALCULATIONS (N/A)			
FIRE SEPARATION DISTANCE (feet) FROM PROPERTY LINES	DEGREE OF OPENINGS PROTECTION (TABLE 705.8)	ALLOWABLE AREA (%)	ACTUAL SHOWN ON PLANS (%)

LIFE SAFETY SYSTEM REQUIREMENTS
Emergency Lighting: Yes No
Exit Signs: Yes No
Fire Alarm: Yes No
Smoke Detection Systems: Yes No
Carbon Monoxide Detection: Yes No



SIGNED AND DATED: Phillip A. Fisher, Date: 2023.11.15 10:24:21 -0500
THIS DOCUMENT HAS BEEN DIGITALLY SIGNED AND SEALED IN ACCORDANCE WITH THE STANDARD CERTIFICATION REQUIREMENTS FOUND IN NC ADMINISTRATIVE CODE 21-56.1103(E). THIS DIGITAL SIGNATURE HAS BEEN FOUND BY THE NC BOARD OF EXAMINERS OF PROFESSIONAL ENGINEERS AND SURVEYORS TO MEET THESE STANDARDS. PLEASE CONTACT THE SIGNER IF YOU NEED ASSISTANCE IN VALIDATING THE SIGNATURE.

NO.	DATE	BY	DESCRIPTION
0	11/15/2023	PAF	BID DOCUMENTS

BUNCOMBE COUNTY COURTHOUSE ELECTRICAL UPGRADES
BUNCOMBE COUNTY
ASHEVILLE, NORTH CAROLINA

NOT TO SCALE
OFFICE MANAGER: M. CATHEY
DESIGNER: P. FISHER
PROJECT MANAGER: P. FISHER
REVIEWER: P. FISHER

APPENDIX B BUILDING CODE SUMMARY
DATE: NOVEMBER 2023
PROJECT #: 22.03516
FUNDING #: N/A

SHEET
G-002

P:\2022\22.03516-BUNCOMBECCJCSB-COURTHOUSE ELEC UPGRADES\DRAWINGS\MEPELECTRICAL\22.03516 -APPENDIX B BUILDING CODE SUMMARY.DWG PLOT DATE: 11/15/2023 10:16 AM SONJA ROBERTS

22.03516-BUNCOMBE COUNTY COURTHOUSE ELECTRICAL UPGRADES-ASHEVILLE, NC

LIFE SAFETY PLAN REQUIREMENTS (N/A)

Life Safety Plan Sheet #: _____

- Fire and/or smoke rated wall locations (Chapter 7)
- Assumed and real property line locations (if not on the site plan)
- Exterior wall opening area with respect to distance to assumed property lines (705.8)
- Occupancy Use for each area as it relates to occupant load calculation (Table 1004.1.2)
- Occupant loads for each area
- Exit access travel distances (1017)
- Common path of travel distances [Tables 1006.2.1 & 1006.3.2(1)]
- Dead end lengths (1020.4)
- Clear exit widths for each exit door
- Maximum calculated occupant load capacity each exit door can accommodate based on egress width (1005.3)
- Actual occupant load for each exit door
- A separate schematic plan indicating where fire rated floor/ceiling and and/or roof structure is provided for purposes of occupancy separation
- Location of doors with panic hardware (1010.1.10)
- Location of doors with delayed egress locks and the amount of delay (1010.1.9.7)
- Location of doors with electromagnetic egress locks (1010.1.9.9)
- Location of doors equipped with hold-open devices
- Location of emergency escape windows (1030)
- The square footage of each fire area (202)
- The square footage of each smoke compartment for Occupancy Classification I-2 (407.5)
- Note any code exceptions or table notes that may have been utilized regarding the items above

ACCESSIBLE DWELLING UNITS (N/A)
(SECTION 1107)

TOTAL UNITS	ACCESSIBLE UNITS REQUIRED	ACCESSIBLE UNITS PROVIDED	TYPE A UNITS REQUIRED	TYPE A UNITS PROVIDED	TYPE B UNITS REQUIRED	TYPE B UNITS PROVIDED	TOTAL ACCESSIBLE UNITS PROVIDED

ACCESSIBLE PARKING (N/A)
(SECTION 1106)

LOT OR PARKING AREA	TOTAL # OF PARKING SPACES		# OF ACCESSIBLE SPACES PROVIDED			TOTAL # ACCESSIBLE PROVIDED
	REQUIRED	PROVIDED	REGULAR WITH 8' ACCESS AISLE	VAN SPACES WITH 132" ACCESS AISLE	8' ACCESS AISLE	
TOTAL						

PLUMBING FIXTURE REQUIREMENTS (N/A)
(TABLE 2902.1)

USE	WATERCLOSETS			URINALS	LAVATORIES			SHOWERS/TUB	DRINKING FOUNTAINS	
	MALE	FEMALE	UNISEX		MALE	FEMALE	UNISEX		REGULAR	ACCESSIBLE

SPECIAL APPROVALS (N/A)

Special approval: (Local Jurisdiction, Department of Insurance, OSC, DPI, DHHS, ICC, etc., describe below)

ENERGY SUMMARY (N/A)

ENERGY REQUIREMENTS:

The following data shall be considered minimum and any special attribute required to meet the energy code shall also be provided. Each Designer shall furnish the required portions of the project information for the plan data sheet. If performance method, state the annual energy cost for the standard reference design versus the annual energy cost for the proposed design.

Existing building envelope complies with code: (If checked, the remainder of this section is not applicable)

Exempt Building: Provide code or statutory reference: _____

Climate Zone: 3A 4A 5A

Method of Compliance: _____

Energy Code: Performance Prescriptive

ASHRAE 90.1: Performance Prescriptive

Other: Performance (specify source) _____

THERMAL ENVELOPE: (Prescriptive method only)

Roof/ceiling Assembly (each assembly)

Description of assembly: _____

U-Value of total assembly: _____

R-Value of insulation: _____

Skylights in each assembly: _____

U-Value of skylight: _____

total square footage of skylights in each assembly: _____

Exterior Walls (each assembly)

Description of assembly: _____

U-Value of total assembly: _____

R-Value of insulation: _____

Openings (windows or doors with glazing)

U-Value of assembly: _____

Solar heat gain coefficient: _____

projection factor: _____

Door R-Values: _____

Walls below grade (each assembly)

Description of assembly: _____

U-Value of total assembly: _____

R-Value of insulation: _____

Floors over unconditioned space (each assembly)

Description of assembly: _____

U-Value of total assembly: _____

R-Value of insulation: _____

Floors slab on grade

Description of assembly: _____

U-Value of total assembly: _____

R-Value of insulation: _____

Horizontal/vertical requirement: _____

slab heated: _____

APPENDIX B (N/A)
2018 BUILDING CODE SUMMARY
FOR ALL COMMERCIAL PROJECTS
STRUCTURAL DESIGN

DESIGN LOADS:

Importance Factors: Wind (I_w) _____
Snow (I_s) _____
Seismic (I_e) _____

Live Loads: Roof _____ psf
Mezzanine _____ psf
Floor _____ psf

Ground Snow Load: _____ psf

Wind Load: Basic Wind Speed _____ mph (ASCE-7)
Exposure Category _____

SEISMIC DESIGN CATEGORY: A B C D

Provide the following Seismic Design Parameters:

Occupancy Category (Table 1604.5) I II III IV

Spectral Response Acceleration S_s _____ %g S_1 _____ %g

Site Classification (ASCE 7) A B C D E F

Data Source: Field Test Presumptive Historical Data

Basic structural system (check one)

Bearing Wall Dual w/Special Moment Frame
 Building Frame Dual w/Intermediate R/C or Special Steel
 Moment Frame Inverted Pendulum

Analysis Procedure: Simplified Equivalent Lateral Force Dynamic

Architectural, Mechanical, Components anchored? Yes No

LATERAL DESIGN CONTROL: Earthquake Wind

SOIL BEARING CAPACITIES:

Field Test (provide copy of test report) _____ psf
Presumptive Bearing capacity _____ psf
Pile size, type, and capacity _____

APPENDIX B (N/A)
2018 BUILDING CODE SUMMARY
FOR ALL COMMERCIAL PROJECTS
MECHANICAL DESIGN
MECHANICAL SUMMARY

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

Thermal Zone

winter dry bulb: _____
summer dry bulb: _____

Interior design conditions

winter dry bulb: _____
summer dry bulb: _____
relative humidity: _____

Building heating load: _____
Building cooling load: _____

Mechanical Spacing Conditioning System

Unitary

description of unit: _____
heating efficiency: _____
cooling efficiency: _____
size category of unit: _____

Boiler

Size category. If oversized, state reason: _____

Chiller

Size category. If oversized, state reason: _____
List equipment efficiencies: _____

APPENDIX B (N/A)
2018 BUILDING CODE SUMMARY
FOR ALL COMMERCIAL PROJECTS
ELECTRICAL DESIGN
ELECTRICAL SUMMARY

ELECTRICAL SYSTEM AND EQUIPMENT

Method of Compliance: _____

Energy Code: Prescriptive Performance

ASHRAE 90.1: Prescriptive Performance

Lighting schedule (each fixture type)

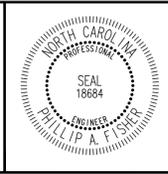
lamp type required in fixture _____
number of lamps in fixture _____
ballast type used in the fixture _____
number of ballasts in fixture _____
total wattage per fixture _____
total interior wattage specified versus allowed (whole building or space by space) _____
total exterior wattage specified versus allowed _____

Additional Prescriptive Compliance

C406.2 More Efficient Mechanical Equipment
 C406.3 Reduced Lighting Power Density
 C406.4 Enhanced Lighting Controls
 C406.5 On-Site Supply of Renewable Energy
 C406.6 Provision of a Dedicated Outdoor Air System
 C406.7 Higher Efficiency Service Water Heating



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SIGNED AND DATED: _____
Digitally signed by Phillip A. Fisher
Date: 2023.11.15 10:24:36 -05'00'

THIS DOCUMENT HAS BEEN DIGITALLY SIGNED AND SEALED IN ACCORDANCE WITH THE STANDARD CERTIFICATION REQUIREMENTS FOUND IN NC ADMINISTRATIVE CODE 21-56.1103(E). THIS DIGITAL SIGNATURE HAS BEEN FOUND BY THE NC BOARD OF EXAMINERS FOR PROFESSIONAL ENGINEERS AND SURVEYORS TO MEET THESE STANDARDS. PLEASE CONTACT THE SIGNER IF YOU NEED ASSISTANCE IN VALIDATING THE SIGNATURE.

