

PROJECT MANUAL

**COOLING TOWER REPLACEMENT  
HAIRSTON MIDDLE SCHOOL  
GUILFORD COUNTY SCHOOLS**

DECEMBER 12, 2022

**SUD ASSOCIATES, P.A.**  
**CONSULTING ENGINEERS**  
**ASHEVILLE, NORTH CAROLINA**

**SET # \_\_\_\_\_**

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# Table Of Contents

## COOLING TOWER REPLACEMENT HAIRSTON MIDDLE SCHOOL GUILFORD COUNTY SCHOOLS

### GENERAL

00 01 01	TITLE PAGE
00 01 10	TABLE OF CONTENTS

### BIDDING REQUIREMENTS

00 11 13	ADVERTISEMENT FOR BIDS
00 43 13	BID BOND FORM
00 41 13.02	BID FORM
00 45 39	MWBE PROCEDURES
00 45 39.01	AFFIDAVIT A
00 45 39.02	AFFIDAVIT B
00 45 39.03	APPENDIX E
00 45 39.04	IDENTIFICATION OF M/WSED BE BUSINESS PARTICIPATION

### CONTRACT REQUIREMENTS

00 52 13	A 101 - 2017 STANDARD FORM OF AGREEMENT
00 52 13.01	A 101 - 2017 EXHIBIT A INSURANCE AND BONDS
00 53 13	A 201 - 2017 GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION
00 54 13	HUB PARTICIPATION REPORT CONSTRUCTION
00 61 13	A 312 - PERFORMANCE BOND AND PAYMENT BOND

### DIVISION 23 – MECHANICAL

23 05 10	BASIC MECHANICAL REQUIREMENTS
23 05 20	PIPING SPECIALTIES
23 05 23	GENERAL DUTY VALVES FOR HVAC PIPING
23 05 29	SUPPORTS, ANCHORS AND VIB ISOLATION
23 05 50	VARIABLE SPEED DRIVES
23 07 00	MECHANICAL INSULATION
23 21 60	PIPES AND PIPE FITTINGS
23 27 12	INDUCED DRAFT COOLING TOWER

### DIVISION 26 – ELECTRICAL

26 00 00	GENERAL REQUIREMENTS
26 00 75	ELECTRICAL IDENTIFICATION
26 00 80	ELECTRICAL TESTING
26 01 20	CONDUCTORS AND CABLES
26 01 30	RACEWAYS AND BOXES
26 04 10	ENCLOSED SWITCHES AND BREAKERS
26 05 01	COMMON WORK RESULT FOR ELECTRICAL
26 05 10	GROUNDING AND BONDING
26 27 26	WIRING DEVICES
26 28 13	FUSES

END OF TABLE OF CONTENTS

**Guilford County Schools**  
**ADVERTISEMENT FOR BIDS**  
**COOLING TOWER REPLACEMENT HAIRSTON MIDDLE SCHOOL**  
3911 Naco Road, Greensboro, NC 27401

Sealed proposals will be received by the Guilford County School System until **2:00 PM, January 12th, 2023** at 501 W. Washington Street room 100, Greensboro, NC 27401, and immediately thereafter opened. The bid tab will be distributed by GCS. The contractor may mail bids or hand deliver to be open at 2:00 PM, including all required supporting documentation, to furnish all materials and labor for the **COOLING TOWER REPLACEMENT HAIRSTON MIDDLE SCHOOL PROJECT**.

Plans, specifications, and contract documents will be available for inspection during business hours from December 12th, 2022, until bids are opened at the following locations: office of Sud Associates, P.A. 90 Southside Avenue, Suite 350, Asheville, NC; 828-255-4691. Electronic copies will be made available upon request. Bidders will be responsible for checking with the engineer for updates.

Questions regarding the bid should be directed [msaenger@sudassociates.com](mailto:msaenger@sudassociates.com)

A brief description of work in the project follows:

The existing cooling tower will be removed and replaced.  
A VSD will be added for the tower fan.  
New piping will be installed as needed to install the cooling tower.  
DDC controls will be installed on the new cooling tower. Install wells, sensors. Add points as necessary.  
Electrical will require modifications.

**A non mandatory pre-bid conference** will be held at the site at **10:00 AM, December 20th, 2022**. Attendance at this conference is recommended for all potential bidders to examine the existing conditions and to discuss particular details of the project. Bidders must be properly licensed for the work in accordance with Section 87 of the North Carolina General Statutes.

A 5% Bid Bond and 100% Performance and Labor and Material Payment Bonds are required for this project. Bids may not be withdrawn or changed for a period of 60 days after the scheduled closing time for the receipt of bids.

E-Verify Requirements: This project requires the awarded vendor to comply with the requirements of E-Verify. (U.S. law requiring companies to employ only individuals who may legally work in the United States – either U.S. citizens, or foreign citizens who have the necessary authorization.)

This project will be funded with ESSER funds and will require the contractor to follow the Guilford County Schools ESSER reporting requirements. See: 29 C.F.R. §§ 3.3, 5.5(a). <https://www.dol.gov/agencies/whd/government-contracts/construction/forms>

Minority businesses are encouraged to submit bids for this project. The appropriate forms from the section entitled “Participation by Women and Minority Owned Businesses” must be submitted with each bid to show good faith efforts to obtain Minority and Women Owned Business Enterprise participation.

The Guilford County Board of Education awards public contracts without regard to race, religion, color, creed, national origin, sex, age, or handicapped condition as defined by North Carolina General Statutes, Section 168A-3. The Board reserves the right to reject any or all bids presented and to waive any informalities and irregularities.

Guilford County Schools  
Shayla Parker  
Purchasing Director

# BID BOND FORM Section 00 43 13

KNOW ALL MEN BY THESE PRESENTS, That we,

\_\_\_\_\_  
(Bidder's Name)

\_\_\_\_\_, of \_\_\_\_\_  
(Street Address) (City, State, Zip)

Hereinafter called the Principal, and

\_\_\_\_\_  
(Surety's Name)

A corporation organized and existing under the Laws of the State of \_\_\_\_\_, and authorized to transact business in the State of \_\_\_\_\_, as Surety, hereinafter called Surety, are held and firmly bound unto the \_\_\_\_\_ (Owner).

Hereinafter called Obligee, in the Penal sum of five percent (5%) of the amount bid, good and lawful money of the United States of America, for the payment of which the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The Condition of this Obligation is such, that, WHEREAS the Principal has submitted a proposal to the Obligee on a contract for the construction

of \_\_\_\_\_

(Contract Name and Number)

NOW THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the Bidding or Contract Documents with good and sufficient surety for the faithful performance of such construction for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith

# BID BOND FORM Section 00 43 13

contract with another party to perform the Work covered by said bid, then this obligation shall be null and void; otherwise to remain in full force and effect.

In witness whereof, we have hereunto set our signatures and seal this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_, all pursuant to due authorization.

\_\_\_\_\_  
Principal (Seal)

\_\_\_\_\_  
By  
Surety

\_\_\_\_\_  
By  
Attorney-in-Fact in accordance with the attached Power of Attorney

STATE OF \_\_\_\_\_)

ss:

COUNTY OF \_\_\_\_\_)

I, \_\_\_\_\_, a Notary Public in and for the State and County aforesaid, do hereby certify that \_\_\_\_\_, and \_\_\_\_\_, whose names are signed to the foregoing bond, this day personally appeared before me in my State and County aforesaid and acknowledged the same.

Given under my hand seal this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_\_.

\_\_\_\_\_  
Notary Public (Seal)

My Commission expires:

Contract: Mechanical

Project: **Cooling Tower Replacement, Hairston Middle School**  
Guilford County Board of Education  
Guilford County, NC

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, has read all special and supplemental provisions furnished prior to the opening of bids, has satisfied himself relative to the work to be performed, and thereby proposes and agrees if this proposal is accepted, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the fabrication and delivery of the work, and other related work in full and complete accordance with the plans, specifications and contract documents, to the full and entire satisfaction of the Owner, with a definite understanding that no money will be allowed for extra work except as set forth in the General Conditions and other contract documents, on the **Cooling Tower Replacement, Hairston Middle School, 3911 Naco Road Greensboro, NC 27401.**

Bidders are advised that a notice to proceed may be issued upon approval by the Guilford County Board of Education, and in advance of the contract document.

The Bidder proposes and agrees, if this proposal is accepted, to execute a Contract within ten (10) days after notification of award, for the above work and for the below stated Compensation, in the form of AIA A107-2007 Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum., for the sum of:

**BASE BID:** \_\_\_\_\_

\_\_\_\_\_ Dollars (\$\_\_\_\_\_)

**ALT 1 BID:**

\_\_\_\_\_

\_\_\_\_\_ Dollars (\$\_\_\_\_\_)

**BID UNIT PRICES: NA**

**ADDENDA:**

The following addenda were received and used in computing this bid:

	Date	Initial
Addendum #1	_____	_____
Addendum #2	_____	_____
Addendum #3	_____	_____

The Bidder further proposes and agrees hereby to commence work under this contract on a date to be specified in a written order by the Owner or Designer and shall substantially complete the work on or before 170 days from the "Notice to Proceed" or the contract.

The undersigned further agrees that in the case of failure on his part to execute the said contract and the bond within ten (10) consecutive calendar days after written notice being given of the award of the 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. Attach certified check, cash or bid bond to this proposal.

RESPECTFULLY SUBMITTED this \_\_\_\_\_ day of \_\_\_\_\_, 2022.

\_\_\_\_\_  
(Name of firm or corporation making bid)

By: \_\_\_\_\_

Title: \_\_\_\_\_  
(Owner / Partner / President / Vice President)

License No. \_\_\_\_\_

Federal ID No. \_\_\_\_\_

WITNESS: (Proprietorship / Partnership)

By: \_\_\_\_\_

ATTEST: (Corporation)



# BID FORM Section 00 41 13.02

Contractor Initials & Date \_\_\_\_\_

By: \_\_\_\_\_

(CORPORATE SEAL)

Title: \_\_\_\_\_  
(Corporate Secretary or Asst. Secretary Only)

Guilford County Board of Education  
Administrative Procedure

Descriptor Term:  PARTICIPATION BY MINORITY AND WOMEN OWNED BUSINESSES (MWBE)		Descriptor Code:  DK-P	
Draft Date: March 29, 2007	Date Issued by the Superintendent:	Latest Revision Date: November 28, 2011	

The Guilford County Schools' MWBE Office, Facilities and Purchasing Departments are committed to:

- Getting maximum benefits for the students from the school system's state, local and federal funds carrying out the purchasing process in the best interest of the Guilford County Schools, its students and employees and the taxpayers of Guilford County.
- Acting in accordance with NC General Statutes, local Board of Education policies and procedures, and recognized professional purchasing practices.
- Providing a climate of fair and open competition for all qualified vendors.

A. For the purposes of this procedure, the following definitions shall apply:

1. "Bidder/Participant" – Any person, firm, partnership, corporation, association, or joint venture seeking to be awarded a public contract or subcontract.
2. "Contract" – A mutually binding legal document which defines a business relationship or any modification at the level of performance which obligates the seller to furnish supplies, equipment, materials or services, knowledge in performing construction and procurements, and obligating the buyer to pay for services.
3. "Contractors" – Any person, firm, partnership, corporation, association, or joint venture awarded a contract purchase or service agreement at any level with GCS or has contracted with the GCS to perform construction work or repair.
4. "Discrimination" – To distinguish, differentiate, separate, or segregate solely on the basis of age, race, religion, sex, national origin, handicap or veteran's status.
5. "Disabled" – A person with a disability as that term is defined in N.C. Gen. Stat. § 168A-3(7a).
6. "Equipment" – Includes materials, supplies, commodities, apparatus.

7. “Goal” – An objective, expressed numerically to evaluate the type and amount of public contract awards and performance of MWBE firms.
8. “Good Faith Effort” – An activity performed by bidders to assure the participation of MWBE firms in contracts covered under this plan.
9. “Joint Venture” – A legal merger of two or more separately owned businesses/firms for the purpose of submitting a single bid, to carry out a single business enterprise for profit, for which purpose they combine their property, capital, efforts, skills or knowledge.
10. “LEA” – Local Education Administration unit, thusly Guilford County Schools (GCS).
11. “Minority” - a person who is a citizen or lawful permanent resident of the United States and who is:
  - a. African-American, that is, a person having origins in any of the original 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 Island, regardless of race;
  - c. Native-American, that is, a person having origins in any of the original peoples of North America;
  - d. Asian-American, that is, persons having origin in any of the countries of the Far East, Southeast Asia, or the Indian areas.
12. “Minority or Women or Disabled or Disadvantaged Business Enterprises (MWBE )” – A business enterprise owned and controlled at a minimum of 51% by one or more members of a group defined as a minority or women. A business certified as an MWBE will show evidence of ownership and management interests and the daily business operations are real and continuing not created solely to meet the MWBE requirements.
13. “Owned and controlled” means a business, which is a: 1) sole proprietorship legitimately owned by a person who is a minority or white female; 2) a partnership or joint venture controlled by minorities and/or women, and in which at least 51% of the beneficial ownership interests legitimately are held by minorities and/or females, and in which at least 51% of the voting stock or interested 51% of the beneficial ownership interests are legitimately held by minorities and/or females. In addition, these persons must control the management and operations of the business on a day-to-day basis.
14. “Owner” – The Guilford County Board of Education (BOE).
15. “Subcontractor” – A firm under contract with the prime contractor for supplying materials or labor and materials and/or installation. The subcontractor may or may not provide materials in his subcontract. Work subcontracted in an emergency and which could not have been anticipated is excluded as a part of this program.
16. “Socially and Economically Disadvantaged Individual” – A person who is socially and economically disadvantaged as that term is 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 that are not socially disadvantaged.

17. “Verifiable Goal” –

- a. For purposes of separate prime contract system, that the awarding authority has adopted written guidelines specifying the actions that will be taken to ensure a good faith effort in the recruitment and selection of MWBE firms for participation in contracts awarded.
- b. For purposes of separate prime contract system, that the awarding authority has adopted written guidelines specifying the actions that the prime Contractor must take to ensure a good faith effort in the recruitment and selection of MWBE firms for participation in the contract awarded; and
- c. The required actions must be documented in writing by the prime contractors to the GCS.

B. GCS’s Duties

1. Identification/Certification of Minority, Women and Socially and Economically Disadvantaged Business Enterprises

- a. The school system shall affirmatively seek out and gain knowledge of minority and women-owned business enterprises (hereinafter MWBE) in the construction trades.
- b. The school system will maintain a list of products and services provided by MWBE firms.
- c. Attend the scheduled prebid conference.
- d. At least 10 days prior to the scheduled day of bid opening, notify MWBE firms that have requested notices from the GCS for public construction or repair work and MWBE firms that have indicated to the MWBE coordinator’s office 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.

- e. Utilize other media, as appropriate, likely to inform potential MWBE firms of the bid being sought.
- f. Maintain documentation of any contacts, correspondence, or conversation with MWBE firms made in an attempt to meet the goals.
- g. 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 MWBE firms 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 Guilford County Board of Education.
- h. Evaluate and analyze documentation to determine that a good faith effort has been achieved for MWBE utilization prior to recommendation of award to Guilford County Board of Education.
- i. Review prime contractor’s pay applications for compliance with MWBE utilization commitments prior to payment.
- j. Make documentation showing evidence of implementation of GCS’s responsibilities available for review by State Construction Office and HUB Office and other interested parties upon request.

C. Minority Business Subcontractor Goals

- 1. The goals set for participation by MWBE firms as subcontractors have been set at 12.46%. GCS goal for goods and services has been set at 10%.
- 2. The bidder must identify on its bid all MWBE firms that will be utilized on the project with corresponding total dollar value of the bid and an affidavit listing and documenting good faith efforts (Affidavit A) or an affidavit of self-performance of work (Affidavit B), 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).
- 3. The bidder must complete all Sections of Affidavit A and attach Affidavit A to its bid, with documentation of Good Faith Effort as required, including a description of the portion of work to be executed by MWBE firms expressed as a percentage of the total contract price, OR
- 4. Provide Affidavit B, which includes sufficient information for GCS to determine that the bidder does not customarily subcontract work on this type project.

The above information must be provided as required. Failure to earn at least 50 points from the Good Faith Efforts list on Affidavit A shall render the bid non-responsive. Achieving the participation goal of 12.46% creates a presumption that the bidder made the required Good Faith Effort. Regardless of the percentage of participation, however, ALL BIDDERS must complete and submit Affidavit A, and must further provide certain documentation as specified by Affidavit A with their bid in order to receive Good Faith Points for certain items. GCS also shall require the apparent lowest, responsible, responsive bidder to

provide additional documentation of Good Faith Efforts within 72 hours of notification of being the apparent lowest responsible, responsive bidder. Failure to submit these documents / information as requested shall be grounds for deduction of Good Faith Points. In the event such a deduction results in a failure to achieve the required number of Good Faith Points, the bid shall be rejected unless the bidder has otherwise demonstrated Good Faith Efforts.

#### D. Communications with MWBE firms

GCS shall provide information to MWBE firms about the GCS's construction program. This shall be accomplished by:

1. Sending a notice to each MWBE engaged in any aspect of school construction that is identified and certified for each school construction project that is advertised for bids;
2. Insuring that prospective MWBE bidders and subcontractors have access to bidding documents; and
3. Furnishing MWBE subcontractors with the name of prospective bidders on a project upon request, and providing prospective bidders with the schools system's list of known MWBE firms.

#### E. Designer

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

Attend the scheduled pre-bid conference to assist in the explanation of MWBE firms requirements to the prospective bidders.

Assist the owner to identify and notify prospective MWBE prime and subcontractors of potential contracting opportunities.

Maintain documentation of any contacts, correspondence, or conversation with MWBE firms made in an attempt to meet the goals.