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BUNCOMBE COUNTY COURTHOUSE
ELECTRICAL UPGRADES

BUNCOMBE COUNTY

ASHEVILLE, NORTH CAROLINA

NOT TO SCALE

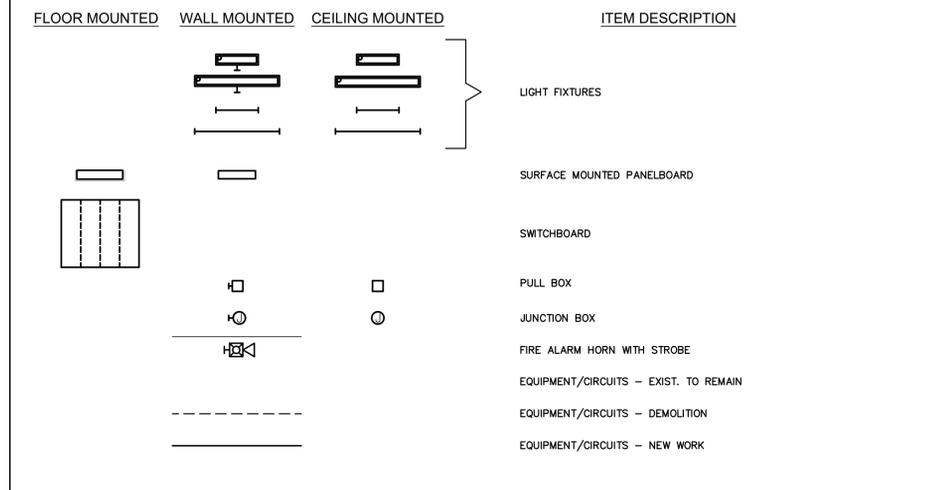
OFFICE MANAGER	DESIGNER
M. CATHEY	P. FISHER
PROJECT MANAGER	REVIEWER
P. FISHER	P. FISHER

APPENDIX B
BUILDING CODE SUMMARY

DATE	PROJECT #	FUNDING #
NOVEMBER 2023	22.03516	N/A

SHEET
G-003

ELECTRICAL LEGEND



ABBREVIATIONS

A OR AMP	AMPERE	H.I.D.	HIGH INTENSITY DISCHARGE	P	# OF POLES IN CIRCUIT BREAKER
A.C.	ALTERNATING CURRENT	HP	HORSEPOWER	PH OR ϕ	PHASE
AF	FRAME AMPERE	H.P.S.	HIGH PRESSURE PUMP STATION	PM	POWER MONITOR
A.F.F.	ABOVE FINISHED FLOOR	HSPS	HIGH SERVICE PUMP STATION	PMT	PAD MOUNTED TRANSFORMER
A.F.G.	ABOVE FINISHED GRADE	HVAC	HEAT-VENT-AIR CONDITIONING	PNL	PANEL
A.I.C.	AMPERE INTERRUPTING CURRENT	I.G.	ISOLATED GROUND	PSI	POUNDS PER SQUARE INCH
AS	AMMETER SELECTOR SWITCH	I.D.	INNER DIAMETER	PT	POTENTIAL TRANSFORMER
AT	TRIP AMPERE	IMC	INTERMEDIATE METAL CONDUIT	PVC	POLYVINYL CHLORIDE
A.T.S.	AUTOMATIC TRANSFER SWITCH	IND.	INDUSTRIAL	RM	REMOVE
AUTO	AUTOMATIC	JB	JUNCTION BOX	RP	REPLACE OR REPLACED
AWG	AMERICAN WIRE GAUGE	J.I.C.	JOINT INDUSTRIAL COUNCIL	QTY.	QUANTITY
B.F.G.	BELOW FINISHED GRADE	KA	KILOAMPERE	RGS	RIGID GALVANIZED STEEL
BLDG.	BUILDING	KCMIL	1000 CIRCULAR MILS	RVSS	REDUCED VOLTAGE SOLID STATE
C OR COND.	CONDUIT	KV	KILOVOLT	SC	SURGE CAPACITOR
CB	CIRCUIT BREAKER	KVA	KILOVOLT AMPERE	SCC	SYSTEM CONTROL CENTER
CKT	CIRCUIT	KW	KILOWATT	SER	SERVICE ENTRANCE RATED
CP	CONTROL PANEL	LA	LIGHTNING ARRESTOR	SM	SUB-METER
CPT	CONTROL PANEL TRANSFORMER	LC	LIGHTING CONTACTOR	SP	SPARE
CR	CONTROL RELAY	LTG	LIGHTING	SPD	SURGE-PROTECTIVE DEVICE
DESIG	DESIGNATION	MAX	MAXIMUM	S.S.	STAINLESS STEEL
DIA.	DIAMETER	MCB	MAIN CIRCUIT BREAKER	SWBD	SWITCHBOARD
DIV.	DIVISION	mA	MILI-AMP	TBA	TO BE ABANDONED
DPDT	DOUBLE POLE, DOUBLE THROW	MC	MANUFACTURER'S CABLE	TBR	TO BE REMOVED
DS	DISCONNECT SWITCH	MCC	MOTOR CONTROL CENTER	TCC	TELECOMMUNICATIONS CLOSET
E.C.	ELECTRICAL CONTRACTOR	MFR	MANUFACTURER	TDC	TELECOMMUNICATIONS DISTRIBUTION CLOSET
EHH	ELECTRIC HANDHOLE	MIN.	MINIMUM	TYP.	TYPICAL
EMH	ELECTRIC MANHOLE	M.L.O.	MAIN LUG ONLY	UE	UNDERGROUND ELECTRIC
EP	EXPLOSION PROOF	M.O.D.	MOTOR OPERATED DAMPER	UH	UNIT HEATER
EUH	ELECTRIC UNIT HEATER	MS	MOTOR STARTER	UL	UNDERWRITERS LABORATORY
E.W.	EACH WAY	MTD.	MOUNTED	U.O.N.	UNLESS OTHERWISE NOTED
EX	EXISTING TO REMAIN	N/A	NOT APPLICABLE	UT	UNDERGROUND TELEPHONE
EXH	EXHAUST FAN	N.C.	NORMALLY CLOSED	UV	ULTRAVIOLET
FU	FUSE	NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION	V	VOLT
FRE	FIBERGLASS REINFORCED EPOXY	NID	NETWORK INTERFACE DEVICE (4 POSITION)	VAC	VOLTS ALTERNATING CIRCUIT
G.C.	GENERAL CONTRACTOR	N.O.	NORMALLY OPEN	VS	VOLTMETER SELECTOR SWITCH
GEN	GENERATOR	NO.	NUMBER	W	WIRE
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	NPT	NOMINAL PIPE THREADS	W/	WITH
GND. OR GRD.	GROUND	OE	OVERHEAD ELECTRIC	WP	WEATHERPROOF
				XFMR	TRANSFORMER

GENERAL NOTES:

- ALL MOUNTING HEIGHTS SHOWN ARE FROM THE FINISHED FLOOR TO THE CENTERLINE OF THE DEVICE, UNLESS NOTED OTHERWISE.
- SEE DETAIL SHEET(S) FOR TYPICAL INSTALLATION DETAILS.
- UNLESS NOTED OTHERWISE, EXISTING CONDUIT AND CONDUCTORS MAY BE REUSED WHERE THEY ARE OF THE TYPE SPECIFIED, MEET THE REQUIREMENTS OF NEW CIRCUITS, AND REMAIN IN GOOD CONDITION.
- THE ELECTRICAL CONTRACTOR SHALL DISCONNECT ALL EXISTING EQUIPMENT SHOWN TO BE REMOVED AND SHALL REMOVE ALL CONDUIT AND CONDUCTORS THAT SHALL NOT REMAIN IN PLACE. THE ELECTRICAL CONTRACTOR SHALL LEAVE ALL MODIFIED CIRCUITS IN A SAFE CONDITION.
- ALL WORK SHOWN ON THE DRAWINGS IS NEW, UNLESS SPECIFICALLY INDICATED AS EXISTING.
- THE EXISTING PORTIONS OF THIS FACILITY WILL REMAIN IN OPERATION DURING THIS CONSTRUCTION. CONTRACTOR SHALL COOPERATE FULLY WITH THE ADMINISTRATION IN ORDER TO CAUSE AS LITTLE DISRUPTION AS POSSIBLE TO THE FUNCTIONING OF THE FACILITY, AND TO MAINTAIN THE COMFORT AND SAFETY OF THE PUBLIC AND STAFF.
- THIS PROJECT INVOLVES WORK IN EXISTING PORTIONS OF THE FACILITY. EXISTING FEEDERS, BRANCH CIRCUITS, RACEWAYS, ETC. WHICH ARE DISRUPTED BY THIS PROJECT SHALL BE RE-ROUTED AND/OR RE-FED FROM A NEW SOURCE AS REQUIRED TO MAINTAIN THEM IN FULL AND PERMANENT SERVICE. THE CONTRACTOR SHOULD VISIT THE SITE PRIOR TO BIDDING TO REVIEW EXISTING CONDITIONS. CONTRACTOR SHALL NOT BE EXCUSED FROM PERFORMING REQUIRED WORK BECAUSE HE DID NOT VISIT THE SITE.
- EXISTING CONDUIT RUNS AND EQUIPMENT LOCATIONS HAVE BEEN TAKEN FROM EXISTING DRAWINGS FURNISHED BY THE OWNER AND LIMITED SITE VISIT, ALL INFORMATION SHALL BE FIELD VERIFIED ON THE JOB SITE, BEFORE PROCEEDING WITH CONSTRUCTION.
- THE INDICATED ROUTING OF NEW AND TEMPORARY FEEDERS IS SUGGESTED ROUTING. CONTRACTOR MAY ROUTE DIFFERENTLY THAN SHOWN TO MAXIMIZE CONSTRUCTION EFFICIENCY WITH THE GOAL OF MAINTAINING MAXIMUM HEADROOM AND TO AVOID LIMITING MAINTENANCE AND INSPECTION ACCESS TO OTHER ADJACENT SYSTEMS.
- DETAILED SEQUENCING OF WORK IS THE RESPONSIBILITY OF THE CONTRACTOR WITH THE GOAL OF MINIMIZING THE DURATION OF ALL OUTAGES. REFER TO SPECIFICATION SECTION 011000 "SUMMARY" FOR OUTAGE LIMITATIONS DURING CONSTRUCTION.
- THE KEYNOTES ARE GENERALLY IN ORDER OF A PROPOSED SEQUENCE OF CONSTRUCTION. THE CONTRACTOR MAY COMPLETE THE WORK IN A DIFFERENT SEQUENCE THAN THE ONE PRESENTED AT THEIR DISCRETION.
- THE WORK IS INDICATED IN THREE GENERAL PHASES AS FOLLOWS:
 - PHASE 1 IS INTENDED TO REWORK FEEDERS, LIGHTING, FIRE ALARM, AND SPRINKLER PIPING TO CLEAR AN AREA FOR THE INSTALLATION OF NEW SWITCHBOARD NO. 1, PANEL DP1, AND PANEL DP2.
 - PHASE 2 IS INTENDED TO PROVIDE THREE TEMPORARY FEEDERS TO RE-ROUTE POWER DURING CONSTRUCTION. PROVIDE DEMOLITION OF EXISTING WALL. PROVIDE INSTALLATION OF SWITCHBOARD AND PANELBOARDS. PROVIDE FEEDERS BETWEEN SWITCHBOARD NO., PANEL DP1, AND PANEL DP2. PROVIDE CONNECTION TO EXISTING 3000 A FEEDER BUSWAY. REWORK 1200 A BUSWAYS TO SWITCHBOARD NO. 1.
 - PHASE 3 IS INTENDED TO SYSTEMATICALLY REWORK ALL FEEDERS FROM THE OLD SWITCHBOARD TO SWITCHBOARD NO. 1, PANEL DP1, AND PANEL DP2.
- NOT ALL REQUIRED JUNCTION OR PULL BOXES ARE INDICATED. THE CONTRACTOR IS REQUIRED TO PROVIDE JUNCTION AND PULL BOXES AS NECESSARY TO FACILITATE THE WORK AND COMPLY WITH CODE REQUIREMENTS REGARDING NUMBER OF CONDUIT BENDS, ETC.
- SOME EXISTING FEEDERS DO NOT HAVE EQUIPMENT GROUNDING CONDUCTORS. ALL NEW FEEDER SEGMENTS SHALL BE PROVIDED WITH EQUIPMENT GROUNDING CONDUCTORS.
- CONTRACTOR TO FIELD VERIFY LOCATION OF FEEDER CIRCUIT BREAKERS PRIOR TO COMMENCING WITH CONSTRUCTION ASSOCIATED WITH THAT CIRCUIT. PLEASE NOTIFY THE ENGINEER IF ANY DISCREPANCIES ARE DISCOVERED BETWEEN ACTUAL FIELD CONDITIONS AND WHAT IS INDICATED BEFORE PROCEEDING WITH ANY WORK ASSOCIATED WITH THAT CIRCUIT.
- ALL EXISTING CONDUCTORS ARE COPPER UNLESS NOTED OTHERWISE. EXTEND ALL EXISTING ALUMINUM FEEDERS WITH COPPER CONDUCTORS TO THE INDICATED SWITCHBOARD OR PANELBOARD. PROVIDE AL TO CU SPLICES.
- ALL SUPPORTS ATTACHED TO THE CEILING SHALL BE ATTACHED TO THE UNDERLYING STRUCTURE AND PROVIDE THE MAGNITUDE OF SUPPORT AS SPECIFIED.
- FEEDER DESIGNATIONS AND NAMING INDICATED ON THESE PLANS FOLLOW HISTORICAL NAMING OF PANELS AND EQUIPMENT BASED ON CURRENT FIELD DESIGNATIONS AND RECORD DRAWINGS. PRIOR TO CREATING PERMANENT CIRCUIT DIRECTORIES AND DEVICE LABELS FOR NEW EQUIPMENT, COORDINATE THE FINAL DESIRED NAMING/DESIGNATIONS OF ALL FEEDERS WITH THE OWNER. PROVIDE NAMING AS DIRECTED BY THE OWNER.