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 MWBE firms 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.

During construction phase of the project, review "MWBE Documentation for Contract Payment" – (Appendix E) for compliance with MWBE utilization commitments. Submit Appendix E form with monthly pay applications to the owner.

Assist the Owner in evaluating any Contractor's request to terminate an MWBE, including, but not limited to, evaluation of the merits of termination request, and computation of percentage of completion of the work of the MWBE at issue.

Make documentation showing evidence of implementation of Designer's responsibilities available for review by State Construction Office and HUB Office, upon request.

## F. Anticipated Assurances from Contractors

1. Upon adoption of its verifiable goal GCS is expected to require bidders on projects to provide assurances in writing that they will make a good faith effort to solicit MWBE firms as subcontractors should they be awarded a construction contract. Bidders shall provide the following information to GCS and any other information requested in the attached forms:
  - a. Provide applicable GCS Affidavit A or B on bid date with backup information for any requested items as specified by Affidavit A or B. Failure to submit this information shall be deemed non-responsive and subject to rejection of bid.
  - b. An Identification of MWBE Participation form;
  - c. A description of the work, each named MWBE will perform; (AFFIDAVIT A, Section II)
  - d. The dollar amount of participation by each MWBE (AFFIDAVIT A, Section II) and
  - e. Documentation of Good Faith Efforts (Affidavit A, Section III)
2. A contractor's good faith effort to included but are not limited to involve MWBE firms in the project can be demonstrated by using, among other factors, the following:

Contacted at least three MWBE firms that reasonably could have been expected to submit a quote and that were known to the contractor, or available on approved lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed. "Contact" means contact by letter, fax, e-mail or other means to a viable and active address. Contractor must attach evidence of this contact to bid document to Affidavit A and submit with its bid.

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

Broken down or combined elements of work into economically feasible units to facilitate MWBE participation.

Worked with MWBE trade, community, or contractor organizations identified by the MWBE Administrator's Office and included in the bid documents that provide assistance in recruitment of MWBE firms.

Attended pre-bid meetings scheduled by the public owner.

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

Negotiated in good faith with interested MWBE firms and did not reject them as unqualified without discussion with entity a sound reasons based on their capabilities. Any

rejection of an MWBE based on lack of qualification should have the reasons documented in writing and submitted with Affidavit A with the bid.

Provided assistance to an otherwise qualified MWBE 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. Assist MWBE firms in obtaining the same unit pricing with the bidder's suppliers in order to help MWBE firms in establishing credit.

Negotiated joint venture and partnership arrangements with MWBE participation on this construction or repair project when possible.

Provide quick pay agreements and policies to enable MWBEs and suppliers to meet cash-flow demands.

3. Failure to submit backup information for any item required by Affidavit A may result in the bid being declared non responsive and subject to rejection.

#### G. MWBE Responsibilities

All MWBE firms must seek certification through the Department of Administration Office for Historically Underutilized Business ("HUB Office"). MWBEs who are not certified at the time the firm commits to provide services, should immediately apply for certification with the HUB Office. If the MWBE fails to submit an application or if the MWBE is not granted certification, that MWBE's contract dollars will not be counted as MWBE participation.

1. MWBE firms do not have to be certified to be listed on the bid documents; however, MWBE firms that have been awarded contracts will not be credited towards the Bidder's MWBE Participation Plan unless they are certified with the State of North Carolina.
2. MWBE firms should make every effort to establish contacts and relationships with contractors for potential future business, including attending pre-bid conferences and subscribing to industry and trade journals.
3. MWBE firms should also document all contact and communications made with contractors above so as to be able to assist the Grievance Designee in determining whether a complaint lodged by an MWBE against a bidder for failure to use good faith efforts is valid.
4. In addition, MWBE firms who are contacted by GCS or bidders should respond promptly as to whether or not they wish to submit a bid.
5. MWBE firms are urged to take advantage of appropriate technical assistance and training when it is available.

#### H. Subcontractor Replacement



1. The Director of Construction and the MWBE Administrator must be notified in writing immediately upon the need to replace any Subcontractor. The notification shall include the following:
  - a. The basis for the request to terminate;
  - b. The estimated percentage of completion of the work of the affected Subcontractor;
  - c. The amount due to the affected Subcontractor, if any, on account of work in place;
  - d. A description of any defective work;
  - e. The estimated cost of any corrective work; and
  - f. Any back charges claimed against the affected Subcontractor.
2. A Contractor shall not replace a mechanical, electrical or plumbing Subcontractor listed on its bid without the prior written consent of the Director of Construction (following prior notification to the Board) for good cause shown. A Contractor shall not replace an MWBE listed on its Affidavit A without the prior written consent of the Director of Construction and the MWBE Administrator (following prior notification to the Board) and for good cause shown.
3. Upon receipt of notification from a Contractor that it seeks to replace a Subcontractor, the Director of Construction shall inform the Superintendent or his designee. The Director of Construction also shall immediately provide the affected Subcontractor written notice of the request, and an opportunity of no less than seven (7) days within which to respond.

The response of the affected Subcontractor shall include the following:

- a. Subcontractor's response(s) to Contractor's allegation(s) offered in support of termination;
- b. The estimated percentage of completion of the work of the affected Subcontractor;
- c. The amount due to the affected Subcontractor if any, on account of work in place;
- d. Subcontractor's response to any claims of defective work;
- e. Subcontractor's response to any claims for back charges; and
- f. A list of all second tier subcontractors, vendors and suppliers, including for each the amount paid to date, amount currently due, and total contract value.

4. After receiving the response of the affected Subcontractor, if any, the Director of Construction may require the Contractor, the affected Subcontractor or both to submit further documentation in support of their position.
5. Prior to, or as a condition of, giving approval to replace a Subcontractor, the Director of Construction may require the Contractor and the affected Subcontractor to mediate any dispute.
6. If approval for termination is granted, the Contractor shall immediately pay any undisputed amounts owed to the affected Subcontractor.
7. The Contractor shall make and document Good Faith Efforts in the selection of a substitute Subcontractor to the same extent required of Bidders submitting an initial bid under N.C. Gen. Stat. § 143-128.2 and Guilford County Board of Education's MWBE Procedure. If the Subcontractor to be replaced is an MWBE, Contractor shall use its best efforts to select another MWBE to serve as a substitute Subcontractor.

The Director of Construction and the MWBE Administrator must approve any substitute Subcontractor in writing.

***Emergency Circumstances Exception as defined in the Financial Services Procedure Manual Section 7.3 page 51: GCS may waive the utilization requirements if it is determined that an emergency exists that requires goods or services to be provided with such immediacy that the contractor is unable to comply with the replacement procedure.***

#### I. Penalties for Contractor Noncompliance

1. The low bidder or bidders on a school construction project must provide assurance in writing to the BOE prior to the acceptance of their bid that they have made a good faith effort to meet the verifiable goal for MWBE participation adopted by the BOE.
2. When deciding whether or not a bidder has made a good faith effort, the BOE shall consider whether the bidder has met the verifiable goal for MWBE participation, as well as the criteria set forth above, including the number of certified MWBE firms available and capable of performing the work and the amount of other work being awarded or performed in the market area of the GCS.
3. Failure of a low bidder to make and demonstrate a good faith effort to meet the goal shall result in the bid being considered as non-responsive and being rejected.
4. Failure to comply with the requirements of this GCS Good Faith Effort policy may lead to the contractor's disqualification from bidding on and receiving other GCS contracts.
5. In the event that any contractor or subcontractor fails to provide requested records for inspection, such failure shall constitute a material breach of the contract and will permit the imposition of remedies noted in this section.

#### K. Competitive Bids

Nothing contained herein is to be construed as to require the GCS or contractors to purchase supplies and equipment or award contracts to MWBE firms whom do not submit the lowest responsible bid.

L. Grievance Procedures

It is the policy of this BOE that disputes, which involve a person's rights, duties or privileges, should be settled through informal procedures. Any participant feeling himself/herself aggrieved by implementation of the MWBE Program may present such grievance to the Superintendent or his designee. The grievance (internal complaint resolution) procedure is a resource available to all contractors, subcontractors, and vendors doing business with the Guilford County Schools under the MWBE Program. Grievances related to the administration of the MWBE Program will be processed as follows:

1. The grievance shall first be discussed with the responsible operating department. If the grievance is not resolved, exercise item #2.
2. The grievance (complaint) must be reported in writing, including a brief description and supporting documentation and evidence to the Superintendent's designee at 712 N. Eugene Street, Greensboro, North Carolina, 27401.
3. The Superintendent's designee will review the basis and the issue(s) of the complaint and may request additional supporting evidence. A response to the grievance will be completed within fifteen (15) working days unless circumstances mandate otherwise. Parties involved will be notified of any and all delays in processing the grievance.
4. Any participant not satisfied with the decision of the Superintendent's designee may avail himself/herself or any remedies available under applicable Federal, State and Local law.

To that end, MWBE disputes arising under these guidelines should be resolved.

The total value of minority business contracting will be (\$)\_\_\_\_\_.

## AFFIDAVIT A

This Affidavit and **ALL THREE (3) SECTIONS** Herein Must Be Completed By **ALL BIDDERS** and Submitted with Bid.

### Section I - Listing of the Good Faith Effort

**Bidder must earn at least 50 points from the Good Faith Efforts list for their Bid to be considered responsive and must submit documentation supporting all items checked within the timeframes set forth in Section III below.**

I have made Good Faith Effort to comply under the following areas checked:

- 1 - 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. "Contact" means contact by letter, fax, e-mail or other means to a viable and active address. **CONTRACTOR MUST ATTACH EVIDENCE OF CONTACT TO THIS AFFIDAVIT AND SUBMIT WITH BID.** Value = 10 points.
- 2.-Made the construction plans, specifications and requirements available for review by prospective MWBE businesses, or providing these documents to them at least 10 days before the bids are due. Value = 10 points.
- 3 - Broken down or combined elements of work into economically feasible units to facilitate minority participation. Value = 15 points.
- 4 - Worked with MWBE 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 MWBE'S. Value = 10 points.
- 5 - Attended prebid meetings scheduled by the public owner. Value = 10 points.
- 6 - Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors. Value = 20 points.
- 7 - Negotiated in good faith with interested MWBE'S and did not reject them as unqualified without discussing with MWBE'S sound reasons based on their capabilities. **CONTRACTOR MUST ATTACH TO THIS AFFIDAVIT AND SUBMIT WITH BID COPIES OF QUOTES OR RESPONSES FROM ALL FIRMS SUBMITTING QUOTES OR RESOPNSES, AND, IF APPLICABLE, WRITTEN JUSTIFICATION FOR ANY REJECTION OF A MWBE BASED ON LACK OF QUALIFICATION.** Value = 15 points.
- 8 - Provided assistance to an otherwise qualified MWBE 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 MWBE businesses in establishing credit. Value = 25 points.
- 9 - Negotiated joint venture and partnership arrangements with MWBE businesses in order to increase opportunities for MWBE business participation on the construction or repair project when possible. Value = 20 points.
- 10 - Provided quick pay agreements and policies to enable MWBE contractors and suppliers to meet cash-flow demands. Value = 20 points.

The undersigned hereby certifies that he or she has read the terms of the MWBE business commitment, that the bidder has made the Good Faith Efforts in the areas checked above, and that he or she is authorized to bind the bidder to the commitment herein set forth.

Date: \_\_\_\_\_ Name of Authorized Officer: \_\_\_\_\_

Signature: \_\_\_\_\_

## Section II - Portion of the Work to be Performed by Minority Firms

I will expend a minimum of \_\_\_\_\_% of the total dollar amount of the contract with MWBE. MWBE 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 necessary)

Name and Phone Number	*MWBE Category	Work description	Dollar Value

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

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with MWBE 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: \_\_\_\_\_

### Section III – Documentation of Good Faith Efforts

**ALL BIDDERS**, regardless of percentage of MWBE participation, **MUST** provide documentation of all Good Faith Efforts checked in Section I within the timeframes set forth in Parts A and B below.

Failure to submit these documents / information shall be grounds for deduction of Good Faith Points. In the event such a deduction results in a failure to achieve the required number of Good Faith Points, the Bid shall be rejected unless the bidder has otherwise demonstrated Good Faith Efforts.

#### **PART A (Documentation Required to be Submitted With Bid)**

Documentation **MUST** be provided **WITH THE BID** in order for the bidder to receive credit for certain items checked. If the bidder checked Items 1 or 7 in Section I, the bidder **MUST** provide documentation supporting those Good Faith Efforts **WITH THE BID**.

Examples of such documentation include, but are not limited to, the following:

#### **ITEM 1**

- Copies of solicitations for quotes to at least three (3) MWBE's 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.
- Copies of quotes and responses received from each firm responding to the solicitation.
- A telephone log of follow-up calls to each firm sent a solicitation.

#### **ITEM 7**

- Copies of quotes or responses received from all firms submitting quotes or responses for each subcontract, and, if applicable a letter detailing the reason(s) for any rejection of minority business(es) due to lack of qualification.

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

Date: \_\_\_\_\_ Name of Authorized Officer: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_



State of North Carolina, County of \_\_\_\_\_  
Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_  
Notary Public \_\_\_\_\_  
My commission expires \_\_\_\_\_

**PART B (Documentation Required to be Submitted Within 72 Hours of Notification)**

Certain documentation **MUST** be provided within 72 hours of notification of being the apparent lowest responsible, responsive bidder in order to receive credit for certain additional Items checked. If the bidder checked Items 2, 3, 4, 5, 6, 8, 9 or 10, the bidder **MUST** provide documentation supporting those Good Faith Efforts within 72 hours of notification of being the apparent lowest responsible, responsive bidder.

Examples of such documentation include, but are not limited to the following:

**ITEM 2**

- Invitation to view construction plans, specifications and requirements.
- Cover letter enclosing construction plans, specifications and requirements.

**ITEM 3**

- Copies of all bid solicitations or request for proposals broken down by scope of work.
- Letter detailing contractor's efforts to break down or combine elements of work into economically feasible units to facilitate minority participation.

**ITEM 4**

- Documentation of any contacts or correspondence to MWBE, community, or contractor organizations in an attempt to meet the goal.

**ITEM 5**

- Copy of pre-bid roster.

**ITEM 6**

- Letter documenting efforts to provide assistance in obtaining required bonding or insurance for MWBE.

**ITEM 8**

- 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.

**ITEM 9**

- Letter documenting negotiations with MWBE businesses to create joint venture or partnership arrangement for the construction or repair project.

**ITEM 10**

- Copy of quick pay agreements.
- Copy of quick pay policies.

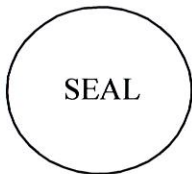
---

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

Date: \_\_\_\_\_ Name of Authorized Officer: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_



State of North Carolina, County of \_\_\_\_\_  
Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_  
Notary Public \_\_\_\_\_  
My commission expires \_\_\_\_\_

## 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 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 North Carolina, County of \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_

Notary Public \_\_\_\_\_

My commission expires \_\_\_\_\_







# DRAFT AIA® Document A101™ – 2017

## Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

**AGREEMENT** made as of the « » day of « » in the year « »  
(In words, indicate day, month and year.)

**BETWEEN** the Owner:  
(Name, legal status, address and other information)

« Guilford County Schools »« »  
« Building Services »  
«3920 Naco Road »  
« Greensboro, NC 27401 »

and the Contractor:  
(Name, legal status, address and other information)

« »« »  
« »  
« »  
« »

for the following Project:  
(Name, location and detailed description)

«Cooling Tower Replacement Hairston Middle School»  
«3911 Naco Road»  
«Greensboro, NC 27401»

The Architect:  
(Name, legal status, address and other information)

«Sud Associates, P.A. »« »  
«90 Southside Avenue, Suite 350 »  
«Asheville, N.C 28801 »  
« »

The Owner and Contractor agree as follows.

**ADDITIONS AND DELETIONS:**  
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101™-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201™-2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.



**ELECTRONIC COPYING** of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

## TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS

### EXHIBIT A INSURANCE AND BONDS

#### ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

#### ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

#### ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:  
(Check one of the following boxes.)

- The date of this Agreement.
- A date set forth in a notice to proceed issued by the Owner.
- Established as follows:  
(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

#### § 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:  
(Check one of the following boxes and complete the necessary information.)

[ « » ] Not later than « » ( « » ) calendar days from the date of commencement of the Work.

[ « » ] By the following date: « »

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages shall be assessed as set forth in Section 4.5.

#### ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » (\$ « » ), subject to additions and deductions as provided in the Contract Documents.

#### § 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement. (Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum: (Identify each allowance.)

Item	Price

#### § 4.4 Unit prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)

#### § 4.5 Liquidated damages:

§ 4.5.1 Should the Contractor fail to achieve substantial completion within the Contract Time, as adjusted, Contractor shall pay to the Owner \_\_\_\_\_ and No/100 Dollars (\$\_\_\_\_\_) for each day beyond the Contract Time, as may be adjusted for which Substantial Completion has not been achieved, and \_\_\_\_\_ and No/100 Dollars (\$\_\_\_\_\_) for each day beyond the Contract Time, as may be adjusted for which Final Completion has not been achieved, not as a penalty, but as liquidated damages.

§ 4.5.2 Contractor and Owner agree to the daily sum of \_\_\_\_\_ and No/100 Dollars (\$\_\_\_\_\_) as liquidated damages because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would sustain in the event the Contractor fails to achieve Substantial Completion within the Contract Time, as may be adjusted, and that the daily sum of \_\_\_\_\_ and No/100 Dollars (\$\_\_\_\_\_) as liquidated damages because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would sustain in the event the Contractor fails to achieve Final Completion within the Contract Time, as may be adjusted. « »

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

<< >>

**ARTICLE 5 PAYMENTS**

**§ 5.1 Progress Payments**

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

<< >>

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the <> day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the <> day of the <following> month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than <> (<>) days after the Architect receives the Application for Payment.

(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values, unless objected to by the Owner or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work; and
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld or nullified a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect or Owner may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

### § 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

*(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)*

« Five percent (5%) »

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:

*(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)*

« Once fifty percent (50%) of the Work has been completed, provided the Owner finds that satisfactory progress is being made and subject to the consent of the Surety, the Owner may authorize payment to the Contractor in full of any progress payment for work performed beyond the fifty percent (50%) stage of completion. If a reduction in retainage has been made, the Owner may increase the retainage back to five percent (5%) at any time if the Owner concludes that the Contractor is not progressing the work in a timely or satisfactory manner. The Owner may also if agreed by the Contractor release retainage to the Contractor and direct the Contractor to reduce the retainage of a particular subcontractor.

If a reduction in retainage has been made, the Owner may increase the retainage back to five percent (5%) at any time if the Owner concludes that the Contractor is not progressing the work in a timely or satisfactory manner. The Owner may also if agreed by the Contractor release retainage to the Contractor and direct the Contractor to reduce the retainage of a particular subcontractor.

»

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Final Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

### § 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

« »

### § 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

*(Insert rate of interest agreed upon, if any.)*

«Eight percent (8) % » «per annum »

**ARTICLE 6 DISPUTE RESOLUTION**

**§ 6.1 Initial Decision Maker**

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker. (If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

«Sud Associates, P.A.»  
«90 Southside Avenue Suite 350»  
«Asheville, NC 28801»

**§ 6.2 Binding Dispute Resolution**

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows: (Check the appropriate box.)

- Arbitration pursuant to Section 15.4 of AIA Document A201–2017
- Litigation in a court of competent jurisdiction
- Other (Specify)

« Litigation, unless the Owner elects Arbitration pursuant to Section 15.4 of AIA Document A201-2017, as modified. »

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

**ARTICLE 7 TERMINATION OR SUSPENSION**

**§ 7.1** The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

**§ 7.2** The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

**ARTICLE 8 MISCELLANEOUS PROVISIONS**

**§ 8.1** Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

**§ 8.2** The Owner’s representative:  
(Name, address, email address, and other information)

«Tracy Nance»  
«Guilford County Schools»  
«Building Services 3920 Naco Road»  
«Greensboro, NC 27401»  
«nancet2@gcsnc.com»

**§ 8.3** The Contractor’s representative:  
(Name, address, email address, and other information)

« »  
« »  
« »  
« »



<< >>  
<< >>

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

### § 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™-2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™-2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201-2017, may be given in accordance with AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

*(If other than in accordance with AIA Document E203-2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)*

<< >>

§ 8.7 Other provisions:

<< >>

## ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™-2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™-2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™-2017, General Conditions of the Contract for Construction
- .4 AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

*(Insert the date of the E203-2013 incorporated into this Agreement.)*

<< >>

- .5 Drawings

Number	Title	Date
See Attachment A Drawing Sheet		

- .6 Specifications

Section	Title	Date	Pages
See Attachment B TOC			

- .7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

- .8 Other Exhibits:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[  ] AIA Document E204™-2017, Sustainable Projects Exhibit, dated as indicated below:  
(Insert the date of the E204-2017 incorporated into this Agreement.)

[  ] The Sustainability Plan:

Title	Date	Pages

[  ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
See A101 Exhibit A 2017	Insurance and Bonds		

.9 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™-2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

This Agreement entered into as of the day and year first written above.

\_\_\_\_\_  
**OWNER** (Signature)

\_\_\_\_\_  
(Printed name and title)

\_\_\_\_\_  
**CONTRACTOR** (Signature)

\_\_\_\_\_  
(Printed name and title)

# DRAFT AIA® Document A101™ – 2017

## Exhibit A

### *Insurance and Bonds*

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the « » day of « » in the year « »  
(In words, indicate day, month and year.)

for the following **PROJECT**:  
(Name and location or address)

«Cooling Tower Replacement Hairston Middle School »  
«3911 Naco Road Greensboro, NC 27401»

**THE OWNER:**  
(Name, legal status and address)

«Guilford County Schools »« »  
«3920 Naco Road Greensboro, NC 27401 »

**THE CONTRACTOR:**  
(Name, legal status and address)

« »« »  
« »

#### TABLE OF ARTICLES

- A.1 GENERAL
- A.2 OWNER'S INSURANCE
- A.3 CONTRACTOR'S INSURANCE AND BONDS
- A.4 SPECIAL TERMS AND CONDITIONS

#### ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201™–2017, General Conditions of the Contract for Construction.

#### ARTICLE A.2 OWNER'S INSURANCE

##### § A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

##### § A.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

**ADDITIONS AND DELETIONS:**  
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Document A201™–2017, General Conditions of the Contract for Construction. Article 11 of A201™–2017 contains additional insurance provisions.

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### § A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 **Deductibles and Self-Insured Retentions.** If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

### § A.2.3.2 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any insurance required by this Section A.2, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

## ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

### § A.3.1 General

§ A.3.1.1 **Certificates of Insurance.** The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 **Deductibles and Self-Insured Retentions.** The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 **Additional Insured Obligations.** To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the

Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

### § A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

*(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)*

<< >>

### § A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than ~~five million dollars~~ (\$ ~~5,000,000~~ ) each occurrence, ~~ten million dollars~~ (\$ ~~10,000,000~~ ) general aggregate, and ~~five million dollars~~ (\$ ~~5,000,000~~ ) aggregate for products-completed operations hazard, providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal injury and advertising injury;
- .3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- .1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- .3 Claims for bodily injury other than to employees of the insured.
- .4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- .8 Claims related to roofing, if the Work involves roofing.
- .9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the Work involves such hazards.
- .11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than ~~one million dollars~~ (\$ ~~1,000,000~~ ) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than «one million dollars» (\$ «1,000,000» ) each accident, «one million dollars» (\$ «1,000,000» ) each employee, and «five million dollars» (\$ «5,000,000» ) policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than «two million dollars» (\$ «2,000,000» ) per claim and «two million dollars» (\$ «2,000,000» ) in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than «one million dollars» (\$ «1,000,000» ) per claim and «two million dollars» (\$ «2,000,000» ) in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than «two million dollars» (\$ «2,000,000» ) per claim and «two million dollars» (\$ «2,000,000» ) in the aggregate.

§ A.3.2.11 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than «two million dollars» (\$ «2,000,000» ) per claim and «four million dollars» (\$ «4,000,000» ) in the aggregate.

### § A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

*(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)*

« »

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

*(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)*

[ « » ] § A.3.3.2.1 Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner

shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below: *(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)*

« »

- [ « » ] **§ A.3.3.2.2 Railroad Protective Liability Insurance**, with policy limits of not less than « » (\$ « » ) per claim and « » (\$ « » ) in the aggregate, for Work within fifty (50) feet of railroad property.
- [ « » ] **§ A.3.3.2.3 Asbestos Abatement Liability Insurance**, with policy limits of not less than « » (\$ « » ) per claim and « » (\$ « » ) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.
- [ « » ] **§ A.3.3.2.4** Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.
- [ « » ] **§ A.3.3.2.5** Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.
- [ « » ] **§ A.3.3.2.6 Other Insurance**  
*(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)*

**Coverage**

**Limits**

**§ A.3.4 Performance Bond and Payment Bond**

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:  
*(Specify type and penal sum of bonds.)*

Type	Penal Sum (\$0.00)
Payment Bond	100%
Performance Bond	100%

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

**ARTICLE A.4 SPECIAL TERMS AND CONDITIONS**

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

« »

# DRAFT AIA® Document A201™ – 2017

## General Conditions of the Contract for Construction

### for the following PROJECT:

(Name and location or address)

«Cooling Tower Replacement Hairston Middle School »  
«3911 Naco Road Greensboro, NC 27401 »

### THE OWNER:

(Name, legal status and address)

«Guilford County Schools »« »  
«3920 Naco Road Greensboro, NC 27401 »

### THE ARCHITECT:

(Name, legal status and address)

«Sud Associates, P.A. »« »  
«90 Southside Ave. Suite 350 Asheville, NC 28801 »

### TABLE OF ARTICLES

1	GENERAL PROVISIONS
2	OWNER
3	CONTRACTOR
4	ARCHITECT
5	SUBCONTRACTORS
6	CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
7	CHANGES IN THE WORK
8	TIME
9	PAYMENTS AND COMPLETION
10	PROTECTION OF PERSONS AND PROPERTY
11	INSURANCE AND BONDS
12	UNCOVERING AND CORRECTION OF WORK
13	MISCELLANEOUS PROVISIONS
14	TERMINATION OR SUSPENSION OF THE CONTRACT
15	CLAIMS AND DISPUTES

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## INDEX

(Topics and numbers in bold are Section headings.)

### **Acceptance of Nonconforming Work**

9.6.6, 9.9.3, **12.3**

Acceptance of Work

9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, 12.3

### **Access to Work**

**3.16**, 6.2.1, 12.1

Accident Prevention

10

Acts and Omissions

3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5,

10.2.8, 13.3.2, 14.1, 15.1.2, 15.2

Addenda

1.1.1

Additional Costs, Claims for

3.7.4, 3.7.5, 10.3.2, 15.1.5

### **Additional Inspections and Testing**

9.4.2, 9.8.3, 12.2.1, **13.4**

### **Additional Time, Claims for**

3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, **15.1.6**

### **Administration of the Contract**

3.1.3, **4.2**, 9.4, 9.5

Advertisement or Invitation to Bid

1.1.1

Aesthetic Effect

4.2.13

### **Allowances**

**3.8**

### **Applications for Payment**

4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.5.4, 9.6.3, 9.7, 9.10

Approvals

2.1.1, 2.3.1, 2.5, 3.1.3, 3.10.2, 3.12.8, 3.12.9,

3.12.10.1, 4.2.7, 9.3.2, 13.4.1

### **Arbitration**

8.3.1, 15.3.2, **15.4**

## **ARCHITECT**

**4**

**Architect**, Definition of

**4.1.1**

Architect, Extent of Authority

2.5, 3.12.7, 4.1.2, 4.2, 5.2, 6.3, 7.1.2, 7.3.4, 7.4, 9.2,

9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1,

13.4.1, 13.4.2, 14.2.2, 14.2.4, 15.1.4, 15.2.1

Architect, Limitations of Authority and

Responsibility

2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2,

4.2.3, 4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4,

9.4.2, 9.5.4, 9.6.4, 15.1.4, 15.2

Architect's Additional Services and Expenses

2.5, 12.2.1, 13.4.2, 13.4.3, 14.2.4

Architect's Administration of the Contract

3.1.3, 3.7.4, 15.2, 9.4.1, 9.5

Architect's Approvals

2.5, 3.1.3, 3.5, 3.10.2, 4.2.7

Architect's Authority to Reject Work

3.5, 4.2.6, 12.1.2, 12.2.1

Architect's Copyright

1.1.7, 1.5

Architect's Decisions

3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3,

7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1,

13.4.2, 15.2

Architect's Inspections

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.4

Architect's Instructions

3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.4.2

Architect's Interpretations

4.2.11, 4.2.12

Architect's Project Representative

4.2.10

Architect's Relationship with Contractor

1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2,

3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16,

3.18, 4.1.2, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5,

9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.3.2, 13.4, 15.2

Architect's Relationship with Subcontractors

1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3

Architect's Representations

9.4.2, 9.5.1, 9.10.1

Architect's Site Visits

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4

Asbestos

10.3.1

Attorneys' Fees

3.18.1, 9.6.8, 9.10.2, 10.3.3

Award of Separate Contracts

6.1.1, 6.1.2

### **Award of Subcontracts and Other Contracts for Portions of the Work**

**5.2**

### **Basic Definitions**

**1.1**

Bidding Requirements

1.1.1

Binding Dispute Resolution

8.3.1, 9.7, 11.5, 13.1, 15.1.2, 15.1.3, 15.2.1, 15.2.5,

15.2.6.1, 15.3.1, 15.3.2, 15.3.3, 15.4.1

Bonds, Lien

7.3.4.4, 9.6.8, 9.10.2, 9.10.3

### **Bonds, Performance, and Payment**

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**, 11.1.3, **11.5**

### **Building Information Models Use and Reliance**

**1.8**

Building Permit

3.7.1

### **Capitalization**

**1.3**

Certificate of Substantial Completion

9.8.3, 9.8.4, 9.8.5

### **Certificates for Payment**

4.2.1, 4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7,

9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.4

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Certificates of Inspection, Testing or Approval  
13.4.4  
Certificates of Insurance  
9.10.2  
**Change Orders**  
1.1.1, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3,  
7.1.2, 7.1.3, **7.2**, 7.3.2, 7.3.7, 7.3.9, 7.3.10, 8.3.1,  
9.3.1.1, 9.10.3, 10.3.2, 11.2, 11.5, 12.1.2  
**Change Orders**, Definition of  
**7.2.1**  
**CHANGES IN THE WORK**  
2.2.2, 3.11, 4.2.8, **7**, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1,  
11.5  
**Claims**, Definition of  
**15.1.1**  
Claims, Notice of  
1.6.2, 15.1.3  
**CLAIMS AND DISPUTES**  
3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, **15**, 15.4  
Claims and Timely Assertion of Claims  
15.4.1  
**Claims for Additional Cost**  
3.2.4, 3.3.1, 3.7.4, 7.3.9, 9.5.2, 10.2.5, 10.3.2, **15.1.5**  
**Claims for Additional Time**  
3.2.4, 3.3.1, 3.7.4, 6.1.1, 8.3.2, 9.5.2, 10.3.2, **15.1.6**  
**Concealed or Unknown Conditions, Claims for**  
**3.7.4**  
Claims for Damages  
3.2.4, 3.18, 8.3.3, 9.5.1, 9.6.7, 10.2.5, 10.3.3, 11.3,  
11.3.2, 14.2.4, 15.1.7  
Claims Subject to Arbitration  
15.4.1  
**Cleaning Up**  
**3.15**, 6.3  
Commencement of the Work, Conditions Relating to  
2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3,  
6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.2, **15.1.5**  
**Commencement of the Work**, Definition of  
**8.1.2**  
**Communications**  
3.9.1, **4.2.4**  
Completion, Conditions Relating to  
3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1,  
9.10, 12.2, 14.1.2, 15.1.2  
**COMPLETION, PAYMENTS AND**  
**9**  
Completion, Substantial  
3.10.1, 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1,  
9.10.3, 12.2, 15.1.2  
Compliance with Laws  
2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 10.2.2,  
13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14.1.1, 14.2.1.3,  
15.2.8, 15.4.2, 15.4.3  
Concealed or Unknown Conditions  
3.7.4, 4.2.8, 8.3.1, 10.3  
Conditions of the Contract  
1.1.1, 6.1.1, 6.1.4

Consent, Written  
3.4.2, 3.14.2, 4.1.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 13.2,  
15.4.4.2  
**Consolidation or Joinder**  
**15.4.4**  
**CONSTRUCTION BY OWNER OR BY**  
**SEPARATE CONTRACTORS**  
1.1.4, **6**  
**Construction Change Directive**, Definition of  
**7.3.1**  
**Construction Change Directives**  
1.1.1, 3.4.2, 3.11, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3,  
**7.3**, 9.3.1.1  
Construction Schedules, Contractor's  
3.10, 3.11, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2  
**Contingent Assignment of Subcontracts**  
**5.4**, 14.2.2.2  
**Continuing Contract Performance**  
**15.1.4**  
**Contract**, Definition of  
**1.1.2**  
**CONTRACT, TERMINATION OR**  
**SUSPENSION OF THE**  
5.4.1.1, 5.4.2, 11.5, **14**  
Contract Administration  
3.1.3, 4, 9.4, 9.5  
Contract Award and Execution, Conditions Relating  
to  
3.7.1, 3.10, 5.2, 6.1  
Contract Documents, Copies Furnished and Use of  
1.5.2, 2.3.6, 5.3  
**Contract Documents**, Definition of  
**1.1.1**  
**Contract Sum**  
2.2.2, 2.2.4, 3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.3, 7.4,  
**9.1**, 9.2, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.5, 12.1.2,  
12.3, 14.2.4, 14.3.2, 15.1.4.2, **15.1.5**, **15.2.5**  
**Contract Sum**, Definition of  
**9.1**  
Contract Time  
1.1.4, 2.2.1, 2.2.2, 3.7.4, 3.7.5, 3.10.2, 5.2.3, 6.1.5,  
7.2.1.3, 7.3.1, 7.3.5, 7.3.6, 7, 7, 7.3.10, 7.4, 8.1.1,  
8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 12.1.2,  
14.3.2, 15.1.4.2, 15.1.6.1, 15.2.5  
**Contract Time**, Definition of  
8.1.1  
**CONTRACTOR**  
**3**  
Contractor, Definition of  
**3.1**, **6.1.2**  
**Contractor's Construction and Submittal**  
**Schedules**  
**3.10**, 3.12.1, 3.12.2, 4.2.3, 6.1.3, 15.1.6.2  
Contractor's Employees  
2.2.4, 3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6,  
10.2, 10.3, 11.3, 14.1, 14.2.1.1  
**Contractor's Liability Insurance**  
**11.1**