GENERAL DEMOLITION NOTES:

- IMMEDIATELY NOTIFY ENGINEER AND OWNER OF ANY MATERIALS ENCOUNTERED DURING DEMOLITION AND NEW WORK WHICH ARE SUSPECTED TO CONTAIN CONTAMINANTS POSSIBLY HAZARDOUS TO HUMAN HEALTH.
- ALL DEMOLITION ACTIVITIES TO BE SCHEDULED AND COORDINATED WITH OWNER.
- CONTRACTOR SHALL VISIT THE SITE AND INSPECT THE ELECTRICAL SYSTEMS TO DETERMINE THE EXTENT OF THE DEMOLITION WORK REQUIRED AND INCLUDE THE PRICE FOR THAT WORK IN THEIR BID. NO EXTRA COMPENSATION WILL BE GIVEN FOR DEMOLITION WORK AS A RESULT OF FAILURE TO INSPECT THE SITE BEFORE BID.
- WHEN AN ITEM IS INDICATED TO BE REMOVED, ALSO REMOVE WIRING, CONDUIT, BOXES AND ASSOCIATED ITEMS. CONDUIT AND WIRE SHALL BE REMOVED BACK TO THE SOURCE.
- EXERCISE CARE WHEN REMOVING CONDUITS AND WIRING NOT TO REMOVE CONDUITS AND WIRING OF ITEMS NOT INDICATED TO BE REMOVED.
- REMOVE ALL ABANDONED CONDUIT AND WIRING, INCLUDING THAT ABANDONED DURING THIS CONTRACT AND EXISTING UNUSED ABANDONED CONDUIT AND WIRING. CONDUIT AND WIRING SHALL BE REMOVED BACK TO THE SOURCE.
- EXISTING CONDUIT WHICH IS SCHEDULED TO BE REMOVED, MAY BE REUSED IF THE CONDUIT COMPLIES WITH ALL REQUIREMENTS (SIZE, SUPPORTS, COUPLINGS, ETC.) OF THE NEC AND THE SPECIFICATIONS.
- REMOVE FROM THE SITE ALL REMOVED ELECTRICAL ITEMS NOT REQUESTED TO BE TURNED OVER TO THE OWNER.
- REMOVE ALL DEVICES INDICATED ON THE DEMOLITION DRAWINGS EXCEPT THOSE INDICATED TO REMAIN.
- WHERE FEEDERS ARE INDICATED TO BE REMOVED, THEY ARE SHOWN WITH PHASE, NEUTRAL AND GROUND CONDUCTOR COUNTS AND SIZES BASED ON A STUDY OF RECORD DOCUMENTS AND LIMITED FIELD INVESTIGATIONS. PLEASE NOTIFY THE ENGINEER IF ACTUAL COUNTS OR SIZES DIFFER FROM WHAT IS INDICATED BEFORE PROCEEDING WITH ANY WORK ASSOCIATED WITH THAT CIRCUIT.
- WHEN REMOVING EXISTING AND TEMPORARY FEEDERS, COORDINATE THAT WORK WITH THE NEW CONSTRUCTION. COMPLETE AS MUCH OF THE NEW WORK ON THE REPLACEMENT FEEDER AS POSSIBLE PRIOR TO REMOVING THE IN-SERVICE FEEDERS IN ORDER TO MINIMIZE THE OUTAGE DURATION DURING THE TRANSITION.
- REMOVE ALL UNUSED HANGERS, SUPPORTS AND MISCELLANEOUS APPURTENANCES DURING THE DEMOLITION PROCESS.

P:\2022\22.03516-BUNCOMBE\CD-COURTHOUSE ELEC. UPGRADES\DRAWINGS\MEP\ELECTRICAL\22.03516 - ELECTRICAL LEGEND.DWG PLOT DATE: 11/15/2023 10:16 AM SONIA ROBERTS

22.03516 BUNCOMBE COUNTY COURTHOUSE ELECTRICAL UPGRADES - ASHEVILLE, NC



55 Broad Street
Asheville, NC 28801
828.252.0575
NC Firm License # C-0459
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SIGNED AND DATED:
 Digitally signed by
Phillip A. Fisher
 Date: 2023.11.15
 10:24:49 -05'00'

THIS DOCUMENT HAS BEEN DIGITALLY SIGNED AND SEALED IN ACCORDANCE WITH THE STANDARD CERTIFICATION REQUIREMENTS FOUND IN NC ADMINISTRATIVE CODE 21-56.1103(E). THIS DIGITAL SIGNATURE HAS BEEN FOUND BY THE NC BOARD OF EXAMINERS FOR ENGINEERS AND SURVEYORS TO MEET THESE STANDARDS. PLEASE CONTACT THE SIGNER IF YOU NEED ASSISTANCE IN VALIDATING THE SIGNATURE.

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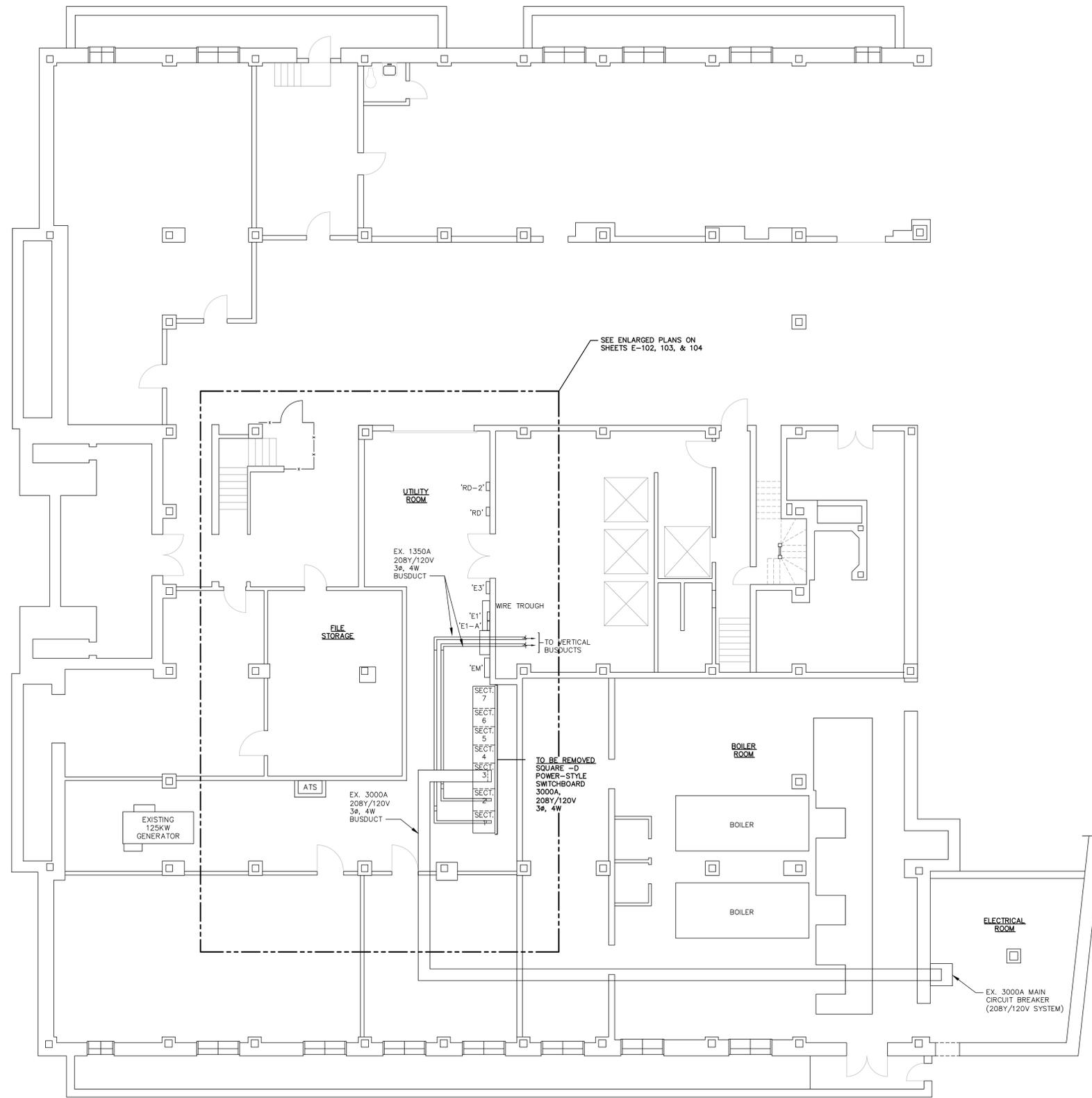
BUNCOMBE COUNTY COURTHOUSE
ELECTRICAL UPGRADES

BUNCOMBE COUNTY

ASHEVILLE, NORTH CAROLINA

NOT TO SCALE		ELECTRICAL LEGEND, ABBREVIATIONS, AND NOTES		
OFFICE MANAGER	DESIGNER			
M. CATHEY	P. FISHER			
PROJECT MANAGER	REVIEWER	DATE	PROJECT #	FUNDING #
P. FISHER	P. FISHER	NOVEMBER 2023	22.03516	N/A

SHEET
E-001



BASEMENT ELECTRICAL PLAN
SCALE: 1/8"=1'-0"

P:\2022\22.03516-BUNCOMBECOUNTY-COURTHOUSE-ELEC-UPGRADES\DRAWINGS\ME\ELECTRICAL\22.03516 - BASEMENT - EXIST ELEC PLANS DWG PLOT DATE 11/15/2023 10:16 AM SONIA ROBERTS

22.03516 BUNCOMBE COUNTY COURTHOUSE ELECTRICAL UPGRADES - ASHEVILLE, NC

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SIGNED AND DATED:
Phillip A. Fisher
Date: 2023.11.15
10:25:02 -05'00'

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ELECTRICAL UPGRADES
BUNCOMBE COUNTY
ASHEVILLE, NORTH CAROLINA

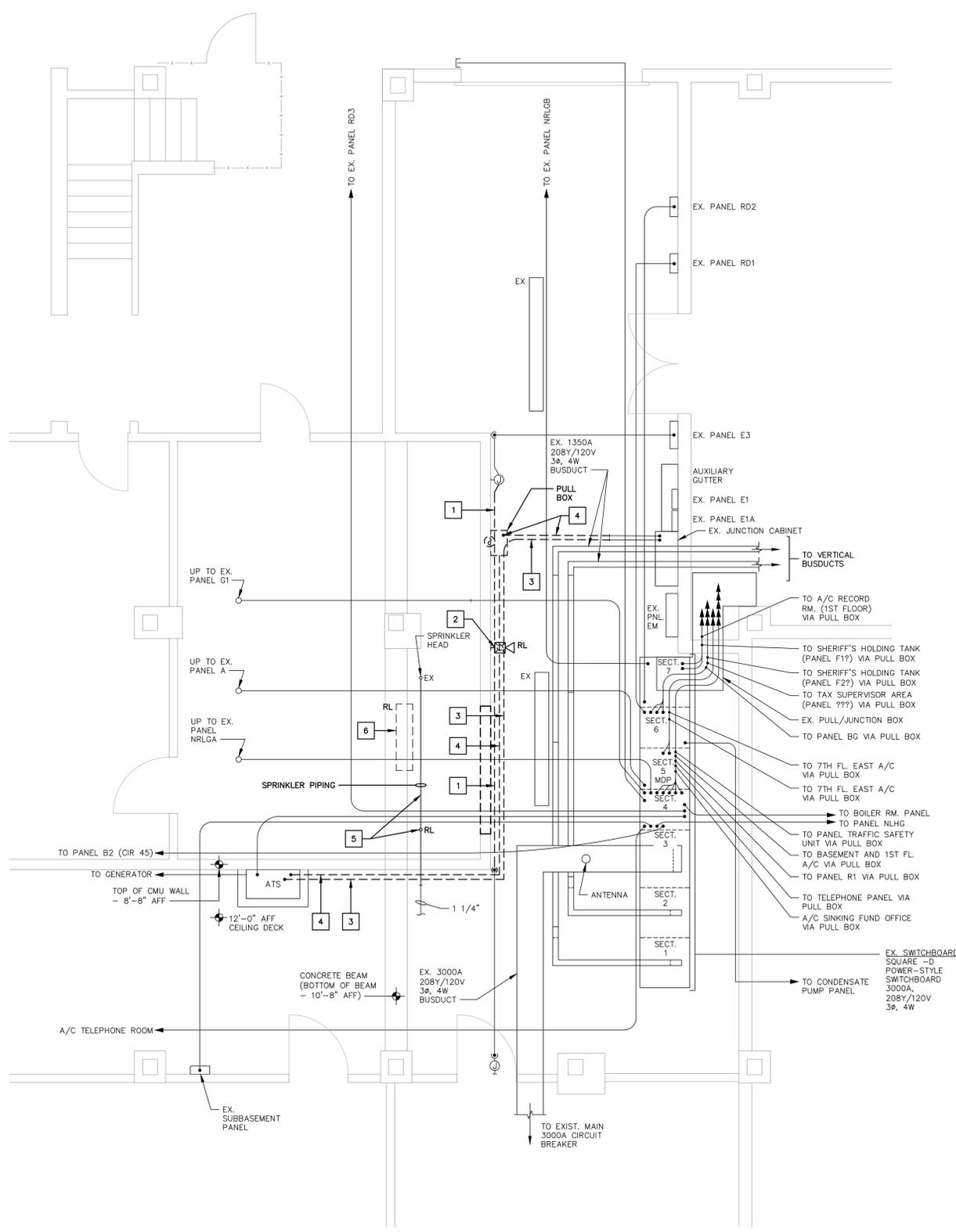
OFFICE MANAGER M. CATHEY	DESIGNER P. FISHER
PROJECT MANAGER P. FISHER	REVIEWER P. FISHER

BASEMENT ELECTRICAL PLAN		
DATE NOVEMBER 2023	PROJECT # 22.03516	FUNDING # N/A

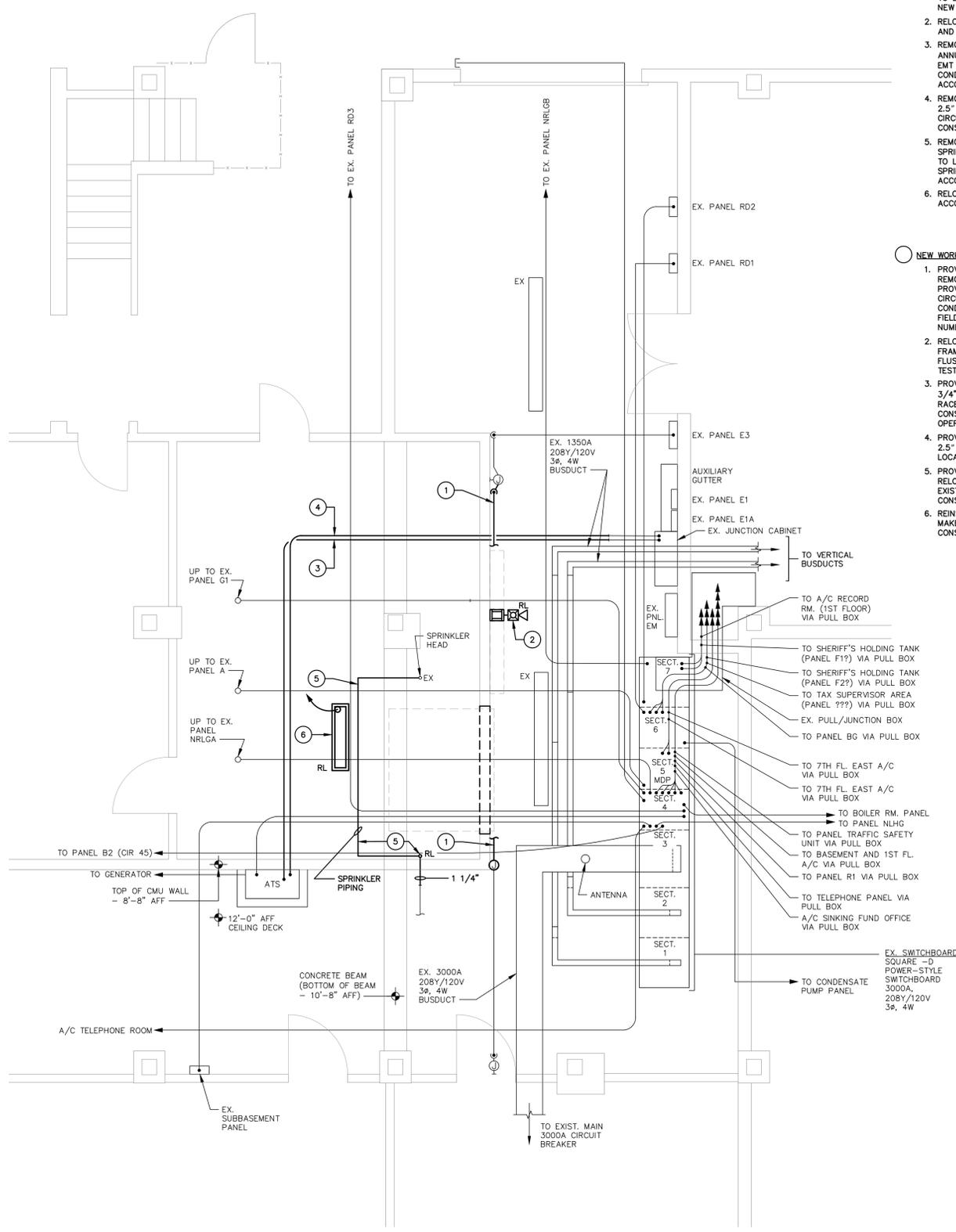
SHEET
E-101

- DEMOLITION PLAN KEYNOTES**
- REMOVE PORTION BRANCH CIRCUITS E3-7, E3-9, E3-11, E-6,8, AND E-10,12 AND 1/2" EMT AS INDICATED. CIRCUIT TO BE RELOCATED TO CEILING DECK TO ACCOMMODATE NEW CONSTRUCTION.
 - RELOCATE FIRE ALARM HORN/STROBE. REWORK CIRCUIT AND EMT TO LOCATION INDICATED ON NEW WORK PLAN.
 - REMOVE PORTION OF TRANSFER SWITCH REMOTE ANNUNCIATOR CIRCUIT AND 3/4" EMT AS INDICATED. EMT CONTAINS 5-#14 STRANDED COPPER THHN CONDUCTORS. CIRCUIT TO BE RELOCATED TO ACCOMMODATE NEW CONSTRUCTION.
 - REMOVE 2 SETS OF 3-250 KCMIL, 1/0 N. AND #2 G. IN 2.5" EMT BETWEEN EXISTING ATS AND PANEL EM. CIRCUIT TO BE RELOCATED TO ACCOMMODATE NEW CONSTRUCTION.
 - REMOVE SECTION OF 1-1/4" SPRINKLER PIPING AND SPRINKLER HEAD. REWORK PIPING AND SPRINKLER HEAD TO LOCATION AS INDICATED ON NEW WORK PLAN. SPRINKLER PIPING AND HEAD TO BE RELOCATED TO ACCOMMODATE NEW CONSTRUCTION.
 - RELOCATE CHAIN HUNG LIGHTING FIXTURE TO ACCOMMODATE NEW CONSTRUCTION.