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Contractor's Relationship with Separate Contractors and Owner's Forces  
3.12.5, 3.14.2, 4.2.4, 6, 11.3, 12.2.4  
Contractor's Relationship with Subcontractors  
1.2.2, 2.2.4, 3.3.2, 3.18.1, 3.18.2, 4.2.4, 5, 9.6.2, 9.6.7, 9.10.2, 11.2, 11.3, 11.4  
Contractor's Relationship with the Architect  
1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5.1, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.4, 15.1.3, 15.2.1  
Contractor's Representations  
3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2  
Contractor's Responsibility for Those Performing the Work  
3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8  
Contractor's Review of Contract Documents  
3.2  
Contractor's Right to Stop the Work  
2.2.2, 9.7  
Contractor's Right to Terminate the Contract  
14.1  
Contractor's Submittals  
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2, 9.8.3, 9.9.1, 9.10.2, 9.10.3  
Contractor's Superintendent  
3.9, 10.2.6  
Contractor's Supervision and Construction Procedures  
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 7.3.6, 8.2, 10, 12, 14, 15.1.4  
Coordination and Correlation  
1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1  
Copies Furnished of Drawings and Specifications  
1.5, 2.3.6, 3.11  
Copyrights  
1.5, **3.17**  
Correction of Work  
2.5, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, **12.2**, 12.3, 15.1.3.1, 15.1.3.2, 15.2.1  
**Correlation and Intent of the Contract Documents**  
**1.2**  
**Cost**, Definition of  
**7.3.4**  
Costs  
2.5, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.4, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6, 11.2, 12.1.2, 12.2.1, 12.2.4, 13.4, 14  
**Cutting and Patching**  
**3.14**, 6.2.5  
Damage to Construction of Owner or Separate Contractors  
3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 12.2.4  
Damage to the Work  
3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 12.2.4  
Damages, Claims for  
3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.3.2, 11.3, 14.2.4, 15.1.7

Damages for Delay  
6.2.3, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 14.3.2  
**Date of Commencement of the Work**, Definition of  
**8.1.2**  
**Date of Substantial Completion**, Definition of  
**8.1.3**  
**Day**, Definition of  
**8.1.4**  
Decisions of the Architect  
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.4.2, 14.2.2, 14.2.4, 15.1, 15.2  
**Decisions to Withhold Certification**  
9.4.1, **9.5**, 9.7, 14.1.1.3  
Defective or Nonconforming Work, Acceptance, Rejection and Correction of  
2.5, 3.5, 4.2.6, 6.2.3, 9.5.1, 9.5.3, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1  
Definitions  
1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 5.1, 6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1  
**Delays and Extensions of Time**  
**3.2**, **3.7.4**, 5.2.3, 7.2.1, 7.3.1, **7.4**, **8.3**, 9.5.1, **9.7**, 10.3.2, **10.4**, 14.3.2, **15.1.6**, 15.2.5  
**Digital Data Use and Transmission**  
**1.7**  
Disputes  
6.3, 7.3.9, 15.1, 15.2  
**Documents and Samples at the Site**  
**3.11**  
**Drawings**, Definition of  
**1.1.5**  
Drawings and Specifications, Use and Ownership of  
3.11  
Effective Date of Insurance  
8.2.2  
**Emergencies**  
**10.4**, 14.1.1.2, **15.1.5**  
Employees, Contractor's  
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3.3, 11.3, 14.1, 14.2.1.1  
Equipment, Labor, or Materials  
1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2  
Execution and Progress of the Work  
1.1.3, 1.2.1, 1.2.2, 2.3.4, 2.3.6, 3.1, 3.3.1, 3.4.1, 3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.6, 8.2, 9.5.1, 9.9.1, 10.2, 10.3, 12.1, 12.2, 14.2, 14.3.1, 15.1.4  
Extensions of Time  
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2, 10.4, 14.3, 15.1.6, **15.2.5**  
**Failure of Payment**  
9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2  
Faulty Work  
(See Defective or Nonconforming Work)  
**Final Completion and Final Payment**  
4.2.1, 4.2.9, 9.8.2, **9.10**, 12.3, 14.2.4, 14.4.3

This document has been modified from the original Form AIA A201-2017 Document. As a result, references in this Index may no longer be accurate. To the extent there are conflicts between this Index and the language in the body of the document, the language in the body of the document shall control.

Financial Arrangements, Owner's  
2.2.1, 13.2.2, 14.1.1.4

## **GENERAL PROVISIONS**

### **1**

#### **Governing Law**

##### **13.1**

Guarantees (See Warranty)

#### **Hazardous Materials and Substances**

##### **10.2.4, 10.3**

Identification of Subcontractors and Suppliers  
5.2.1

#### **Indemnification**

3.17, **3.18**, 9.6.8, 9.10.2, 10.3.3, 11.3

#### **Information and Services Required of the Owner**

2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10.1, 6.1.3, 6.1.4, 6.2.5,  
9.6.1, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2,  
14.1.1.4, 14.1.4, 15.1.4

#### **Initial Decision**

##### **15.2**

#### **Initial Decision Maker, Definition of**

1.1.8

Initial Decision Maker, Decisions

14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5

Initial Decision Maker, Extent of Authority

14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5

#### **Injury or Damage to Person or Property**

##### **10.2.8, 10.4**

Inspections

3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3,

9.9.2, 9.10.1, 12.2.1, 13.4

Instructions to Bidders

1.1.1

Instructions to the Contractor

3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.4.2

**Instruments of Service, Definition of**

##### **1.1.7**

Insurance

6.1.1, 7.3.4, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5,

##### **11**

Insurance, Notice of Cancellation or Expiration

11.1.4, 11.2.3

#### **Insurance, Contractor's Liability**

##### **11.1**

Insurance, Effective Date of

8.2.2, 14.4.2

#### **Insurance, Owner's Liability**

##### **11.2**

#### **Insurance, Property**

##### **10.2.5, 11.2, 11.4, 11.5**

Insurance, Stored Materials

9.3.2

## **INSURANCE AND BONDS**

### **11**

Insurance Companies, Consent to Partial Occupancy

9.9.1

Insured loss, Adjustment and Settlement of

11.5

Intent of the Contract Documents

1.2.1, 4.2.7, 4.2.12, 4.2.13

## **Interest**

### **13.5**

#### **Interpretation**

1.1.8, 1.2.3, **1.4**, 4.1.1, 5.1, 6.1.2, 15.1.1

Interpretations, Written

4.2.11, 4.2.12

Judgment on Final Award

15.4.2

#### **Labor and Materials, Equipment**

1.1.3, 1.1.6, **3.4**, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,

5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1,

10.2.4, 14.2.1.1, 14.2.1.2

Labor Disputes

8.3.1

Laws and Regulations

1.5, 2.3.2, 3.2.3, 3.2.4, 3.6, 3.7, 3.12.10, 3.13, 9.6.4,

9.9.1, 10.2.2, 13.1, 13.3.1, 13.4.2, 13.5, 14, 15.2.8,

15.4

Liens

2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8

Limitations, Statutes of

12.2.5, 15.1.2, 15.4.1.1

Limitations of Liability

3.2.2, 3.5, 3.12.10, 3.12.10.1, 3.17, 3.18.1, 4.2.6,

4.2.7, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 9.6.8, 10.2.5, 10.3.3,

11.3, 12.2.5, 13.3.1

Limitations of Time

2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7,

5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3,

9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15,

15.1.2, 15.1.3, 15.1.5

#### **Materials, Hazardous**

##### **10.2.4, 10.3**

Materials, Labor, Equipment and

1.1.3, 1.1.6, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,

5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2,

10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2

Means, Methods, Techniques, Sequences and

Procedures of Construction

3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2

Mechanic's Lien

2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8

#### **Mediation**

8.3.1, 15.1.3.2, 15.2.1, 15.2.5, 15.2.6, **15.3**, 15.4.1,

15.4.1.1

#### **Minor Changes in the Work**

1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1, **7.4**

## **MISCELLANEOUS PROVISIONS**

### **13**

**Modifications, Definition of**

##### **1.1.1**

Modifications to the Contract

1.1.1, 1.1.2, 2.5, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7,

10.3.2

#### **Mutual Responsibility**

##### **6.2**

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**Nonconforming Work, Acceptance of**

9.6.6, 9.9.3, **12.3**

Nonconforming Work, Rejection and Correction of  
2.4, 2.5, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4,  
12.2

**Notice**

**1.6**, 1.6.1, 1.6.2, 2.1.2, 2.2.2., 2.2.3, 2.2.4, 2.5, 3.2.4,  
3.3.1, 3.7.4, 3.7.5, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 7.4,  
8.2.2 9.6.8, 9.7, 9.10.1, 10.2.8, 10.3.2, 11.5, 12.2.2.1,  
13.4.1, 13.4.2, 14.1, 14.2.2, 14.4.2, 15.1.3, 15.1.5,  
15.1.6, 15.4.1

Notice of Cancellation or Expiration of Insurance  
11.1.4, 11.2.3

**Notice of Claims**

1.6.2, 2.1.2, 3.7.4, 9.6.8, 10.2.8, **15.1.3**, 15.1.5,  
15.1.6, 15.2.8, 15.3.2, 15.4.1

Notice of Testing and Inspections  
13.4.1, 13.4.2

Observations, Contractor's  
3.2, 3.7.4

**Occupancy**

2.3.1, 9.6.6, 9.8

**Orders, Written**

1.1.1, 2.4, 3.9.2, 7, 8.2.2, 11.5, 12.1, 12.2.2.1, 13.4.2,  
14.3.1

**OWNER**

**2**

**Owner, Definition of**

**2.1.1**

**Owner, Evidence of Financial Arrangements**

**2.2**, 13.2.2, 14.1.1.4

**Owner, Information and Services Required of the**

2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5,  
9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1,  
13.4.2, 14.1.1.4, 14.1.4, 15.1.4

**Owner's Authority**

1.5, 2.1.1, 2.3.32.4, 2.5, 3.4.2, 3.8.1, 3.12.10, 3.14.2,  
4.1.2, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1,  
7.3.1, 8.2.2, 8.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2,  
10.3.2, 11.4, 11.5, 12.2.2, 12.3, 13.2.2, 14.3, 14.4,  
15.2.7

**Owner's Insurance**

**11.2**

**Owner's Relationship with Subcontractors**

1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2

**Owner's Right to Carry Out the Work**

**2.5**, 14.2.2

**Owner's Right to Clean Up**

**6.3**

**Owner's Right to Perform Construction and to  
Award Separate Contracts**

**6.1**

**Owner's Right to Stop the Work**

**2.4**

**Owner's Right to Suspend the Work**

14.3

**Owner's Right to Terminate the Contract**

14.2, 14.4

**Ownership and Use of Drawings, Specifications  
and Other Instruments of Service**

1.1.1, 1.1.6, 1.1.7, **1.5**, 2.3.6, 3.2.2, 3.11, 3.17, 4.2.12,  
5.3

**Partial Occupancy or Use**

9.6.6, **9.9**

**Patching, Cutting and**

**3.14**, 6.2.5

**Patents**

3.17

**Payment, Applications for**

4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1,  
14.2.3, 14.2.4, 14.4.3

**Payment, Certificates for**

4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1,  
9.10.3, 14.1.1.3, 14.2.4

**Payment, Failure of**

9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2

**Payment, Final**

4.2.1, 4.2.9, **9.10**, 12.3, 14.2.4, 14.4.3

**Payment Bond, Performance Bond and**

**7.3.4.4**, 9.6.7, 9.10.3, **11.1.2**

**Payments, Progress**

9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4

**PAYMENTS AND COMPLETION**

**9**

**Payments to Subcontractors**

5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2

**PCB**

10.3.1

**Performance Bond and Payment Bond**

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**

**Permits, Fees, Notices and Compliance with Laws**

2.3.1, **3.7**, 3.13, 7.3.4.4, 10.2.2

**PERSONS AND PROPERTY, PROTECTION  
OF**

**10**

**Polychlorinated Biphenyl**

10.3.1

**Product Data, Definition of**

**3.12.2**

**Product Data and Samples, Shop Drawings**

3.11, **3.12**, 4.2.7

**Progress and Completion**

4.2.2, **8.2**, 9.8, 9.9.1, 14.1.4, 15.1.4

**Progress Payments**

9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4

**Project, Definition of**

**1.1.4**

**Project Representatives**

4.2.10

**Property Insurance**

10.2.5, **11.2**

**Proposal Requirements**

1.1.1

**PROTECTION OF PERSONS AND PROPERTY  
10**

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## Regulations and Laws

1.5, 2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1, 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14, 15.2.8, 15.4

## Rejection of Work

4.2.6, 12.2.1

## Releases and Waivers of Liens

9.3.1, 9.10.2

## Representations

3.2.1, 3.5, 3.12.6, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.10.1

## Representatives

2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.10, 13.2.1

## Responsibility for Those Performing the Work

3.3.2, 3.18, 4.2.2, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10

## Retainage

9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3

## Review of Contract Documents and Field Conditions by Contractor

3.2, 3.12.7, 6.1.3

## Review of Contractor's Submittals by Owner and Architect

3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2

## Review of Shop Drawings, Product Data and Samples by Contractor

3.12

## Rights and Remedies

1.1.2, 2.4, 2.5, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1, 6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.1, 12.2.2, 12.2.4, 13.3, 14, 15.4

## Royalties, Patents and Copyrights

3.17

## Rules and Notices for Arbitration

15.4.1

## Safety of Persons and Property

10.2, 10.4

## Safety Precautions and Programs

3.3.1, 4.2.2, 4.2.7, 5.3, 10.1, 10.2, 10.4

## Samples, Definition of

3.12.3

## Samples, Shop Drawings, Product Data and

3.11, 3.12, 4.2.7

## Samples at the Site, Documents and

3.11

## Schedule of Values

9.2, 9.3.1

## Schedules, Construction

3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2

## Separate Contracts and Contractors

1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2

## Separate Contractors, Definition of

6.1.1

## Shop Drawings, Definition of

3.12.1

## Shop Drawings, Product Data and Samples

3.11, 3.12, 4.2.7

## Site, Use of

3.13, 6.1.1, 6.2.1

## Site Inspections

3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.9.2, 9.4.2, 9.10.1, 13.4

## Site Visits, Architect's

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4

## Special Inspections and Testing

4.2.6, 12.2.1, 13.4

## Specifications, Definition of

1.1.6

## Specifications

1.1.1, 1.1.6, 1.2.2, 1.5, 3.12.10, 3.17, 4.2.14

## Statute of Limitations

15.1.2, 15.4.1.1

## Stopping the Work

2.2.2, 2.4, 9.7, 10.3, 14.1

## Stored Materials

6.2.1, 9.3.2, 10.2.1.2, 10.2.4

## Subcontractor, Definition of

5.1.1

## SUBCONTRACTORS

5

## Subcontractors, Work by

1.2.2, 3.3.2, 3.12.1, 3.18, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2, 9.6.7

## Subcontractual Relations

5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1

## Submittals

3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.4, 9.2, 9.3, 9.8, 9.9.1, 9.10.2, 9.10.3

## Submittal Schedule

3.10.2, 3.12.5, 4.2.7

## Subrogation, Waivers of

6.1.1, 11.3

## Substances, Hazardous

10.3

## Substantial Completion

4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 12.2, 15.1.2

## Substantial Completion, Definition of

9.8.1

## Substitution of Subcontractors

5.2.3, 5.2.4

## Substitution of Architect

2.3.3

## Substitutions of Materials

3.4.2, 3.5, 7.3.8

## Sub-subcontractor, Definition of

5.1.2

## Subsurface Conditions

3.7.4

## Successors and Assigns

13.2

## Superintendent

3.9, 10.2.6

## Supervision and Construction Procedures

1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.4

This document has been modified from the original Form AIA A201-2017 Document. As a result, references in this Index may no longer be accurate. To the extent there are conflicts between this Index and the language in the body of the document, the language in the body of the document shall control.

**Suppliers**

1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.5.4, 9.6, 9.10.5, 14.2.1

**Surety**

5.4.1.2, 9.6.8, 9.8.5, 9.10.2, 9.10.3, 11.1.2, 14.2.2, 15.2.7

**Surety, Consent of**

9.8.5, 9.10.2, 9.10.3

**Surveys**

1.1.7, 2.3.4

**Suspension by the Owner for Convenience**

**14.3**

**Suspension of the Work**

3.7.5, 5.4.2, 14.3

**Suspension or Termination of the Contract**

5.4.1.1, 14

**Taxes**

3.6, 3.8.2.1, 7.3.4.4

**Termination by the Contractor**

14.1, 15.1.7

**Termination by the Owner for Cause**

5.4.1.1, 14.2, 15.1.7

**Termination by the Owner for Convenience**

**14.4**

**Termination of the Architect**

2.3.3

**Termination of the Contractor Employment**

14.2.2

**TERMINATION OR SUSPENSION OF THE CONTRACT**

**14**

**Tests and Inspections**

3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 12.2.1, 13.4

**TIME**

**8**

**Time, Delays and Extensions of**

3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, 8.3, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5

**Time Limits**

2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15.1.2, 15.1.3, 15.4

**Time Limits on Claims**

3.7.4, 10.2.8, 15.1.2, 15.1.3

**Title to Work**

9.3.2, 9.3.3

**UNCOVERING AND CORRECTION OF WORK**

**12**

**Uncovering of Work**

**12.1**

**Unforeseen Conditions, Concealed or Unknown**

3.7.4, 8.3.1, 10.3

**Unit Prices**

7.3.3.2, 9.1.2

**Use of Documents**

1.1.1, 1.5, 2.3.6, 3.12.6, 5.3

**Use of Site**

3.13, 6.1.1, 6.2.1

**Values, Schedule of**

9.2, 9.3.1

**Waiver of Claims by the Architect**

13.3.2

**Waiver of Claims by the Contractor**

9.10.5, 13.3.2, 15.1.7

**Waiver of Claims by the Owner**

9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.3.2, 14.2.4, 15.1.7

**Waiver of Consequential Damages**

14.2.4, 15.1.7

**Waiver of Liens**

9.3, 9.10.2, 9.10.4

**Waivers of Subrogation**

6.1.1, 11.3

**Warranty**

3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.2, 9.10.4, 12.2.2, 15.1.2

**Weather Delays**

8.3, 15.1.6.2

**Work, Definition of**

**1.1.3**

**Written Consent**

1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.10.3, 13.2, 13.3.2, 15.4.4.2

**Written Interpretations**

4.2.11, 4.2.12

**Written Orders**

1.1.1, 2.4, 3.9, 7, 8.2.2, 12.1, 12.2, 13.4.2, 14.3.1

## ARTICLE 1 GENERAL PROVISIONS

### § 1.1 Basic Definitions

#### § 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid, or portions of Addenda relating to bidding or proposal requirements.

#### § 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

#### § 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project. Except as specifically required in the Contract Documents, Contractor is not responsible for design of the Project. Without assuming the Architect's design responsibilities, before proceeding with the work Contractor will acknowledge that Contractor has reviewed the Contract Documents and has found them to be adequate and sufficient to provide for completion of the Work, including Work which may be required for completion of the Work by Contractor in accordance with applicable laws, codes and professional standards.

#### § 1.1.4 The Project

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

#### § 1.1.5 The Drawings

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

#### § 1.1.6 The Specifications

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

#### § 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

#### § 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

### § 1.1.9 CONSTRUCTION MANAGER



The Construction Manager is the Construction Manager at Risk engaged by the Owner to manage construction of the Project. As used herein, the term “Contractor” shall mean the Construction Manager.

#### **§ 1.1.10 THE PROJECT MANUAL**

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

#### **§ 1.1.11 KNOWLEDGE**

The terms “knowledge,” “recognize,” and “discover,” their respective derivatives, and similar terms in the Contract Documents, as used in reference to the Contractor, shall be interpreted to mean that which the Contractor knows, recognizes, and discovers in exercising the care, skill, and diligence required by the Contract Documents. Analogously, the expression “reasonably inferable” and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a contractor familiar with the Project and exercising the high level of care, skill and diligence required of the Contractor by good contracting practices of the Contract Documents.

#### **§ 1.1.12 PROGRAM MANAGER**

Owner may retain an independent program manager (“Program Manager”) to assist Owner in connection with this and other Projects. Owner may also assign and delegate to Program Manager certain duties and obligations of the Owner and/or Architect, which assignment and delegation shall be in writing and shall specifically set forth the duties and authority of the Program Manager. Contractor shall cooperate with the Program Manager and shall promptly provide all information and data requested by the Program Manager in the form and format requested. Contractor shall also comply with written directives from Program Manager to Contractor, but only to the extent they are within the written authority provided by Owner to Program Manager. Program Manager does not have authority to amend the Contract or direct Contractor to perform in such manner as would result in an increase in Contract Sum or Contract Time. To the extent Contractor contends that any act, failure to act or direction by Program Manager entitles Contractor to an increase in the Contract Sum or Contract Time, it shall immediately provide written notice, including a detailed description of the basis for such contention, to Architect and Owner, requesting written directive as to how to proceed.

### **§ 1.2 Correlation and Intent of the Contract Documents**

**§ 1.2.1** The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. All Work shall conform to the Contract Documents. No material change therefrom shall be made without prior written authorization by the Architect and Owner. Whenever there are discrepancies between Drawings, or between the Drawings and Specifications, or conflicts within the Specifications, Contractor shall immediately notify the Owner and the Architect in writing and obtain a resolution. Contractor is expected to furnish and install the better quality or greater quantity unless otherwise ordered in writing. Items shown on the Drawings and not mentioned in the Specifications shall be of like effect as if shown or mentioned in both. Should the Specifications and drawings fail to particularly describe a product or material shown to be used in any place, Contractor shall immediately notify Owner and Architect in writing and obtain a resolution. The Contractor is expected to furnish the product that would normally be used in this place to produce first quality finished Work subject to the Architect’s approval. If the Contractor believes that the Architect’s decision entitles the Contractor to a change order, Contractor shall proceed with a request for change order as provided in this Agreement.

**§ 1.2.1.1** The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties’ intentions and purposes in executing the Contract.

**§ 1.2.2** Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. Contractor represents that the Subcontractor’s manufacturers, and suppliers engaged or to be engaged by it are and will be familiar with the requirements for performance by them of their obligations.

§ 1.2.2.1 Dimensions indicated on the Drawings shall be followed. Do not scale Drawings. Conflicts, discrepancies, and omissions shall be promptly brought to the Architect's attention when discovered by Contractor and, if possible, resolved prior to ordering or installing materials and equipment.

§ 1.2.2.2 The Contractor shall provide critical clearances, tolerances, and dimensions as indicated on the Drawings. These critical dimensions are not optional. The Architect shall specifically identify on the drawings all critical clearances, tolerances and dimensions by clouding as "critical." The Architect and Owner shall be advised immediately if existing conditions do not permit critical dimensions as shown. No consideration will be given to any claim based on differences between the actual dimensions and those indicated on the Drawings.

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

§ 1.2.4 If there should be a conflict between two or more of the Contract Documents, the following order of interpretation shall apply:

§ 1.2.4.1 Where requirements specifically set forth in the Owner-Contractor's Agreement are in conflict with other Contract Documents, the Owner-Contractor Agreement shall govern.

§ 1.2.4.2 Where there is a conflict between the requirements of the General Conditions of the Contract and the Supplementary General Conditions, the requirements of the General Conditions shall govern. The General Conditions of the Contract (as modified by the Supplementary General Conditions) shall take precedence over other Contract Documents except for the Owner-Contractor Agreement.

§ 1.2.4.3 Where there is a conflict between the Drawings and Specifications or a conflict within the Drawings or within the Specifications, the conflict shall be brought to the attention of the Architect for determination/resolution of the conflict. If the Contractor believes that the Architect's decision entitles the Contractor to a change order, Contractor shall proceed with a request for change order as provided in this Agreement.

### § 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

### § 1.4 Interpretation

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

### § 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors of their respective Instruments of Service, including the Drawings and Specifications.

§ 1.5.2 All Drawings and Specifications prepared pursuant to this Agreement shall be jointly owned by Owner and Architect, provided, however, the rights of ownership shall be limited as follows:

- .1 Owner may utilize the Drawings and Specifications with respect to construction, maintenance, repair and modification of the Project.
- .2 Owner may utilize the Drawings and Specifications with respect to another project if (a) Owner engages Architect to perform architectural services with respect thereto at a fee for the new project to be negotiated at that time, or (b) Owner engages another licensed architect with respect to said project, in which event Owner agrees to hold Architect harmless and indemnify Architect from any claims arising out of Owner's subsequent use of said Drawings and Specifications, assuming compliance with all licensing statutes relating to architects.
- .3 Architect may utilize any of the constituent parts of the Drawings and Specifications on any other project.

- 4 Submission or distribution of documents to meet official regulatory requirements or for similar purposes in connection with the Project is not to be construed as publication and does not violate either parties' rights under this Agreement.

**§ 1.5.3** Except for the licenses granted in this Section 1.5, no other license or right shall be deemed granted or implied under this Agreement. The Owner shall not assign, delegate, sublicense, pledge or otherwise transfer any license granted herein to another party without the prior written agreement of the Architect. Any unauthorized use of the Instruments of Service shall be at the Owner's risk and without liability to the Architect and the Architect's consultants.

**§ 1.5.4** The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings and Specifications and other documents prepared by the Architect and the Architect's consultants appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Drawings and Specifications and other documents prepared by the Architect and the Architect's consultants.

**§ 1.5.5** Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

#### **§ 1.6 Notice**

**§ 1.6.1** Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

**§ 1.6.2** Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, by courier providing proof of delivery, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

#### **§ 1.7 Digital Data Use and Transmission**

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

#### **§ 1.8 Building Information Models Use and Reliance**

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™-2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

### **ARTICLE 2 OWNER**

#### **§ 2.1 General**

**§ 2.1.1** The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization, provided, however, that Contractor acknowledges and agrees that certain changes to the contract, including, but not limited to, change orders in excess of certain amounts and waivers of liquidated damages or claims may require the action of the Guilford County Board of Education in order to bind the Owner, as set forth in the Board Policies adopted and amended from time to time by the Guilford County Board of Education. Any action requiring Board

approval pursuant to the Board Policies shall not be binding on the Owner, irrespective of prior approvals from the Owner's designated representative, until action is taken by the Guilford County Board of Education ratifying or approving the decision of the Owner's designated representative. Should the Board decline to ratify or approve actions of the Owner's designated representative requiring Board action, the action of the Owner's representative shall be deemed null and void and of no effect. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

## **§ 2.2 Information and Services Required of the Owner**

**§ 2.2.1** Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

**§ 2.2.2** The Owner shall retain an architect lawfully licensed to practice architecture or engineering, or an entity lawfully practicing architecture or engineering, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

**§ 2.2.3** If the employment of the Architect terminates, the Owner shall employ a successor to the Architect. The Owner has sole discretion in choosing a successor Architect, and the Contractor shall have no grounds to object to the Owner's choice of successor Architect.

**§ 2.2.4** The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall confirm the accuracy of all such information furnished by Owner before beginning construction and shall notify Architect of any discrepancies discovered. Failure to do so shall constitute a waiver of any claim for any discrepancies in the materials furnished by Owner. Contractor shall excavate and dispose of each un-needed on-site utility and shall cap each off-site utility as required by the Work and as may be included in the Specifications. At Owner's request, the Contractor shall make available to the Owner the results of any site investigation, test borings, analyses, studies or other tests conducted by or in possession of the Contractor or any of its agents. Such materials shall be for Owner's information only and are not part of the Contract. The Contractor represents that, prior to commencement of the Work, it will become familiar with the Project site and will not begin Work until it has received all information it needs concerning the conditions of the Project site. The Contractor represents that it has inspected the location of the Work. The Contractor shall exercise special care in executing subsurface Work in proximity of known subsurface utilities, improvements and easements.

**§ 2.2.5** The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

**§ 2.2.6** Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

**§ 2.2.7** The Owner's implied warranty of the Architect's design, plans or specifications extends only to the extent that the design, plans and specifications were prepared utilizing the ordinary standard of care required of design professionals in the Guilford County, North Carolina area for Projects of this type. The Owner specifically disclaims, and the Contractor specifically waives, any implied warranty of the Architect's design, plans or specifications to the extent that the Architect failed to meet the ordinary standard of care required of design professionals in the Guilford County, North Carolina area for projects of this type when preparing the design, plans and specifications for this Project. Notwithstanding the foregoing, however, nothing in this Section 2.2.7 or the Contract Documents shall constitute a waiver of the Contractor's right to pursue a claim against the Architect for negligence.

## **§ 2.3 Owner's Right to Stop the Work**

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or fails to carry out Work in accordance with the Contract Documents, the Owner may, without any additional charge or penalty, issue a written order to the Contractor to stop the Work, or any portion

thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity. This right shall be in addition to and not in restriction of Owner's rights under Article 12.2. Such order of stoppage by the Owner shall not constitute grounds for delay, claim or Contractor termination by the Contractor.

#### **§ 2.4 Owner's Right to Carry Out the Work**

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, or fails to provide adequate manpower, material or resources, and fails within a seven (7) day period after receipt of notice from the Owner to commence and continue correction of such default or neglect or to provide adequate manpower, material or resources, with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect, or to provide adequate manpower, material or resources, with diligence and promptness to the satisfaction of the Owner and the Architect, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies, or provide adequate manpower, material and resources (including supplement Contractor's workforce). Owner may perform such Work in a manner it deems expedient and shall not be required to utilize the least expensive alternative. In such case an appropriate Change Order (which shall not require Contractor's agreement or signature) shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, or providing adequate manpower, material and resources, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Notwithstanding any other provision of the Contract, the Owner may withhold payments then or thereafter due until the cost of correction is determined. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

#### **§ 2.5 GENERAL**

**§ 2.5.1** The rights stated in this Article 2 and elsewhere in the Contract Documents are cumulative and not in limitation of any rights of the Owner (i) granted in the Contract Documents, (ii) at law or (iii) in equity.

**§ 2.5.2** In no event shall the Owner have control over, charge of, or any responsibility for construction means, methods, techniques, sequences, or procedures or for safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

### **ARTICLE 3 CONTRACTOR**

#### **§ 3.1 General**

**§ 3.1.1** The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed in the State of North Carolina. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

**§ 3.1.2** The Contractor shall perform the Work in accordance with the Contract Documents.

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

#### **§ 3.2 Review of Contract Documents and Field Conditions by Contractor**

**§ 3.2.1** Execution of the Contract by the Contractor is a representation that 1) the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents and (2) prior to execution of the Agreement, the Contractor and each subcontractor evaluated and satisfied themselves as to the conditions and limitations under which the Work is to be performed, including, without limitation, (i) the location, condition, layout, and nature of the Project site and surrounding areas, (ii) generally prevailing climatic conditions, (iii) anticipated labor supply and costs, (iv) availability and cost of materials, tools, and equipment, and (v) other similar issues. The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site. Except as set forth in Section 10.3, the Contractor shall be solely responsible for providing a safe place for the performance of his Work. The Owner shall not be required to make any adjustment in either the

Contract Sum or the Contract Time in connection with any failure by any Contractor or any Subcontractor to have complied with the requirements of this Section.

**§ 3.2.2** Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. The Contractor shall promptly report to the Owner and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor in writing, either as a request for information or such form as the Architect may require. The Contractor shall take reasonable steps to minimize the cost and/or delay caused by any such errors, inconsistencies or omissions. The Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents unless the Contractor recognized, or should have recognized, such error, inconsistency or omission and failed to report it to the Owner and Architect. If the Contractor performs any construction activity which Contractor knows, or should know, involves an error inconsistency or omission in the Contract Documents without such prior notice to the Owner and the Architect, the Contractor shall assume responsibility for such performance and shall bear all costs for correction. Notwithstanding the foregoing, it is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

**§ 3.2.3** The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

**§ 3.2.4** If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.8, as would have been avoided if the Contractor had performed such obligations

### **§ 3.3 Supervision and Construction Procedures**

**§ 3.3.1** The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract, unless the Contract documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Provided the Architect approves the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures. Otherwise, the Contractor shall not proceed with that portion of the Work without further written instructions from the Architect.

**§ 3.3.2** The Contractor shall be responsible in all respects to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

**§ 3.3.3** The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

**§ 3.3.4** If any of the Work is required to be inspected or approved by any public authority (other than the Owner), the Contractor shall schedule and coordinate such inspection or approval to be performed. Owner shall not be responsible for any cost or delay resulting from delays in completing inspections or obtaining approvals from any public authority (other than the Owner). No inspection performed or failed to be performed by the Owner hereunder shall be a waiver of any of the Contractor's obligations hereunder to be construed as an approval or acceptance of the Work or any part thereof.

**§ 3.3.5** The Contractor is required to attend job site progress conferences as called by the General Contractor, Architect and/or Program Manager (if applicable). The Contractor shall be represented at these job progress conferences by both home office and project personnel. The representatives attending the meetings shall have authority to act on behalf of and bind the party they represent. These meetings shall be open to subcontractors, materials suppliers, and any others who can contribute toward maintaining required job progress. It shall be the principal purpose of these meetings, or conferences to effect 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 Contract Time. The Contractor shall be prepared to assess progress of the Work to recommend remedial measures for correction of progress as may be appropriate. The General Contractor and/or Architect or their authorized representative may set the time and place for the conferences, and the General Contractor as Project Coordinator shall preside as chairman. Contractor shall notify Architect and the Owner in writing within ten (10) days of the publishing of the meeting minutes of any exception taken thereto, and shall include a detailed statement of the basis for such exception.

### **§ 3.4 Labor and Materials**

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

**§ 3.4.2** The Contractor may make substitutions only with the consent of, or after evaluation by, the Architect and as authorized by a Change Order. In order to promote uniformity of product and materials within the school system, alternates and “or equal” products, as a general rule will not be accepted. If Contractor desires to submit an alternate product or method in lieu of what has been specified or shown in the Contract Documents, the Contractor must submit to the Architect and the Owner (i) a full explanation of the proposed substitution and all supporting data, including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures, and other like information necessary for a complete evaluation of the substitution; (ii) a written explanation of the reasons the substitution is advantageous and necessary, including the benefits to the Owner and the Work in the event the substitution is acceptable; (iii) the adjustment, if any, in the Contract Sum, in the event the substitution is acceptable; (iv) the adjustment, if any, in the time of completion of the Contract and the construction schedule in the event the substitution is acceptable; and (v) an affidavit stating that (a) the proposed substitution conforms to and meets all the requirements of the pertinent Specifications and the requirements shown on the Drawings, and (b) the Contractor accepts the warranty and correction obligations in connection with the proposed substitution as if originally specified by the Architect. Proposals for substitutions shall be submitted in triplicate to the Architect in sufficient time to allow the Architect no less than ten (10) working days for review. No substitutions will be considered or allowed without the Contractor’s submittal of complete substantiating data and information as stated above. Substitution and alternates may be rejected by either the Architect or Owner without explanation and will be considered only under one or more of the following conditions: (i) the proposal is required for compliance with interpretation of code requirements or insurance regulations then existing; (ii) specified products are unavailable through no fault of the Contractor, (iii) subsequent information discloses the inability of specified products to perform properly or to fit in the designated space; (iv) the manufacturer/fabricator refuses to certify or guarantee the performance of the specified product as required; and (v) when in the judgment of the Owner or the Architect, a substitution would be substantially in the Owner’s best interests, in terms and cost, time, or other considerations. Whether or not any proposed substitution is accepted by the Owner or the Architect, the Contractor shall reimburse the Owner for any fees charged by the Architect or other consultants for evaluating each proposed substitute.