- NEW WORK PLAN KEYNOTES**
- PROVIDE 2 - 3/4" EMT TO REPLACE SINGLE RACEWAY REMOVED. LOCATE CLEAR OF REMAINING CONSTRUCTION. PROVIDE #10 CONDUCTORS IN ONE RACEWAY FOR CIRCUITS E3-7, E3-9, E3-11, AND E-10,12. PROVIDE #8 CONDUCTORS IN ONE RACEWAY FOR CIRCUIT E-6,8. FIELD VERIFY QUANTITIES OF CONDUCTORS AND PROVIDE NUMBERS AS REQUIRED RESTORE CIRCUIT OPERATION.
 - RELOCATED FIRE ALARM HORN/STROBE. PROVIDE FRAMING STRUT TO LOCATE MOUNTING BOX OPENING FLUSH WITH FRONT OF PANELBOARDS. RECONNECT AND TEST PER NFPA 72 REQUIREMENTS.
 - PROVIDE 5#14 STRANDED COPPER THHN CONDUCTORS IN 3/4" EMT TO REPLACE PORTION OF CIRCUIT AND RACEWAY REMOVED. LOCATE CLEAR OF REMAINING CONSTRUCTION. RECONNECT AND TEST FOR PROPER OPERATION.
 - PROVIDE 2 SETS OF 3-250 KCMIL, 1/0 N. AND #2 G. IN 2.5" EMT BETWEEN EXISTING ATS AND PANEL EM. LOCATE CLEAR OF REMAINING CONSTRUCTION.
 - PROVIDE 1-1/4" SPRINKLER PIPING TO ACCOMMODATE RELOCATION OF SPRINKLER HEAD AND RECONNECTION OF EXISTING HEAD TO REMAIN. LOCATE CLEAR OF REMAINING CONSTRUCTION.
 - REINSTALL LIGHTING FIXTURE AND EXTEND MC CABLE TO MAKE OPERATIONAL. LOCATE CLEAR OF REMAINING CONSTRUCTION.



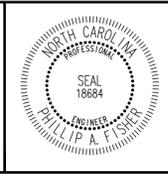
SWITCHGEAR ELECTRICAL PLAN - DEMOLITION - PHASE 1
SCALE: 1/4"=1'-0"



SWITCHGEAR ELECTRICAL PLAN - NEW WORK - PHASE 1
SCALE: 1/4"=1'-0"

P:\2022\22.03516-BUNCOMBE COUNTY COURTHOUSE ELEC UPGRADES\DRAWINGS\ELECTRICAL\22.03516 - ELECTRICAL PLANS.DWG PLOT DATE: 11/15/2023 10:16 AM SONJA ROBERTS

55 Broad Street
Asheville, NC 28801
828.252.0575
NC Firm License # C-0459
mcgillassociates.com



SIGNED AND DATED:
Phillip A. Fisher
Date: 2023.11.15 10:25:15 -0500

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NO.	DATE	BY	DESCRIPTION
0	11/15/2023	PAF	BID DOCUMENTS

BUNCOMBE COUNTY COURTHOUSE
ELECTRICAL UPGRADES
BUNCOMBE COUNTY
ASHEVILLE, NORTH CAROLINA

OFFICE MANAGER
M. CATHEY

DESIGNER
P. FISHER

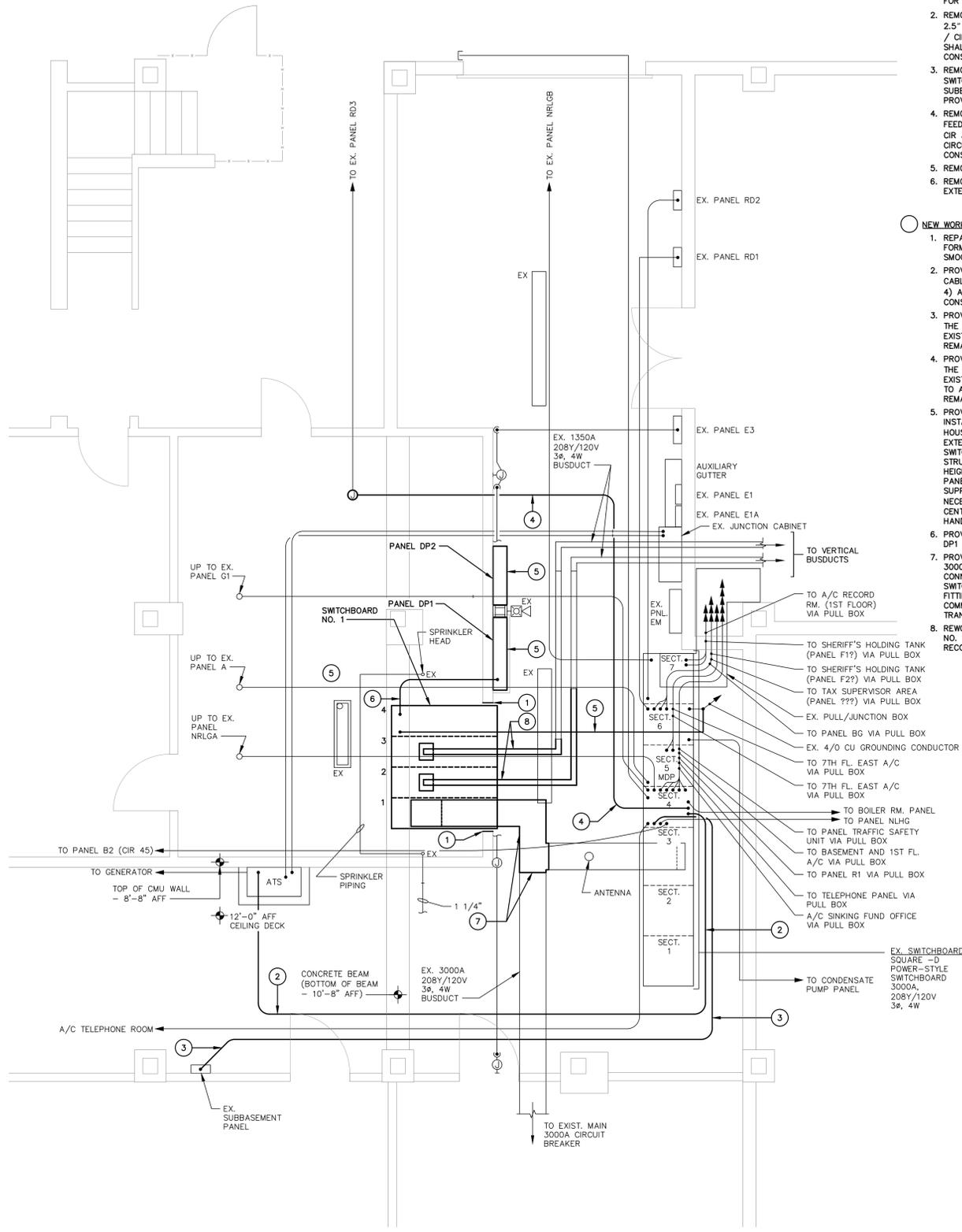
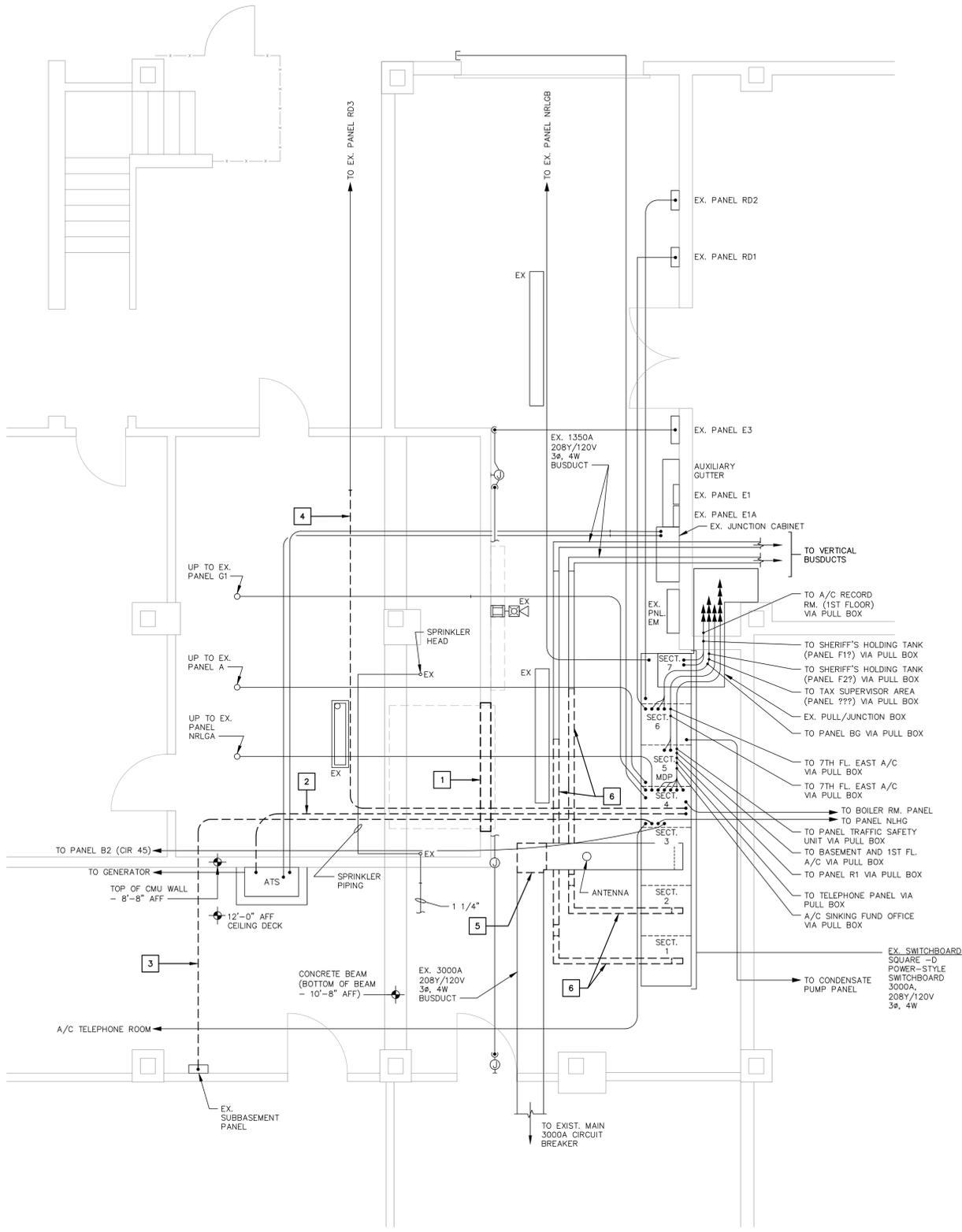
PROJECT MANAGER
P. FISHER