**§ 3.4.3** The Contractor shall enforce strict discipline and good order among the Contractor’s employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

**§ 3.4.4** The Contractor acknowledges that it is the Contractor’s responsibility to hire or contract all personnel for the proper and diligent prosecution of the Work and the Contractor shall use its best efforts to maintain labor peace for the duration of the Project. In the event of a labor dispute, the Contractor shall not be entitled to any increase in the Contract Sum or a time extension.

**§ 3.4.5** The Contractor has the responsibility to ensure that all product suppliers and Subcontractors adhere to the Contract Documents and that they order products on time, taking into account the current market and delivery

conditions, and that they provide products on time. The Contractor shall keep the Owner, Architect and the Program Manager informed as to the availability of all specified materials and equipment and shall advise them promptly, in writing, of all material and equipment that may no longer be obtainable, or the availability of which may be delayed, for the purposes of the Contract, whether due to conditions of the market or other limiting or governing factors.

**§ 3.4.6** The Contractor shall disclose the existence and extent of any financial interests, whether direct or indirect, he has in Subcontractors and material suppliers which he may propose for this Project.

### **§ 3.5 Warranty**

**§ 3.5.1** The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects. Work, materials, or equipment not conforming to these requirements, including substitutions not properly approved and authorized, shall be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

**§ 3.5.2** The Contractor shall provide to the Owner all material, equipment, or other special warranties required by the Contract Documents within thirty (30) days after the date of Substantial Completion. All warranties shall be issued in the name of the Owner, or shall be transferable to the Owner, shall be in a form satisfactory to the Owner, and shall commence in accordance with Section 9.8.4.

**§ 3.5.3** In addition to other warranties required by the Contract Documents, the Contractor further warrants that for a period of twenty-four (24) months following the date of Substantial Completion, that the building shall be watertight and leak free at every point and in every area. The Contractor shall, immediately upon notification by the owner of water penetration, determine the source of water penetration and, at the contractor's own expense, do any work necessary to make the building watertight. The Contractor shall also, at the Contractor's own expense, repair or replace any other damaged material to return the building to its original accepted condition.

**§ 3.5.4** If the Contractor uses any portion of the Work or Owner's other property prior to the date of Substantial Completion of the entire Work, such Work shall be restored to new or "like new" condition. Contractor's warranty and agreement to correct defective Work shall specifically include Contractor's obligations under this paragraph.

**§ 3.5.5** Any manufacturers' and subcontractors' warranties and guarantees called for in the Contract Documents shall be for twelve (12) months unless a longer period is specified in the Contract Documents. Such written warranties or guarantees shall be signed by the manufacturer or subcontractor, as the case may be, and countersigned by the Contractor. All warranties and guarantees shall be issued in the name of the Owner. In the event a manufacturer or subcontractor does not have a suitable written warranty form to fully cover the guarantee and warranty obligations as set forth in the Contract Documents, the Contractor shall arrange for the manufacturer or subcontractor to provide a written warranty in such form as shall fully document the guarantee or warranty set forth in the Contract Documents.

**§ 3.5.6** If the Contractor, after notice, fails within forty-eight (48) hours to develop and transmit a proposed Plan of Remedial Action to the Architect and Owner for correction of warranty items, and/or fails to proceed within three (3) days to commence corrective measures of warranty items in compliance with the terms of the warranty/guarantee; the Owner may have the defects corrected and the Contractor and his surety shall be liable for all expense incurred.

**§ 3.5.7** The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, its subcontractors, or those contractors assigned to or for which the Contractor is considered the Project Expediter or is otherwise responsible for coordination of the Work, improper or insufficient maintenance and or operation whereby the Contractor can provide evidence sufficient to the reasonable satisfaction of the Owner of proper training of Owner's personnel, or normal wear and tear.



### § 3.6 Taxes

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

### § 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. At the request of the Owner or Architect, Contractor shall certify to the Owner that Contractor and all of its Subcontractors are in compliance with N.C. Gen. Stat. § 64-26 (E-Verify Requirements for private employers). If the Contractor fails to give such notices, he shall be liable for and shall indemnify and hold harmless the Owner and Architect against any and all resulting fines, penalties, judgments or damages, including reasonable attorneys' fees, imposed on or incurred by the parties indemnified, as a result of such failure by the Contractor.

§ 3.7.3 Except as provided in the Contract Documents, Contractor shall not be responsible for design of the Project. Without assuming or performing the Architect's design responsibility, it shall be the obligation of the Contractor to review the Contract Documents for any discrepancy between building codes and regulations and to notify Owners of such discrepancies which the Contractor discovers. If the Contractor observes that portions of the Contract Documents are at variance with applicable laws, statutes, ordinances, building codes, rules or regulations, the Contractor shall promptly notify the Owner and Architect in writing, and necessary changes shall be accomplished by appropriate modification.

§ 3.7.4 If the Contractor performs Work that it knows, or reasonably should know, is contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.5 Contractor shall notify utility companies of construction to be done near utility lines, including but not limited to high voltage electric lines, and insure that all appropriate safety precautions are taken.

### § 3.7.6 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.7 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

### § 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

### § 3.9 Superintendent and Project Manager

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

§ 3.9.1.1 The Contractor's Superintendent shall be considered "competent" if he has at least five (5) years successful experience as superintendent on projects of equal or greater Construction Budget and similar type and complexity. The Superintendent shall be on site during all working hours, including "overtime" hours. The Superintendent shall not be changed during the Contract Time without written approval of the Owner (which approval shall not be unreasonably withheld) unless the Superintendent ceases to be employed by the Contractor and companies affiliated with the Contractor. So long as the Superintendent remains in its employ, the Contractor shall not replace the Superintendent without the Owner's approval. The Owner shall have the right, but not the obligation, to require the Contractor to remove a Superintendent from the Project whose performance is not satisfactory to the Architect or Owner. The Contractor shall then assign another Superintendent who is satisfactory to the Owner and Architect in the event that the Superintendent is replaced as set out above.

§ 3.9.1.2 The Contractor shall also employ a competent Project Manager who shall be responsible for management of this Project. The Project Manager shall have at least five (5) years successful experience as Project Manager for projects of similar size and complexity. The Project Manager shall be satisfactory to the Architect and Owner in all respects, and Owner shall have the right, but not the obligation, to require Contractor to dismiss from the Project any Project Manager whose performance is not satisfactory to Architect and Owner, and to replace such Project Manager with a Project Manager satisfactory to Architect and Owner. The Contractor shall not replace the Project Manager except with another Project Manager satisfactory to the Owner in all respects.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed Superintendent and Project Manager. Within fourteen (14) days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the fourteen (14) day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed Superintendent or Project Manager to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the Superintendent or Project Manager without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.9.4 The Contractor's Project Manager, Superintendent and other competent representative familiar with the Work shall attend meetings which may be held at the job site or such place as Architect or Owner designate.

### § 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

### § 3.10.4 CPM PROJECT SCHEDULE

The Contractor shall provide a project Critical Path Method (CPM) Construction Schedule in an electronic format for the entire Project. The schedule will be in such format as directed by Owner and Architect. The Project schedule will be reviewed/updated on a monthly basis. The schedule will be utilized for monitoring the progress of the Project and will, in addition, contain the Schedule of Values to be used as a basis for reviewing the amount of monthly progress payments to be made to the Contractor.

### § 3.10.5 INCLUSION OF WEATHER DAYS IN SCHEDULE

The Contractor shall include in the Contractor's Construction Schedule weather days based upon local weather data five (5) year average. Weather days shall be understood to be work days, exclusive of holidays, Sundays and other non-working days. The Contractor shall use these monthly averages when establishing the construction schedule for this Project. Claims for weather delays will not be considered until the number of days for the relevant period actually delayed exceeds the five (5) year average for the period for which a time extension is being requested.

Weather days are to be included to aid the Contractor in its scheduling. These days are included in the total time allowed for construction as defined in Article 8 of these General Conditions. Unused weather days are not available for decreasing the Project time.

### § 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work and shall constitute Contractor's certification that they show complete "as-built" conditions. The Contractor shall record on the Record Drawings maintained at the site all changes and selections made during construction and shall locate by dimensions showing actual field measurements of all major items which will be concealed in the completed Work. These items shall include underground piping and conduit beneath slabs-on-grade (or basement slabs), and underground site utilities such as pipe, conduit, etc. and items above hard ceilings such as large, duct, pipe, etc. At completion of the Work, as-built documents of all systems, which indicate all field changes, shall be submitted to the Architect. As-builts will be required at the time Architect issues Certificates of Substantial Completion. The Application for Payment following the issuance of the Certificate of Substantial Completion will not be processed without the as-builts being submitted.

3.11.1 The Contractor shall maintain all approved permit drawings in a manner so as to make them accessible to governmental inspectors and other authorized agencies. All approved drawings shall be wrapped, marked and delivered to the Owner within sixty (60) days of final completion of the Work.

### § 3.12 Shop Drawings, Product Data and Samples

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

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

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged. Samples requiring color or finish selection shall be submitted in a single, coordinated submittal for the particular portion of the Work covered therein.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors. Submittals that are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect without action.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued and approved by the Owner in writing authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services

or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, completeness, and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

**§ 3.12.10.2** If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

### **§ 3.13 Use of Site**

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, permits, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

**§ 3.13.2** The Project, as school property, may attract children and unauthorized personnel. The Contractor shall take all necessary precautions to secure the Project and its Work to prevent injury and to discourage the entry onto the Project of children and unauthorized personnel.

**§ 3.13.3** The Contractor shall be responsible to avoid fraternization and unnecessary contact with students and school personnel by the persons and entities on the Project for whom the Contractor is responsible. The Contractor will maintain suitable decorum on the site and anyone failing to comply with the requirements of this Section as determined by Owner shall be subject to immediate dismissal.

**§ 3.13.4** The Contractor shall not use Owner's facilities and shall plan and schedule its Work so as not to interrupt or interfere with school operations or activities.

**§ 3.13.5** Only materials and equipment that are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the responsibility of the Contractor. The Contractor shall ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent of the site of the Work shall be free from all debris, building materials, and equipment likely to cause hazardous conditions.

**§ 3.13.6** The Contractor and any entity for whom the Contractor is responsible shall not erect any sign on the Project site without the prior written consent of the Owner, which may be withheld in the sole discretion of the Owner.

**§ 3.13.7** Without limitation of any other provision of the Contract Documents, the Contractor shall minimize any interference with the occupancy or beneficial use of any areas, buildings or facilities on or adjacent to the site of the Work which are occupied or are being used by Owner. To the extent that Owner allows Work to be performed in or around occupied buildings or facilities, it shall be scheduled to be performed at night, during weekends or holidays at no additional cost to Owner, and the facility or building shall be clean and ready for Owner's use during Owner's hours of normal operation. Without prior approval of the Owner, the Contractor shall not permit any Workers to use any existing facilities at the Project site, including, without limitation, lavatories, toilets, entrances, and parking areas other than those designated by the Owner.

- .1 Without limitation of any other provision of the Contract Documents, the Contractor shall comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and the Building, as amended from time to time. The Contractor shall immediately notify the Owner in writing if during the performance of the Work, the Contractor

finds compliance of any portion of such rules and regulations to be impracticable, setting forth the problems of such compliance and suggesting alternatives through which the same results intended by such portions of the rules and regulations can be achieved. The Owner may, in the Owner's sole discretion, adopt such suggestions, develop new alternatives, or require compliance with the existing requirements of the rules and regulations.

- .2 The Contractor shall also comply with all insurance requirements applicable to use and occupancy of the Project site and the Building.

### **§ 3.14 Cutting and Patching**

**§ 3.14.1** The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

**§ 3.14.2** The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

### **§ 3.15 Cleaning Up**

**§ 3.15.1** The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project. The Contractor shall maintain streets, parking areas and sidewalks around the Project site free from any materials or debris resulting from operations under this Contract. The Contractor shall remove all spillage and tracking arising from the performance of the Work from such areas, and shall establish a regular maintenance program of sweeping and hosing to minimize accumulation of dirt and dust upon such areas.

**§ 3.15.2** If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

### **§ 3.16 Access to Work**

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

### **§ 3.17 Royalties, Patents and Copyrights**

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or patent, the Contractor shall be responsible for such loss unless the information is promptly furnished to the Architect.

### **§ 3.18 Indemnification**

**3.18.1** To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner and Program Manager (the "Indemnittees"), and all of their agents and employees of either of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from Contractor's (including subcontractors, anyone directly or indirectly hired by them or anyone for whose acts contractor may be liable) non-performance, negligent acts or omissions. Contractor agrees to assume and defend any claims asserted against the persons and entities listed above at Contractor's expense. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18. Without limiting the foregoing, the Contractor shall indemnify and

hold harmless the Owner and Program Manager from all cost and expense, including attorneys' fees, against any assertion of claims by Contractor's subcontractors, sub-subcontractors, or material suppliers.

**§ 3.18.2** In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

**§ 3.18.3** The Contractor's indemnity obligations under this Section 3.18 shall also specifically include, without limitation, all fines, penalties, damages, liability, costs, expenses (including, without limitation, reasonable attorneys' fees), and punitive damages (if any) arising out of, or in connection with, any (i) violation of or failure to comply with any law, statute, ordinance, rule, regulation, code, or requirement of a public authority that bears upon the performance of the Work by the Contractor, a Subcontractor, or any person or entity for whom either is responsible, (ii) means, methods, procedures, techniques, or sequences of execution or performance of the Work, (iii) failure to secure and pay for permits, fees, approvals, licenses, and inspections as required under the Contract Documents, or any violation of any permit or other approval of a public authority applicable to the Work, by the Contractor, a Subcontractor, or any person or entity for whom either is responsible, and (iv) failure to comply with the Guilford County Schools' Reporting Requirements, if applicable.

**§ 3.18.4** The Contractor shall indemnify and hold harmless all of the Indemnities from and against any costs and expenses (including reasonable attorneys' fees) incurred by any of the Indemnities in enforcing any of the Contractor's defense, indemnity, and hold-harmless obligations under this Contract.

**§ 3.18.5** In the event of accidents involving personal injury or property damage, the Contractor shall immediately notify the Owner, the Program Manager and the Architect, furnishing as much data as is available. As soon as practicable, he shall furnish to the Owner, the Program Manager and the Architect a written report indicating the extent of the damage, the persons involved, the employer of the persons involved and the number of days each person is hospitalized.

**§ 3.18.6** If any legal or any other proceedings are commenced against the Owner on account of any claim, damage, loss or expense caused or alleged to be caused in whole or part by the Contractor, the Owner shall notify the Contractor, who shall defend such proceedings utilizing legal counsel acceptable to Owner (in Owner's sole discretion) at Contractor's expense and fully indemnify Owner from all damages, costs and expenses including judgment or award against the Owner arises therefrom, the Contractor or its surety shall pay or satisfy it and shall reimburse the Owner for all costs and expenses, including attorneys' fees and court or other costs and expenses which the Owner has incurred.

**§ 3.18.7** Owner shall be entitled to recover all damages, costs, expenses and fees (including reasonable attorneys' fees) as a result of Contractor's failure to perform under this Agreement or in the event Contractor commences an action against Owner and is the Non-Prevailing Party. For purposes of this Contract, Contractor shall be deemed the Non-Prevailing Party if it receives an award (after deducting 1) interest, litigation costs and expenses to the extent awarded, and set-offs, and 2) awards received by Owner or to which Owner is entitled) of less than seventy-five percent (75%) of the amount claimed by Contractor at the commencement of the proceeding.

### **§ 3.19 NO THIRD PARTY BENEFICIARY**

**§ 3.19.1** It is specifically agreed between the parties executing this Contract that it is not intended by any of the provisions of any part of the Contract to create in other contractors, the public or any member thereof a third party beneficiary hereunder, or to authorize anyone not a party to this Contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of this Contract and the rights and liabilities of such parties shall remain as imposed by law.

### **§ 3.20 CONTRACTOR'S REPRESENTATIONS**

**§ 3.20.1** By entering into this Contract with the Owner, the Contractor represents and warrants the following, together with all other representations and warranties in the Contract Documents.

- .1 That it is experienced in and competent to perform the type of work required and to furnish the plant, materials, supplies or equipment to be performed or furnished by it;
- .2 That it is financially solvent, able to pay its debts as they mature, and possessed of sufficient working capital to initiate and complete the Work required under Contract;
- .3 That it is familiar with all federal, state, county, municipal and department laws, ordinances, permits, regulations and resolutions which may in any way affect the work or those employed therein, including, but not limited to any special laws or regulations relating to Work or any part thereof;
- .4 That such temporary and permanent Work required by the Contract Documents which is to be done by it will be satisfactorily constructed and fit for use for its intended purpose;
- .5 That it will fully, and at all time, comply with all requirements of the Contract Documents;
- .6 That it will furnish efficient business administration and an adequate supply of workmen, equipment, tools and materials at all times;
- .7 That it will make a good faith effort to utilize minority and women-owned business enterprises (MWBE's) per N.C. General Statutes 143-128, *et seq.*, as subcontractors for the Work; and
- .8 That it will act in good faith and in the best interest of the Owner.

#### **ARTICLE 4 ARCHITECT**

##### **§ 4.1 General**

**§ 4.1.1** The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

**§ 4.1.2** Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner.

##### **§ 4.2 Administration of the Contract**

**§ 4.2.1** The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment, and, with the Owner's concurrence, from time to time during the warranty period for correction of Work. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

**§ 4.2.2** The Architect shall advise and consult with the Owner during the Construction Phase Services. The Architect is not the general agent of the Owner, and shall have the authority to act on behalf of the Owner only to the extent provided in this Agreement. The Architect shall not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences (except to the extent phasing is required in a contract or schedule) or procedures, or for safety precautions and programs in connection with the Work. The Architect shall be responsible for the Architect's negligent acts or omissions, including, but not limited to, a negligent failure to timely determine the Work is not being performed in accordance with the Contract Documents or a negligent failure to notify the Owner that the construction means, techniques, sequences, or procedures utilized by the Contractor are not generally accepted in the industry. Notwithstanding the foregoing, the Architect shall not have control over or charge of, and shall not be responsible for, acts or omissions of the Contractor or of any other persons or entities performing portions of the Work, provided the Architect has given prompt notice to the Owner in writing of any deviations from the Contract Documents in the Work or any defects or deficiencies in the Work of the Contractor of which the Architect has knowledge, or reasonably should have knowledge.