REVIEWER
P. FISHER

SWITCHGEAR ELECTRICAL PLANS
PHASE 1

DATE	PROJECT #	FUNDING #
NOVEMBER 2023	22.03516	N/A

SHEET
E-102



- DEMOLITION PLAN KEYNOTES**
- REMOVE PORTION OF 8'-8" HIGH 8" CMU WALL TO ACCOMMODATE NEW SWITCHBOARD. CHIP AWAY MORTAR AND FLOOR TO PROVIDE A SMOOTH AND LEVEL SURFACE FOR INSTALLATION OF SWITCHBOARD.
 - REMOVE 2 SETS OF 3-250 KCMIL, 1/0 N. AND #2 G. IN 2.5" EMT BETWEEN THE EXISTING SWITCHBOARD (SECT 4 / CIR 4) AND THE EXISTING AT'S. A TEMPORARY CIRCUIT SHALL BE PROVIDED TO MAINTAIN POWER DURING CONSTRUCTION.
 - REMOVE 4#3 IN 1.25" EMT BETWEEN THE EXISTING SWITCHBOARD (SECT 4 / CIR 3B) AND EXISTING SUBBASEMENT PANEL. A TEMPORARY CIRCUIT SHALL BE PROVIDED TO MAINTAIN POWER DURING CONSTRUCTION.
 - REMOVE A PORTION OF THE 4#3, #6 G. IN 1.25" EMT FEEDER BETWEEN THE EXISTING SWITCHBOARD (SECT 4 / CIR 3A) AND EXISTING PANEL RD3. A TEMPORARY CIRCUIT SHALL BE PROVIDED TO MAINTAIN POWER DURING CONSTRUCTION.
 - REMOVE THE EXISTING BUSDUCT "L" FITTING.
 - REMOVE SECTIONS OF 1200 A BUSDUCT TO PROVIDE FOR EXTENSION TO NEW SWITCHBOARD NO. 1.
- NEW WORK PLAN KEYNOTES**
- REPAIR WALL WHERE PORTION WAS REMOVED. PROVIDE FORMS AND GROUT EXPOSED CMU CAVITIES TO CREATE A SMOOTH FINISH AT WALL OPENING.
 - PROVIDE TWO TEMPORARY 4-250 KCMIL, #1 G. MC CABLES BETWEEN EXISTING SWITCHBOARD (SECT 4 / CIR 4) AND EXISTING AT'S. LOCATE CLEAR OF REMAINING CONSTRUCTION.
 - PROVIDE ONE TEMPORARY 4#2, 1#4 MC CABLE BETWEEN THE EXISTING SWITCHBOARD (SECT 4 / CIR 3B) AND EXISTING SUBBASEMENT PANEL. LOCATE CLEAR OF REMAINING CONSTRUCTION.
 - PROVIDE ONE TEMPORARY 4#2, 1#4 MC CABLE BETWEEN THE EXISTING SWITCHBOARD (SECT 4 / CIR 3A) AND EXISTING PANEL RD3. PROVIDE J-BOX WHERE INDICATED TO ACCOMMODATE FEEDER SPLICE. LOCATE CLEAR OF REMAINING CONSTRUCTION.
 - PROVIDE SWITCHBOARD NO. 1 AND PANELS DP1 AND DP2. INSTALL DP1 ON A 3" TALL CAST-IN-PLACE CONCRETE HOUSEKEEPING PAD. PROVIDE 4/0 CU IN 1.25" PVC TO EXTEND EXISTING GROUNDING CONDUCTOR FROM EXISTING SWITCHBOARD TO NEW SWITCHBOARD. PROVIDE METAL STRUT SUPPORT STAND TO SUPPORT PANEL DP2. SET HEIGHT OF DP2 TO MATCH HEIGHT OF DP1. ATTACH PANELS TO WALL; HOWEVER, ALL WEIGHT IS TO BE SUPPORTED DIRECTLY BY THE FLOOR. REDUCE HEIGHT, IF NECESSARY, TO MAINTAIN 6"-7" AFF MAX. TO THE CENTERLINE OF THE HIGHEST BREAKER OPERATING HANDLE.
 - PROVIDE FEEDERS FROM SWITCHBOARD NO. 1 TO PANELS DP1 AND DP2 AS INDICATED ON RISER DIAGRAM.
 - PROVIDE FEEDER BUSDUCT AND CONNECT TO EXISTING 3000 A BUSDUCT. TO ACCOMMODATE THE BUSDUCT CONNECTION WHILE MAINTAINING POWER TO THE EXISTING SWITCHBOARD, REPLACE THE EXISTING BUSDUCT "L" FITTING WITH A "T" FITTING. COMPLETE ALL TESTING AND COMMISSIONING OF SWITCHBOARD NO. 1 PRIOR TO TRANSFERRING ANY LOADS TO THE NEW SWITCHBOARD.
 - REWORK EXISTING 1200 A BUSDUCTS INTO SWITCHBOARD NO. 1. PROVIDE ADDITIONAL BUSDUCT AND FITTINGS TO RECONNECT AS INDICATED.

SWITCHGEAR ELECTRICAL PLAN - DEMOLITION - PHASE 2
SCALE: 1/4"=1'-0"

SWITCHGEAR ELECTRICAL PLAN - NEW WORK - PHASE 2
SCALE: 1/4"=1'-0"

55 Broad Street
Asheville, NC 28801
828.252.0575
NC Firm License # C-0459
mcgillassociates.com



SIGNED AND DATED: Digitally signed by Phillip A. Fisher Date: 2023.11.15 10:25:27 -0500

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NO.	DATE	BY	DESCRIPTION
0	11/15/2023	PAF	BID DOCUMENTS

BUNCOMBE COUNTY COURTHOUSE
ELECTRICAL UPGRADES
BUNCOMBE COUNTY
ASHEVILLE, NORTH CAROLINA

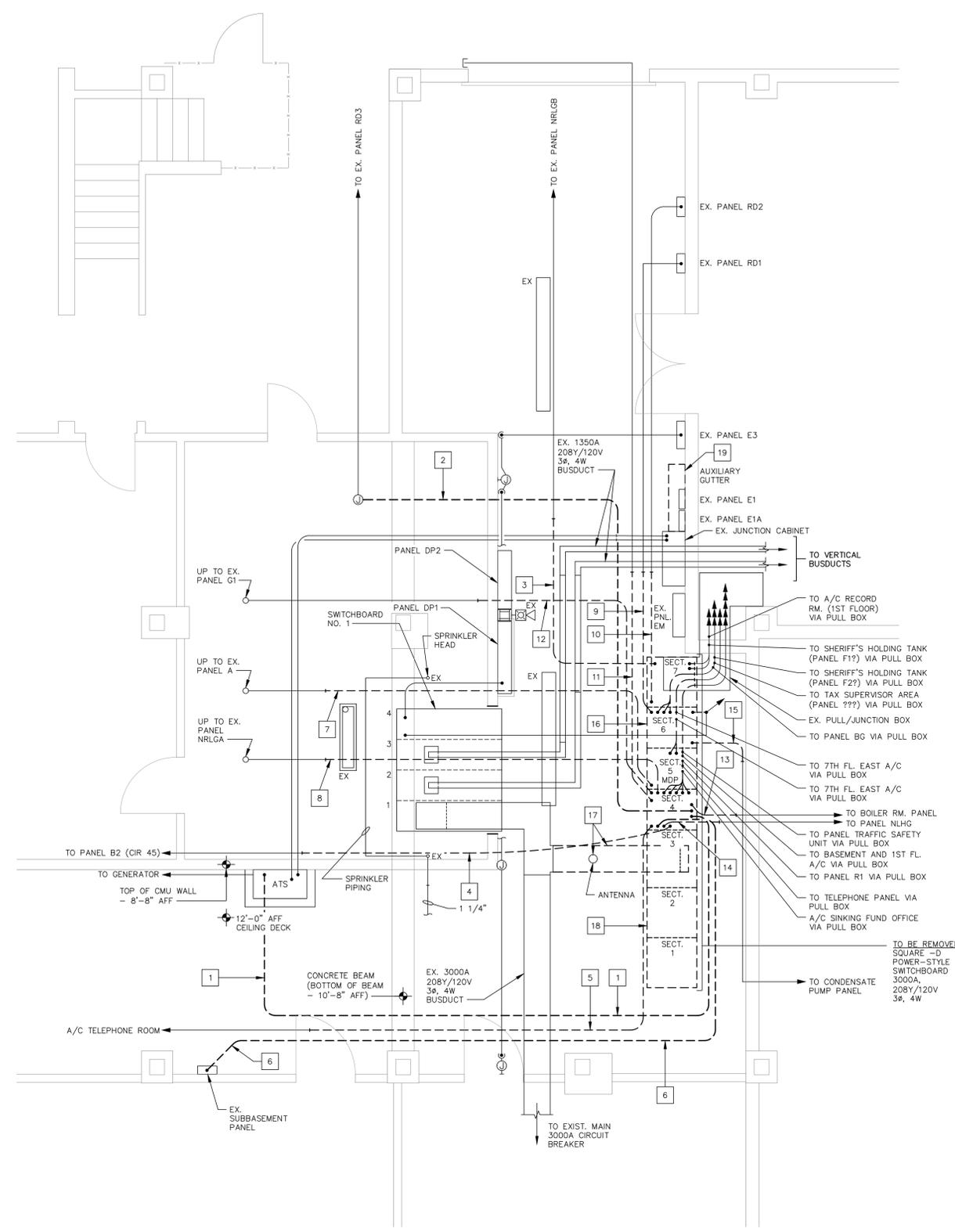
OFFICE MANAGER	DESIGNER
M. CATHEY	P. FISHER
PROJECT MANAGER	REVIEWER
P. FISHER	P. FISHER

SWITCHGEAR ELECTRICAL PLANS PHASE 2		DATE	PROJECT #	FUNDING #
		NOVEMBER 2023	22.03516	N/A

SHEET
E-103

P:\2022\22.03516-BUNCOMBECOUNTY-COURTHOUSE-ELEC-UPGRADES\DRAWINGS\ELECTRICAL\22.03516 - ELECTRICAL PLANS.DWG PLOT DATE: 11/15/2023 10:16 AM SOLJA ROBERTS

22.03516 BUNCOMBE COUNTY COURTHOUSE ELECTRICAL UPGRADES - ASHEVILLE, NC



- DEMOLITION PLAN KEYNOTES**
- REMOVE TEMPORARY MC CABLES BETWEEN EXISTING SWITCHBOARD AND EXISTING ATS.
 - REMOVE TEMPORARY MC CABLE BETWEEN EXISTING SWITCHBOARD AND EXISTING PANEL RD3.
 - REMOVE PORTION OF 4#4/0, #4G IN 2.5" EMT BETWEEN THE EXISTING SWITCHBOARD (SECT 7/CIR 4) AND EXISTING PANEL NRLGB.
 - REMOVE PORTION OF 2#6 IN .75" EMT BETWEEN THE EXISTING SWITCHBOARD (SECT 4/CIR 45) AND EXISTING PANEL B2.
 - REMOVE PORTION OF 4#3 IN 1.25" EMT BETWEEN THE EXISTING SWITCHBOARD (SECT 4/CIR 2B) AND EXISTING A/C TELEPHONE ROOM.
 - REMOVE TEMPORARY MC CABLE BETWEEN EXISTING SWITCHBOARD AND EXISTING SUBBASEMENT PANEL.
 - REMOVE PORTION OF 4#3/0 IN 2" EMT BETWEEN THE EXISTING SWITCHBOARD (SECT 5/CIR 7) AND EXISTING PANEL A.
 - REMOVE PORTION OF 4#4/0 IN 2" EMT BETWEEN THE EXISTING SWITCHBOARD (SECT 5/CIR 3) AND EXISTING PANEL NRLGA.
 - REMOVE PORTION OF 4#3/0, #4G IN 2" EMT BETWEEN THE EXISTING SWITCHBOARD (SECT 6/CIR 5) AND EXISTING PANEL RD1. COMPLETELY REMOVE FEEDER CONDUCTORS BETWEEN SWITCHBOARD AND PANEL RD1. MAINTAIN CONDUCTORS IN GOOD CONDITION FOR REPULLING.
 - REMOVE PORTION OF 4#3/0, #4G IN 2" EMT BETWEEN THE EXISTING SWITCHBOARD (SECT 7/CIR 7) AND EXISTING PANEL RD2. COMPLETELY REMOVE FEEDER CONDUCTORS BETWEEN SWITCHBOARD AND PANEL RD2. MAINTAIN CONDUCTORS IN GOOD CONDITION FOR REPULLING.
 - REMOVE PORTION OF EMPTY 1.25" EMT.
 - REMOVE PORTION OF 4#3 IN 1.25" EMT BETWEEN THE EXISTING SWITCHBOARD (SECT 4/CIR 2A) AND EXISTING PANEL G1. SWITCHBOARD IS LABELED "NEW SNACKBAR"; HOWEVER, SNACKBAR NO LONGER EXISTS.
 - REMOVE PORTION OF 3#3/0 IN 2" EMT BETWEEN THE EXISTING SWITCHBOARD (SECT 6/CIR 3) AND EXISTING BOILER ROOM PANEL.
 - REMOVE PORTION OF 4#3/0, #4G IN 2" EMT BETWEEN THE EXISTING SWITCHBOARD (SECT 2/CIR 1) AND EXISTING PANEL NLHG.
 - REMOVE PORTION OF 3#3/0 IN 2" EMT BETWEEN THE EXISTING SWITCHBOARD (SECT 7/CIR 5) AND EXISTING CONDENSATE PUMP PANEL.
 - DISCONNECT REMAINING FEEDER CIRCUITS CONNECTING TO EXISTING SWITCHBOARD NO. 1. THESE ALL ENTER THE SWITCHBOARD VIA THE EXISTING PULL BOX LOCATED ABOVE SECTION 7. THESE INCLUDE THE FOLLOWING:
 - SECT 7/CIR 6: SHERIFF'S HOLDING TANK (PANEL F1): 2#3/0, #3/0N
 - SECT 7/CIR 10: A/C RECORDS RM (1ST FLOOR): 3#6
 - SECT 6/CIR 2: SHERIFF'S HOLDING TANK (PANEL F2): 2#3/0, #3/0N
 - SECT 6/CIR 20: PANEL BG: 3#2
 - SECT 6/CIR 21: UNKNOWN (LABELED SPARE): 2-#3
 - SECT 5/CIR 9: 7TH FLOOR EAST A/C: 3-#4AL
 - SECT 5/CIR 10: 7TH FLOOR WEST A/C: 3-#4AL
 - SECT 4/CIR 43: PANEL TRAFFIC SAFETY UNIT: 2#6, #6N
 - SECT 4/CIR 44: BASEMENT & 1ST FLOOR A/C: 3#6
 - SECT 4/CIR 46: PANEL R1: 2#6
 - SECT 4/CIR 47: A/C SINKING FUND OFFICE: 3#10
 - SECT 4/CIR 48: TELEPHONE PANEL: 2#6
 - TEMPORARILY SUPPORT EXISTING ANTENNA. REMOVE EXISTING SECTION OF 3000 A BUSWAY.
 - REMOVE EXISTING SWITCHBOARD NO. 1 AND REMOVE ALL RACEWAYS THAT EXTEND ABOVE FLOOR SURFACE TO 1/2" BELOW FINISHED FLOOR. REMOVE PORTION OF 4/0 CU GROUNDING CONDUCTOR THAT CONNECTS TO SWITCHBOARD. MAINTAIN CONNECTION TO NEW SWITCHBOARD.
 - REMOVE EXISTING AUXILIARY GUTTER.

SWITCHGEAR ELECTRICAL PLAN - DEMOLITION - PHASE 3
SCALE: 1/4"=1'-0"

55 Broad Street
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SIGNED AND DATED:
Phillip A. Fisher
Date: 2023.11.15 10:25:40 -05'00'

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NO.	DATE	BY	DESCRIPTION
0	11/15/2023	PAF	BID DOCUMENTS

BUNCOMBE COUNTY COURTHOUSE ELECTRICAL UPGRADES

BUNCOMBE COUNTY

ASHEVILLE, NORTH CAROLINA

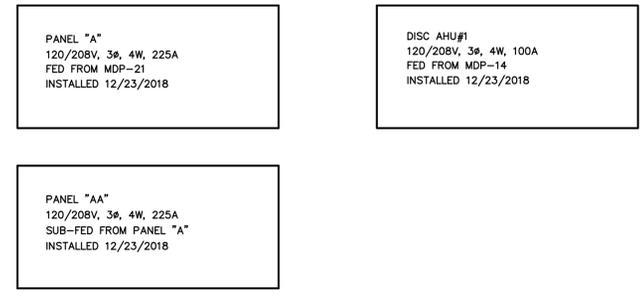
OFFICE MANAGER	DESIGNER
M. CATHEY	P. FISHER
PROJECT MANAGER	REVIEWER
P. FISHER	P. FISHER

SWITCHGEAR ELECTRICAL PLANS PHASE 3	
DATE	PROJECT #
NOVEMBER 2023	22.03516
FUNDING #	N/A

SHEET
E-104A

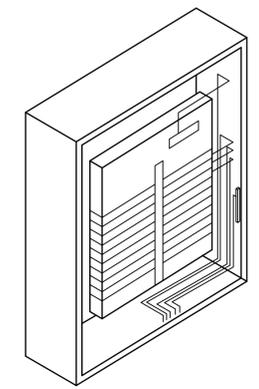
P:\2022\22.03516-BUNCOMBE COUNTY COURTHOUSE ELECTRICAL\22.03516 - ELECTRICAL DETAILS.DWG PLOT DATE 11/15/2023 10:16 AM SONIA ROBERTS

22.03516 BUNCOMBE COUNTY COURTHOUSE ELECTRICAL UPGRADES - ASHEVILLE, NC



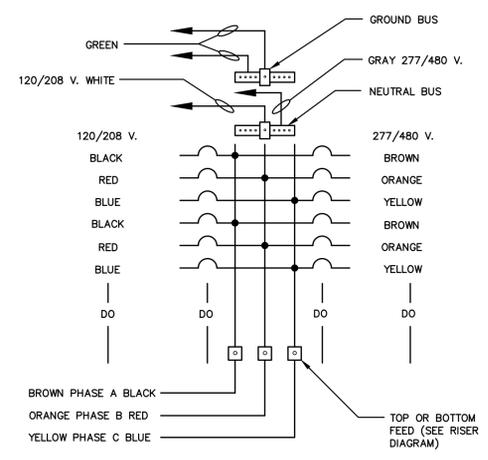
NOTES:
 1. REFER TO SPECIFICATION SECTION 260553 FOR ADDITIONAL INFORMATION.
 2. SUBMIT COMPLETE LIST OF PROPOSED NAMEPLATES TO ARCHITECT/ENGINEER FOR APPROVAL PRIOR TO FABRICATION.

E
 1 TYPICAL NAME PLATE DETAIL
 NOT TO SCALE

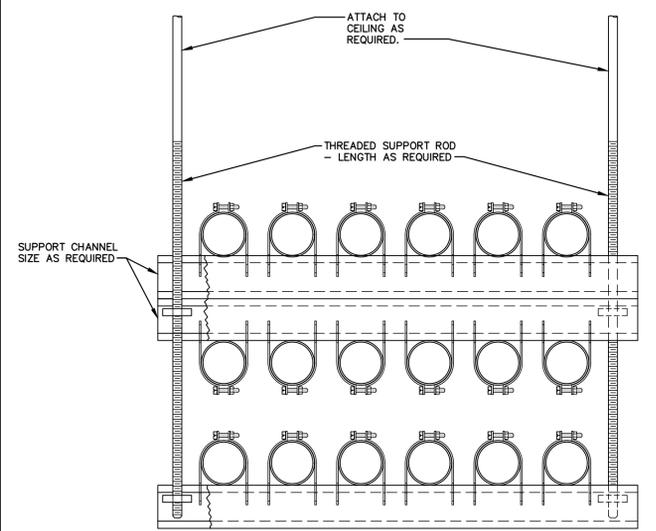


NOTES:
 1. ALL BENDS IN CONDUCTORS #10 AND SMALLER SHALL BE 90 DEGREES STRAIGHT AND TRUE. BENDS IN LARGER SIZE CONDUCTORS SHALL HAVE A UNIFORM RADIUS.
 2. BEND CONDUCTORS TOWARD THE BACK CORNERS OF THE PANEL CAN. BEND CONDUCTORS FORWARD TO CONNECT TO CIRCUIT BREAKERS.
 3. TIE WRAP CONDUCTORS TO FORM NEAT AND ORDERLY BUNDLES. AVOID EXCESSIVE USE OF TIE WRAPS.
 4. NO CONDUCTORS SHALL TOUCH PANEL CAN.
 5. FINISHED PANEL SHALL PRESENT A CLEAN, SHARP, AND ORDERLY APPEARANCE.
 6. EACH ELECTRICAL PANEL SHALL HAVE:
 A. AN ENGRAVED NAMEPLATE PERMANENTLY ATTACHED TO THE EXTERIOR COVER,
 B. A TYPEWRITTEN CIRCUIT DIRECTORY INSIDE EACH DOOR,
 C. A TYPEWRITTEN WIRING COLOR CODE INSIDE EACH DOOR.

E
 2 TYPICAL PANELBOARD WORKMANSHIP
 NOT TO SCALE



E
 2 WIRING COLOR CODING
 NOT TO SCALE



E
 4 TYPICAL CONDUIT HANGER DETAIL
 NOT TO SCALE

55 Broad Street
 Asheville, NC 28801
 828.252.0575
 NC Firm License # C-0459
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SIGNED AND DATED:
 Digitally signed by
Phillip A. Fisher
 Date: 2023.11.15
 10:26:08 -05'00'

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BUNCOMBE COUNTY COURTHOUSE
 ELECTRICAL UPGRADES
BUNCOMBE COUNTY
 ASHEVILLE, NORTH CAROLINA

AS NOTED

OFFICE MANAGER	DESIGNER
M. CATHEY	P. FISHER
PROJECT MANAGER	REVIEWER
P. FISHER	P. FISHER

ELECTRICAL DETAILS

DATE	PROJECT #	FUNDING #
NOVEMBER 2023	22.03516	N/A

SHEET
E-501

PANEL DP1															
CCT	LOAD	DESCRIPTION	C	G	W	CB	CCT	CCT	CB	W	G	C	DESCRIPTION	LOAD	CCT
1	0						2	2						0	2
3	0	CONDENSATE PUMP PANEL	2	4	3/0	200	3	4	200	3/0	4	2	BOILER RM PANEL	0	4
5	0					3P	5	6	3P					0	6
7	0						7	8						0	8
9	0	TAX SUPERVISOR AREA (PANEL NLHG)	2	4	3/0	200	9	10	200	3/0	4	2	PANEL A	0	10
11	0					3P	11	12	3P					0	12
13	0						13	14						0	14
15	0	A/C RECORDS RM - 1ST FL	1.25	8	6	100	15	16	225	4/0	4	2	PANEL NRLGA	0	16
17	0					3P	17	18	3P					0	18
19	0						19	20						0	20
21	0	PANEL BG	1.25	8	2	100	21	22	100	4	8	1.25	A/C 7TH FLOOR EAST	0	22
23	0					3P	23	24	3P					0	24
25	0						25	26						0	26
27	0	A/C BASEMENT & 1ST FL	1	10	6	60	27	28	100	4	8	1.25	A/C 7TH FLOOR WEST	0	28
29	0					3P	29	30	3P					0	30
31	0						31	32	200	3/0	6	2	SHERIFF'S HOLDING TANK (PANEL F1)	0	32
33	0	A/C SINKING FUND OFFICE	1	10	6	60	33	34	2P					0	34
35	0					3P	35	36	200	3/0	6	2	SHERIFF'S HOLDING TANK (PANEL F2)	0	36
37	0	UNKNOWN (LABELED AS SPARE)	1.25	8	3	100	37	38	2P					0	38
39	0	TRAFFIC SAFETY UNIT PANEL	1	10	6	60	39	40	60	6	10	1	PANEL R1	0	40
41	0					2P	41	42	60	6	10	1	TELEPHONE PANEL	0	42
43	0	SPACE ONLY					43	44	60					0	44
45	0	SPACE ONLY					45	46	2P					0	46
47	0	SPACE ONLY					47	48						0	48
49	0	SPACE ONLY					49	50	800					0	50
51	0	SPACE ONLY					51	52	3P	SEE	RISE		LUGS ONLY (TO PANEL DP2)	0	52
53	0	SPACE ONLY					53	54						0	54