**§ 4.2.3** Subject to Article 15, the Architect's responsibility to provide Construction Phase Services commences with the award of the Contract for Construction and terminates at the end of the one (1) year warranty period.



**§ 4.2.4** If errors, omissions or conflicts are discovered in the Construction Documents, the Architect shall prepare and submit such amendments or supplementary documents as are required to resolve the situation at no additional cost to the Owner and so as to minimize delay to the progress of the Work.

**§ 4.2.5** Scheduling and Coordination of Meetings. The Architect shall review construction schedules prepared by the Contractor or Program Manager, as well as coordination of construction performed by separate Contractors or by the Owner's own forces and review coordination of services in connection with construction performed and equipment supplied by the Owner, including establishing and conducting a regular schedule of meetings between the Contractor, the Program Manager, the Architect and the Owner no less than once every two (2) weeks. Such meetings shall be held prior to the regular job site meeting throughout the entire Construction Phase of the Project and shall be for the primary purpose of assessing the progress of the Work of the Contractor and recommending to the Owner such remedial actions as are necessary to ensure required progress and completion in accordance with the construction schedule and within the contract time. The Architect shall submit to the Owner, Program Manager and to the Contractor meeting minutes of each job site meeting as soon after the meeting as is practical, but in any case within seven (7) days of the meeting.

**§ 4.2.6** Regular Job Site Meetings. The Architect shall establish and conduct a regular schedule of meetings between the Contractor, the Program Manager, the Architect and the Owner not less than every two (2) weeks and immediately following the Scheduling and Coordination Meeting described above. The Architect shall chair the meeting and prepare and distribute minutes of each such meeting to the Contractor, Program Manager, and Owner as soon after the meeting as practical, but in any case within seven (7) days of the meeting. The purpose of the meetings will be to review the status of the Project and to address such other matters relating to the Project as the Architect, Owner, Program Manager and Contractor deem appropriate.

**§ 4.2.7** The Architect shall visit the site at intervals appropriate to the stage of construction, but not less than once every two (2) weeks. Each engineering discipline shall make periodic visits not less than once every two (2) weeks, during the course of work applicable to its discipline. During critical work phases, each engineering discipline and Architect may be required to make more frequent visits. The purpose of the visits is to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. On the basis of the observations, Architect shall use reasonable care to guard the Owner against defects and deficiencies in the Work of the Contractor. If the Architect observes any work that does not conform to the Construction Documents, the Architect shall immediately make an oral and written report to Owner and Program Manager of any such acts or omissions. The engineering disciplines shall prepare and submit a report on each visit, submitted to the Owner, Program Manager and the Contractor through the Architect within five (5) days of the visit.

#### **§ 4.2.8 Communications**

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

**§ 4.2.9** Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

**§ 4.2.10** The Architect has authority to reject Work and shall reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work. In the event that Architect determines that the Work is non-conforming, Architect shall inform the Owner, Program Manager and Contractor in writing within two (2) days of the determination.

§ 4.2.11 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples. The Architect's review will be with reasonable promptness so as not to delay the Work while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.12 If the Contract Documents specifically require the Contractor to provide professional design services or certifications by a design professional related to systems, materials or equipment, the Architect shall specify the appropriate performance and design criteria that such services must satisfy. The Architect shall review shop drawings and other submittals related to the Work designed or certified by the design professional retained by the Contractor that bear such professional's seal and signature when submitted to the Architect. The Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, unless through the exercise of reasonable care and professional training and knowledge the Architect reasonably should have discovered such services and/or information to be defective or deficient, or unless the performance of the Architect's services require the Architect to verify the accuracy or completeness of such information or services.

§ 4.2.13 Subject to the provisions of Article 15, the Architect shall review and respond to requests for information about the Contract Documents. The Architect shall set forth in the Contract Documents the requirements for requests for information. Requests for information shall include, at a minimum, a detailed written statement that indicates the specific Drawings or Specifications in need of clarification and the nature of the clarification requested. The Architect's response to such requests shall be made with reasonable promptness so as to cause no delay in the Work or in the construction by the Owner or of separate Contractors while allowing sufficient time in the Architect's professional judgment to permit adequate review. If appropriate, the Architect shall prepare and issue supplemental Drawings and Specifications in response to requests for information.

§ 4.2.14 The Architect shall maintain a record of submittals and copies of submittals supplied by the Contractor in accordance with the requirements of the Contract Documents.

#### § 4.2.15 CHANGES IN THE WORK

The Architect may authorize minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect shall prepare Change Orders and Construction Change Directives for the Owner's approval and execution in accordance with the Contract Documents. The Architect will only approve Change Orders and Construction Change Directives that in its professional judgment are necessary or appropriate for the Project. The Architect shall use its best efforts to guard the Owner against unnecessary Change Orders and to present Change Orders which are fair and reasonable in the opinion of the Architect. The Architect may reject any requests for changes in the Work that are not properly prepared or timely submitted. The Architect shall maintain records relative to changes in the Work.

#### PROJECT COMPLETION

§ 4.2.16 As part of Basic Services, the Architect shall conduct a pre-Substantial Completion and a Substantial Completion inspection to determine, in consultation with Owner, if the Work is Substantially Complete and prepare a list of deficiencies, also known as a "punch list" of items to be completed. The Architect shall also conduct up to two final inspections to determine if the completed work is acceptable so that the Architect may recommend, in writing, final payment to the Contractor and may give written notice to the Owner, Program Manager and the Contractor that the work is acceptable (subject to any conditions therein expressed). Any inspections, correspondence or meetings performed by the Architect following the performance of the pre-Substantial Completion and the Substantial Completion inspections and final inspections which are required due to the non-performance of the Contractor shall be at the Contractor's expense and will be deducted from the Contractor's retainage by the Owner for payment to the Architect prior to Architect approving final payment to the Contractor.

§ 4.2.17 The Architect's inspections shall be conducted with the Owner to check conformance of the Work with the requirements of the Contract Documents and to verify the accuracy and completeness of the list submitted by the Contractor of Work to be completed or corrected.

§ 4.2.18 When the Work is found to be substantially complete, the Architect shall inform the Owner and Program Manager about the balance of the Contract Sum remaining to be paid the Contractor, including the amount to be retained from the Contract Sum, if any, for final completion or correction of the Work.

§ 4.2.19 The Architect shall forward to the Owner the following information received from the Contractor: (1) consent of surety or sureties, if any, to reduction in or partial release of retainage or the making of final payment; (2) affidavits, receipts, releases and waivers of liens or bonds indemnifying the Owner against all claims; and (3) any other documentation required of the Contractor under the Contract Documents.

§ 4.2.20 The Architect shall prepare a set of reproducible sealed record drawings and digital files showing significant changes in the Work made during the construction process, based on marked up or redline Contract drawings, prints and other data furnished by the Contractor and the applicable Addenda, Clarifications and Change Orders which occurred during the Project.

§ 4.2.21 The Architect and its consultants shall assist the Owner in resolution of warranty issues as may be required to determine responsibility for deficiencies.

§ 4.2.22 The Architect shall provide testimony in public hearings and dispute resolution proceedings, and such testimony shall be provided without additional fee or charge to the Owner if said testimony is necessitated, in whole or in part, because of questions or claims resulting or arising from the performance by Architect of its services under this agreement or in connection with the Project.

§ 4.2.23 Upon request of the Owner, and prior to the expiration of one (1) year from the date of Substantial Completion, the Architect shall, without additional compensation, conduct a meeting with the Owner to review the facility operations and performance.

§ 4.2.24 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.25 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

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

§ 4.2.27 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

§ 4.2.28 Unless the Owner and Contractor designate another person to serve as an Initial Decision-Maker, as that term is defined herein, the Architect shall render initial decisions on Claims between the Owner and Contractor as provided in the Contract Documents.

## ARTICLE 5 SUBCONTRACTORS

### § 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

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

## § 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

### § 5.2.1

Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner, Program Manager and the Architect (i) the name, trade, and subcontract amount for each Subcontractor and (ii) the names of all persons or entities proposed as manufacturers of the products identified in the Specifications (including those who are to furnish materials or equipment fabricated to a special design) and, where applicable, the name of the installing Subcontractor. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner or the Architect, after due investigations, has reasonable objection to any such proposed person or entity. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor’s Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

## § 5.3 Subcontractual Relations

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

## § 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner pursuant to Article 14 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor’s future rights and obligations under the subcontract.

§ 5.4.2 The Owner shall not be responsible for payment of amounts claimed for Work performed prior to the effective date of the Assignment. Upon such assignment, if the Work has been suspended for more than forty-five (45) days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity

## ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

### § 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

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

§ 6.1.3 The Owner has delegated and assigned to the Contractor all of the Owner's duties of coordination of the Work, and the Owner shall have no coordination responsibilities or obligations. The Contractor shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor for all Work on the Project.

### § 6.2 Mutual Responsibility

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

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not reasonably apparent or discoverable upon reasonable inspection.

§ 6.2.3 The Contractor or its surety shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

### § 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

## ARTICLE 7 CHANGES IN THE WORK

### § 7.1 General

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

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work. Except as permitted in Section 7.3 and Section 9.7, a change in the Contract Sum or the Contract Time shall be accomplished only by Change Order. Accordingly, no course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that the Owner has been unjustly enriched by any alteration of or addition to the Work shall be the basis of any claim to an increase in any amounts due under the Contract Documents or a change in any time period provided for in the Contract Documents.

§ 7.1.4 Notwithstanding the provisions of Sections 7.3.3 or 7.3.6 to the contrary, any Changes in the Work requiring a change in the Contract Sum shall, to the extent such change in the Contract Sum is based on “costs,” permit a charge for overhead and profit determined as follows:

- .1 for the Contractor, for any work performed by his employees or agents 10% of the costs. Deduct 5% for deductive change orders;
- .2 for the Contractor, for work performed by his Subcontractor, 5% of the amount due the subcontractor; and
- .3 for each Subcontractor, for work performed by such Subcontractor, his employees and agents, 10% of the costs.

“Costs” shall not include home-office charges or expenses, supervisions, superintendents, wages of time keepers, watchmen and clerks, small tools, incidentals, general office expense and all other expenses generally constituting overhead or general conditions. The proposals from the contractor for extra work shall include a breakdown showing cost for materials, labor, insurance and overhead and profit and bonds.

If a request for changes requires quotations from Contractor, such pricing shall be returned within seven (7) days of receipt of the request. For requests for changes which are large in scope and which Contractor feels in good faith and despite its best efforts, will require more than seven (7) days to price, Contractor and Architect will agree upon a pricing schedule which will not exceed fourteen (14) days unless agreed otherwise.

## § 7.2 Change Orders

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

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

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

§ 7.2.3 Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum and the construction schedule. Subsequent claims for cumulative cost or cumulative impact shall not be allowed.

## § 7.3 Construction Change Directives

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

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

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

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a reasonable amount for overhead and profit not to exceed ten percent (10%) in total. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect, provided such costs do not exceed the amount customarily imposed by contractors performing similar work in North Carolina;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others; and
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

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

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

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

## § 7.4 Minor Changes in the Work

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

## § 7.5 OVERTIME

The Owner shall not be responsible to the Contractor for overtime unless authorized in writing in advance, which approval shall not be unreasonably withheld.

## ARTICLE 8 TIME

### § 8.1 Definitions

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

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

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

### § 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner. The date of Commencement of the Work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by the Contract Documents or a notice to proceed given by the Owner, the Contractor shall notify the Owner in writing not less than five (5) days or other agreed period before commencing the Work.

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

§ 8.2.4 If the progress or completion of the Work is delayed by any fault, neglect, act or failure to act on the part of the Contractor or any one acting for or on behalf of the Contractor, then the Contractor shall, in addition to all of the other obligations imposed by this Contract and by law upon the Contractor, prepare and implement a Recovery Schedule as required elsewhere herein, and work such overtime or require the appropriate subcontractor(s) to work such overtime as may be necessary to make up for all time lost and to avoid delay in the progress and completion of the Work.

§ 8.2.5 Should the progress or completion of the Work be delayed by, or should Owner be subject to any claim or incur any cost or expense as a result of any fault, neglect, act or failure to act on the part of the Contractor or any one acting for or on behalf of the Contractor so as to cause any additional cost, expense, liability or damage to the Owner or any damage or additional cost or expense for which the Owner may or shall become liable, the Contractor shall and does hereby agree to compensate the Owner for, and to indemnify the Owner against, all such costs, expenses (including attorneys’ fees), liabilities and damages.

### § 8.3 Delays and Extensions of Time

§ 8.3.1 Subject to the requirements of Article 15, if the Contractor experiences a critical path delay in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or by changes ordered in the Work, or by labor disputes (other than those involving Contractor’s or his Subcontractor’s forces), fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor’s control; or by delay authorized by the Owner pending mediation and arbitration; then the Contract Time shall be extended by Change Order to the extent such delay will prevent the Contractor from achieving Substantial Completion within the Contract Time, but only if there was not a concurrent critical path delay in the performance of the Work resulting from any other cause for which the Contractor is not entitled to an extension in the Contract Time under the Contract Documents. The



Contractor further acknowledges and agrees that adjustments in the Contract Time will be permitted for a delay only to the extent such delay (i) is not caused by the Contractor, (ii) could not be limited or avoided by the Contractor's timely notice to the Owner and Architect of the delay or reasonable likelihood that a delay will occur, and (iii) is of a duration not less than one (1) day. Contractor shall strictly comply with all notice and time requirements contained herein. Failure to strictly adhere thereto shall constitute a complete waiver of any claim for an extension of time or additional compensation for delay.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15. The Contractor shall immediately take all reasonable steps to minimize the delay to Owner.

§ 8.3.3 In the event of delay caused in whole or part by the Contractor (or those acting for or on Contractor's behalf), the Contractor will pay any cost incurred on account of the Architect's and Program Manager's services for delays beyond the Contract Time, which shall be in addition to any other damages (including liquidated) to which Owner is entitled as a result of such delays. Such payments will be withheld from amounts owed to the Contractor by the Owner and should the cost of these sustained damages exceed the amounts owed by the Owner, the Contractor shall pay the difference to the Owner.

§ 8.3.5 If the Contractor submits a progress report indicating, or otherwise expresses an intention to achieve completion of the Work prior to any completion date required by the Contract Documents or expiration of the Contract Time, no liability of the Owner to the Contractor for any failure of the Contractor to so complete the Work shall be created or implied.

§ 8.3.6 Delays caused by separate contractors shall not allow the Contractor an extension of time or increase in the Contract Sum.

§ 8.3.7 The Contractor shall not be entitled to an increase in the Contract Sum or recover any damages for delay unless such delay was solely caused by the Owner or its agents. The Contractor expressly waives any claim for delay against the Owner for any concurrent delay or other delay not solely caused by the Owner or its agents, even if the Owner or its agents contributed in part to the delay.

## ARTICLE 9 PAYMENTS AND COMPLETION

### § 9.1 Contract Sum

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

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

### § 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, once approved by the Owner and Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and once approved by the Owner and Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.2.1 The Contractor's schedule of values shall contain the following line items and corresponding values and dollar amounts in addition to all other specified requirements of the contract documents:

- |                                      |                                  |
|--------------------------------------|----------------------------------|
| <b>.1 As-Built Drawing Documents</b> | <b>½ % of total Contract Sum</b> |
| <b>.2 O &amp; M Manuals</b>          | <b>½ % of total Contract Sum</b> |
| <b>.3 Warranty Binders</b>           | <b>1 % of total Contract Sum</b> |

### § 9.3 Applications for Payment

§ 9.3.1 At least ten (10) days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage as provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include for consideration requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives. Notwithstanding the foregoing, inclusion of these amounts in a Pay Application shall not alter the Owner or Architect's right to withhold certification or payment of those amounts as provided elsewhere in the Contract Documents.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay and does promptly pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site. Owner shall have the right to take possession of all materials stored offsite at any time, and any storage agreement made by Contractor must so provide. Storage by Contractor of materials offsite is discouraged. Where circumstances indicate that the Owner's best interest is served by offsite storage, the Contractor shall make written request to the Architect and Owner for approval to include such material costs in his next progress payment. The Contractor's request shall include the following information:

- .1 a list of the fabricated materials consigned to the project (which shall be clearly identified), giving the place of storage, together with copies of invoices and reasons why materials cannot be delivered to the site;
- .2 certification that items have been tagged for delivery to the project and that they will not be used for another purpose;
- .3 copy of insurance policy or amendment covering the material in storage, naming the Owner as additional insured;
- .4 costs incurred by the Architect to inspect material in offsite storage shall be paid by the Contractor; and
- .5 subsequent pay requests shall itemize the materials and their cost which were approved on previous pay requests and remain in offsite storage.

§ 9.3.3 The Contractor warrants that title to all Work and stored materials covered by an Application for Payment will pass to the Owner no later than the time of payment. The fact that retainage may be withheld shall not affect or limit the Owner's title to the Work or material. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work.

## § 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven (7) days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work as provided in Section 4.2 and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.4.4 The Architect shall maintain a record of all Applications and Certificates for Payment.