120 / 208 V
3 PHASE
4 WIRE

800 A MINIMUM BUS SIZE
MAIN LUGS ONLY
42,000 MINIMUM AIC RATING

FLOOR NEMA 12
MOUNTING ENCLOSURE GROUND BAR

NOTES:
1. THE FOLLOWING CIRCUITS DO NOT HAVE NEUTRALS: 1,3,5; 13,15,17; 19,21,23; 25,27,29;
31,33,35; 37,39; 2,4,6; 20,22,24; 26,28,30; 40,42; 44,46
2. FIELD DETERMINE WHAT CIRCUIT 37,39 FEEDS AND LABEL PANEL ACCORDINGLY.
3.
4.

CONNECTED LOADS	
PH. A:	0.0 KVA
PH. B:	0.0 KVA
PH. C:	0.0 KVA
TOTAL:	0.0 KVA
DEMAND:	0.0 A

PANEL DP2															
CCT	LOAD	DESCRIPTION	C	G	W	CB	CCT	CCT	CB	W	G	C	DESCRIPTION	LOAD	CCT
1	0						2	2						0	2
3	0	PANEL NRLGB	2.5	4	4/0	200	3	4	100	3	8	1.25	PANEL G1	0	4
5	0					3P	5	6	3P					0	6
7	0						7	8						0	8
9	0	PANEL RD1	2	4	3/0	200	9	10	100	3	8	1.25	A/C TELEPHONE ROOM	0	10
11	0					3P	11	12	3P					0	12
13	0						13	14						0	14
15	0	PANEL RD2	2	4	3/0	200	15	16	100	3	8	1.25	PANEL RD3	0	16
17	0					3P	17	18	3P					0	18
19	0	PANEL B2	1	10	6	60	19	20						0	20
21	0					2P	21	22	100	3	8	1.25	SUBBASEMENT PANEL	0	22
23	0	SPACE ONLY					23	24	3P					0	24
25	0	SPACE ONLY					25	26						0	26
27	0	SPACE ONLY					27	28						0	28
29	0	SPACE ONLY					29	30						0	30
31	0	SPACE ONLY					31	32						0	32
33	0	SPACE ONLY					33	34						0	34
35	0	SPACE ONLY					35	36						0	36
37	0	SPACE ONLY					37	38						0	38
39	0	SPACE ONLY					39	40						0	40
41	0	SPACE ONLY					41	42						0	42

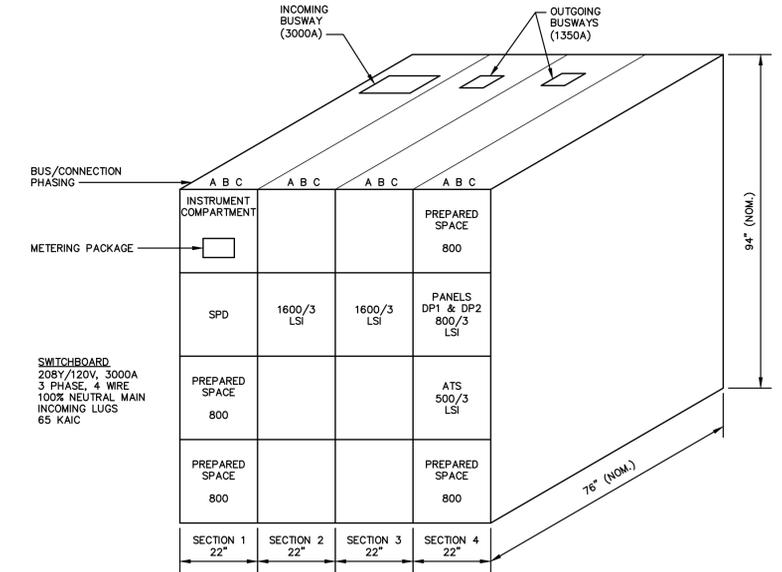
120 / 208 V
3 PHASE
4 WIRE

800 A MINIMUM BUS SIZE
MAIN LUGS ONLY
42,000 MINIMUM AIC RATING

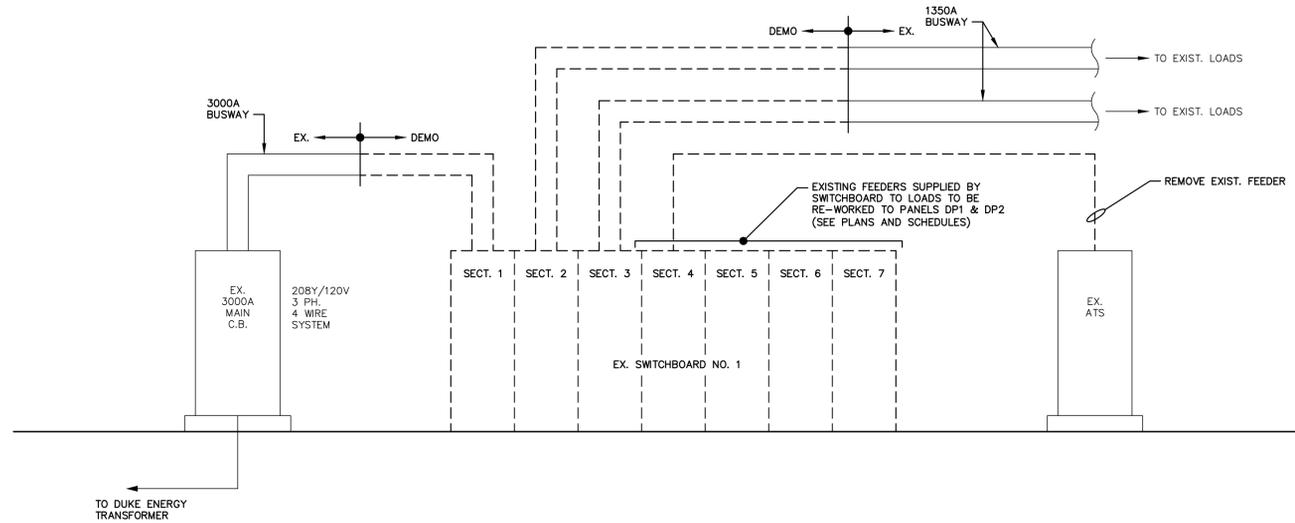
SURFACE NEMA 12
MOUNTING ENCLOSURE GROUND BAR

NOTES:
1. THE FOLLOWING CIRCUITS DO NOT HAVE NEUTRALS: 19,21

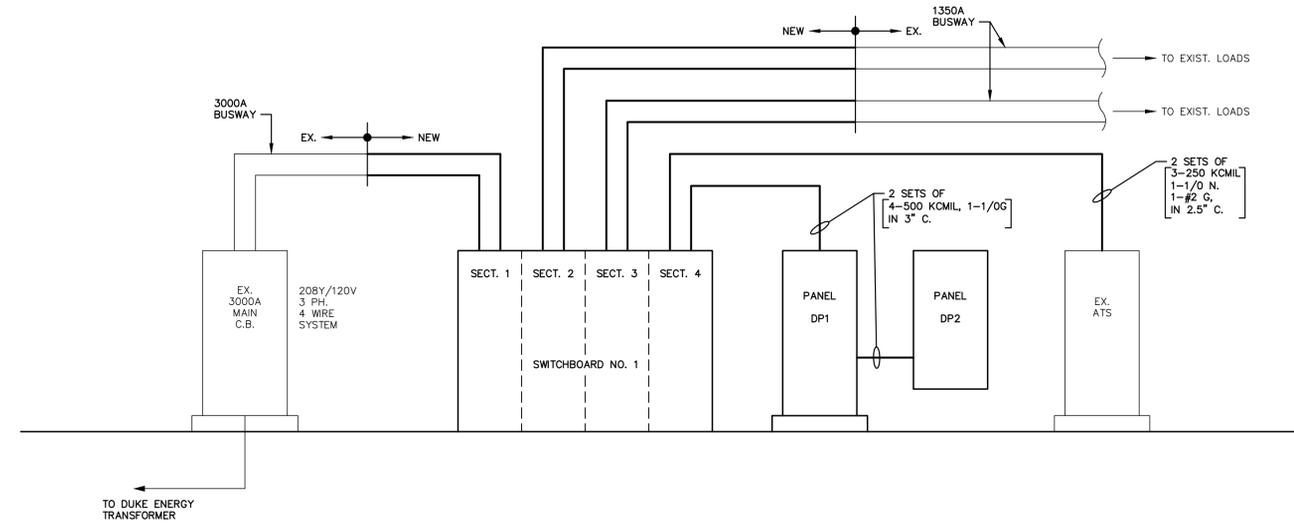
CONNECTED LOADS	
PH. A:	0.0 KVA
PH. B:	0.0 KVA
PH. C:	0.0 KVA
TOTAL:	0.0 KVA
DEMAND:	0.0 A



SWITCHBOARD NO. 1 ELEVATION
NOT TO SCALE



POWER RISER DIAGRAM - DEMOLITION
NOT TO SCALE



POWER RISER DIAGRAM - NEW WORK
NOT TO SCALE

P:\2022\22.03516-BUNCOMBE COURTHOUSE ELECTRICAL ONE-LINES.DWG PLOT DATE: 11/15/2023 10:17 AM SONJA ROBERTS

mcgill
55 Broad Street
Asheville, NC 28801
828.252.0575
NC Firm License # C-0459
mcgillassociates.com



SIGNED AND DATED:
Digitally signed by
Phillip A. Fisher
Date: 2023.11.15
10:28:21 -0500

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NO.	DATE	BY	DESCRIPTION
0	11/15/2023	PAF	BID DOCUMENTS

BUNCOMBE COUNTY COURTHOUSE
ELECTRICAL UPGRADES
BUNCOMBE COUNTY
ASHEVILLE, NORTH CAROLINA

AS NOTED	
OFFICE MANAGER	DESIGNER
M. CATHEY	P. FISHER
PROJECT MANAGER	REVIEWER
P. FISHER	P. FISHER

ELECTRICAL ONE-LINES AND SCHEDULES			
DATE	PROJECT #	FUNDING #	
NOVEMBER 2023	22.03516	N/A	

SHEET
E-601