## § 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, or the Owner may nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's or Owner's opinion the representations required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, or if the Owner nullifies a Certificate for Payment, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor, Owner and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner and which the Owner may accept. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, or the Owner may nullify a Certificate for Payment whether or not previously paid or unpaid, to such extent as may be necessary in the Architect's or Owner's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to or Claims by the Owner or a Separate Contractor;
- .6 failure of the Contractor to achieve the progress required by the Contractor's Construction Schedule;
- .7 reasonable evidence that the Work will not be completed within the Contract Time;
- .8 a determination by the Owner or Architect that the unpaid balance of the Contract Sum would not be adequate to cover actual or liquidated damages for the anticipated delay or the cost to overcome the delay; or
- .9 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 If the Contractor disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, the Contractor may submit a Claim in accordance with Article 15. During the pendency of such Claim, the Contractor shall nevertheless expeditiously continue to prosecute the Work.

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

§ 9.5.4 The Owner, at its sole option, may issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.5.5 Notwithstanding anything to the contrary elsewhere in the Contract Documents, the Owner shall not be deemed to be in breach of the Agreement by withholding any payment or part of a payment on a Pay Application which the Architect has not certified, or which the Owner nullifies on the grounds set forth in Section 9.5.1.

#### § 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect, subject to the right of the Owner to nullify such Certificate for Payment on the grounds set forth in Section 9.5.1.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven (7) days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

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

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

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

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 The Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a cash or surety bond for the property against which the lien or other claim for payment has been asserted.

#### § 9.7 Failure of Payment

§ 9.7.1 If the Architect does not respond to a Certificate for Payment, through no fault of the Contractor, within fifteen (15) days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor any uncontested amount certified by the Architect within thirty (30) days after the date established in the Contract Documents, subject to the provisions of Sections 9.5.1 and 9.5.5, then the Contractor may, give twenty one (21) days' notice to the Owner and Architect of nonpayment. If the Contractor remains unpaid after the expiration

of said twenty one (21) day notice period, the Contractor may, after (15) additional days' written notice stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

**§ 9.7.2** If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract Documents, such payment shall be made promptly upon demand by the Owner. Notwithstanding any provisions in the Contract Documents to the contrary, if the Contractor fails to promptly make any payment due the Owner, if the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective Work, or if the Architect awards a Claim to another Contractor chargeable against Contractor, the Owner shall have an absolute right to offset such amount against the Contract Sum and may, in the Owner's sole discretion, elect to (i) deduct such amount from any payment then or thereafter due the Contractor from the Owner, or (ii) issue a written notice to the Contractor reducing the Contract Sum.

## **§ 9.8 Substantial Completion**

**§ 9.8.1** Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents, when all required occupancy permits and approvals from all applicable governmental authorities have been issued so that the Owner can occupy or utilize the Work for its intended use and all punch list or other incomplete or nonconforming Work which would interfere with the Owner's use of the Project for school purposes have been completed and / or corrected. Upon Substantial Completion, the Contractor shall secure and deliver to the Owner manufacturers' operations and maintenance manuals, submittals, product data, test reports, written warranties and guarantees from its subcontractors, sub-subcontractors, materialmen and suppliers bearing the date of Substantial Completion or some other date as may be agreed to by the Owner and stating the period of warranty as required by the Contract Documents. The Contractor is responsible for the warranty of all Work during the first year after Substantial Completion; which warranty is in addition to and not in lieu of such other rights and remedies which Owner has under this Contract and by law.

**§ 9.8.2** When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

**§ 9.8.3** Upon receipt of the Contractor's list, the Architect and the Owner will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect and the Owner to determine Substantial Completion. At the time the Architect and the Owner commence the Substantial Completion Inspection, if the Architect or the Owner discovers excessive additional items requiring completion or correction, the Architect or the Owner may decline to continue the inspection, instructing the Contractor as to the general classification of deficiencies which must be corrected before the Architect and the Owner will resume the Substantial Completion Inspection. If the Contractor fails to pursue the Work so as to make it ready for Substantial Completion Inspection in a timely fashion, the Architect and the Owner shall, after notifying the Contractor, conduct inspections and develop a list of items to be completed or corrected. This list of items shall be furnished to the Contractor who shall proceed to correct such items as expeditiously as possible, but in no event longer than thirty (30) days. The Architect and the Owner will conduct additional inspections as required to determine that the Work is ready for Substantial Completion Inspection. The Architect will invoice the Owner for the cost of inspections between the termination of the initial Substantial Completion Inspection, and the Contractor shall reimburse the Owner for such cost, and the Owner may offset the amounts payable to the Architect for such services from the amounts due the Contractor under the Contract Documents. For the avoidance of doubt, two (2) Substantial Completion Inspections will be performed without additional charge; all other Substantial Completion Inspections shall be billed to the Owner and be reimbursed by the Contractor.

**§ 9.8.4** When the Work or designated portion thereof has reached Substantial Completion, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and

insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

**§ 9.8.5** The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that the Owner considers to be incomplete or not in accordance with the requirements of the Contract Documents by permitting the Owner to continue to withhold two hundred percent (200%) of the Architect's estimated cost of completion and / or correction of any incomplete or nonconforming Work.

#### **§ 9.9 Partial Occupancy or Use**

**§ 9.9.1** The Owner may occupy or use any completed or partially completed portion of the Work at any stage, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete.

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

**§ 9.9.3** Partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents nor establish the date of Substantial Completion for that portion of the Work or the Work as a whole.

#### **§ 9.10 Final Completion and Final Payment**

**§ 9.10.1** Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. If, following performance of the final inspection, the Architect is required to make any additional site inspections or engage in any correspondence or negotiations with the Contractor, the Owner, or third party in order to substantiate final payment to the Contractor, the cost of all services performed by the Architect following the performance of a final inspection may be deducted from the balance due Contractor prior to final payment of the Owner to the Contractor.

**§ 9.10.1.1** Final Completion is the stage of the Work when all Work is complete and approved by Architect and the Owner, including all "punch list" Work, and the Contractor has delivered all required close-out documentation as set forth in Section 9.10.2 in a form acceptable to the Owner and the Architect.

**§ 9.10.1.2** At the time the Architect commences the Final Completion Inspection, if the Architect discovers excessive items requiring completion or correction, the Architect may decline to continue the inspection, instructing the Contractor as to the general classification of deficiencies which must be corrected before the Architect will resume the Final Completion Inspection. The Architect will conduct additional inspections as required to determine that the Work is ready for Final Completion Inspection. The Architect will invoice the Owner for the cost of all inspections except the satisfactory Final Completion Inspection, and the Contractor shall reimburse the Owner for such cost, and the Owner may offset the amounts payable to the Architect for such services from the amounts due the Contractor under the Contract Documents. In summary, one (1) Final Completion Inspection will be performed without additional charge; all other Final Completion Inspections shall be billed to the Owner and be reimbursed by the Contractor.

**§ 9.10.1.3** Final payment, constituting the unpaid balance of the Contract Sum, shall be paid to the Contractor in full, including retainage, only after Final Completion has been certified by Architect and the Project has been finally completed to Owner's and Architect's satisfaction and accepted by the Owner. The Owner shall make final

payment to the Contractor no less than sixty (60) days and no more than ninety (90) days following the date of Final Completion.

**§ 9.10.2** Final Completion shall not be achieved, and neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect in a form acceptable to the Owner and the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work (less amounts withheld by Owner) have been paid or otherwise satisfied, in the form of AIA Document G706 – Contractor’s Affidavit of Payment of Debt and Claims (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, in the form of AIA Document G707 – Consent of Surety Company to Final Payment, (5) documentation and assignment of any special warranties, such as manufacturers’ warranties or specific Subcontractor warranties, assembled in a manner acceptable to the Owner and the Architect, (6) delivery of the Contractor’s required warranties and guaranties, assembled in a manner acceptable to the Owner and the Architect (7) delivery of all Operation and Maintenance Manuals, (8) delivery of complete and accurate as-built drawings, (9) a certification that no materials containing asbestos were incorporated into the Work, and (10)() if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys’ fees.

**§ 9.10.3** The making of final payment shall not constitute a waiver of Claims by the Owner.

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

## **ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY**

### **§ 10.1 Safety Precautions and Programs**

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

### **§ 10.2 Safety of Persons and Property**

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

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

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

**§ 10.2.3** The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards. The Contractor shall also be responsible, at the Contractor’s sole cost and expense, for all measures necessary to protect any property adjacent to the Project and improvements therein.

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

§ 10.2.5 Unless otherwise directed by the Owner or the Architect, the Contractor shall promptly remedy damage and loss to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. Any damage to the property referred to in Sections 10.2.1.2 and 10.2.1.3, at the sole election of the Owner or the owner of the adjacent property, may be repaired by the Owner's own or separate forces, or those of the adjacent property owner. In such case, the Contractor shall promptly reimburse the Owner or the owner of the adjacent property for the cost incurred in repairing the damage.

The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

#### § 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.2.10 The Contractor shall promptly report in writing to the Owner and Architect all accidents arising out of or in connection with the Work that cause death, personal injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious damages are caused, the accident shall be reported immediately to the Owner and the Architect by telephone, electronic mail and text message, or by personal messenger.

§ 10.2.11 The Contractor shall comply with all provisions of the Owner's Construction Safety Manual then in effect.

#### § 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and immediately notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's actual reasonable additional costs of shutdown, delay, and start-up. The Contractor shall use its best efforts to mitigate the delay and impact of any such events.

§ 10.3.3 In the event the Owner believes the Contractor likely will encounter asbestos or lead paint on the Project, the Owner will have included a notice to the Contractor of the likely presence of asbestos or lead paint in the Bid Documents. In such event, notwithstanding any provision of Section 10.3.2 to the contrary, Contractor acknowledges it shall be responsible for all testing, abatement, removal, remediation, disposal and clean up of such Hazardous Materials and to properly protect all people working on or visiting the Project. Except as provided



herein, the remaining provisions of Section 10.3 shall remain in full force and effect, including, but not limited to, the Contractor's obligation to report the presence of any such Hazardous Materials to the Owner prior to any disturbance of such Hazardous Materials.

**§ 10.3.4** The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are specifically required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances specifically required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

**§ 10.3.5** The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1.

#### **§ 10.4 Emergencies**

**§ 10.4.1** In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

**§ 10.4.2** Nothing in this Article 10.4 shall be construed as relieving the Contractor from the cost and responsibility for emergencies which, with normal diligence, planning, and close supervision of the Work as required under the Contract Documents, could have been foreseen or prevented. Contractor shall provide the Architect, the Program Manager and the Owner a list of names and telephone numbers of the designated employees of the Contractor and each major subcontractors to be contacted in case of emergency during non-working hours. A copy of the list will also be displayed on the job site.

### **ARTICLE 11 INSURANCE AND BONDS**

#### **§ 11.1 Contractor's Insurance and Bonds**

**§ 11.1.1** The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

**§ 11.1.2** The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents or otherwise required by applicable law. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located. The Contractor shall deliver the required bonds to the Owner when it delivers the executed Agreement to the Architect. The Contractor shall keep the surety informed of the progress of the Work, and, where necessary, obtain the surety's consent to, or waiver of, (i) notice of changes in the Work; (ii) request for reduction or release of retention; (iii) request for periodic or final payment; and (iv) any other item required by the Surety. The Owner may, in the Owner's sole discretion, inform the Surety of the progress of the Work and obtain consents as necessary to protect the Owner's rights, interest, privileges, and benefits under and pursuant to any bond issued in connection with the Work.

**§ 11.1.3** Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

**§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance.** Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the

procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

## **§ 11.2 Owner's Insurance**

**§ 11.2.1** The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

**§ 11.2.2 Notice of Cancellation or Expiration of Owner's Required Property Insurance.** Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; and (2) the Contract Time and Contract Sum shall be equitably adjusted. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

## **§ 11.3 Waivers of Subrogation**

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent of actual recovery of any insurance proceeds provided through property insurance procured pursuant to the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

## **§11.5 Adjustment and Settlement of Insured Loss**

**§ 11.5.1** A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

**§ 11.5.2** Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work and the Contractor shall continue to diligently prosecute the Work.

## ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

### § 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's and the Owner's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the actual and reasonable costs of uncovering and replacement shall be added to the Contract Sum by Change Order. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

### § 12.2 Correction of Work

#### § 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

#### § 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one (1) year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly, but in any event no more than thirty (30) days after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one (1) year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 Upon completion of any Work under or pursuant to this Section 12.2, there shall be a one (1) year warranty and correction period in connection with repairs and corrections performed, including any repairs and replacement to any part of the Work or other property damaged by the defective Work.

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

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

### § 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as

appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made. The acceptance of non-conforming Work by the Owner shall only be by written Change Order or Construction Change Directive, signed by the Owner. Any non-conforming work with an estimated corrective value exceeding \$\_\_\_\_\_ must be approved by action of the Board of Education. Otherwise, any prior acceptance by the Owner shall be void and of no effect.

## **ARTICLE 13 MISCELLANEOUS PROVISIONS**

### **§ 13.1 Governing Law**

The Contract shall be governed by the laws and rules of the State of North Carolina, irrespective of any conflicts of laws principles that would require the application of the laws or rules of any other jurisdiction.

### **§ 13.2 Successors and Assigns**

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

### **§ 13.3 Rights and Remedies**

**§ 13.3.1** Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

**§ 13.3.2** No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

### **§ 13.4 Tests and Inspections**

**§ 13.4.1** Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents or by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities having jurisdiction. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded.

**§ 13.4.2** If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

**§ 13.4.3** If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures, retesting and compensation for the Architect's services and expenses, shall be at the Contractor's expense. The Contractor also agrees that the cost of testing services required for the convenience of the Contractor in his scheduling and performance of the Work, and the cost of testing services related to remedial operations performed to correct deficiencies in the Work, shall be borne by the Contractor.

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

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

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

### § 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate then prevailing at the place where the Project is located, currently eight percent (8%) per annum.

### § 13.6 COMMENCEMENT OF STATUTORY LIMITATION PERIOD

§ 13.6.1 As between the Owner and Contractor:

- .1 Before issuance of Final Certificate for Payment: As to acts or failures to act occurring prior to the issuance of the Final Certificate for Payment, any applicable statute of limitations or statute of repose shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events as of the date of the issuance of the Final Certificate for Payment.
- .2 After Final Certificate for Payment: As to acts or failures to act occurring after the relevant date of issuance of the Final Certificate for Payment, any applicable statute of limitations or statute of repose shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events as of the date of any act or failure to act by the Contractor pursuant to any Warranty provided under Section 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Section 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.

### § 13.7 CHOICE OF FORUM

§ 13.7.1 All litigation pertaining to or arising from or relating to this Agreement or the Work described herein shall be conducted in the General Court of Justice, Superior Court Division for Guilford County (Greensboro) or in the federal court residing in that District, which courts shall be the exclusive forums for any such litigation.

§ 13.7.2 Any arbitration or mediation arising from or related to this Agreement or the Work shall be conducted in Guilford County, North Carolina at a place designated by Owner.

## ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

### § 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of forty five (45) consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped; or
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped.

In the event the Contractor's Work exceeding five (5) days, Contractor shall be entitled to an adjustment of the Contract Time, Contract Sum and GMP as provided in Section 14.3.

§ 14.1.2 The Contractor may terminate the Contract if the Architect has not issued a Certificate for Payment or the Owner has nullified a Certificate of Payment, and has not timely notified the Contractor of the reason for withholding certification as provided in Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents. ;

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may give twenty-one (21) days' written notice to the Owner and Architect that Contractor is considering terminating the Contract and shall state specifically and in detail all grounds for termination. If Owner or Architect has not cured the specified grounds for termination set forth in the written notice within twenty-one (21) days of receipt of such notice, Contractor may, upon giving fifteen (15) additional days' written notice, terminate the Contract and recover from the Owner payment for Work executed including reasonable job site overhead, cost and profit earned to date and the other items set out

in Section 14.4. Contractor waives all consequential damages including, but not limited to, home office overhead and those damages set forth in Section 15.1.8.

§ 14.1.4 If the Work is stopped for a period of ninety (90) consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon twenty one (21) additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

**§ 14.2 Termination by the Owner for Cause**

§ 14.2.1 The Owner may terminate the Contract and / or complete any portion of the Work using its own or separate forces at the Contractor's expense if the Contractor

- .1 refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or Suppliers;
- .3 disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority;
- .4 fails to begin remedial action within any time period set forth in any Notice of Violation issued by NC DEQ , and/or within forty-eight (48) hours after receipt by the Contractor of written notice from the Owner;
- .5 falls more than fourteen (14) days behind the progress required by the Contractor's Construction Schedule (or fails to achieve any milestone as required therein), and fails promptly to commence and continue reasonable action, as determined by Owner, to regain the period of delay;
- .6 fails to comply with its coordination and/or scheduling obligations;
- or
- .7 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven (7) days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned, leased by, or controlled by the Contractor;
- .2 Require Contractor to provide to the Owner within seven (7) days' of termination, a complete summary and recap of all contracts and agreements with subcontractors, suppliers, materialmen, consultants, independent contractors and any other entity with which Contractor has contracted in connection with the Project (collectively the "Contractor's Subcontractors"). The recap shall set out the following information for each of the Contractor's Subcontractors: (i) initial contract amount, (ii) a list of all approved change orders, (iii) a list of all pending change orders and a description thereof, (iv) a list of the billings by each of Contractor's Subcontractors and a list of payments; (v) a list of the amounts billed on each change order, and a list of payments and such other information and documentation as the Owner or the Architect may, in their discretion, require; (vi) a list of all applicable offsets or backcharges. The required summary and recap shall be certified as correct by an officer of Contractor. Along with the recap, Contractor shall deliver all invoices, evidences of payment, subcontracts, change orders and agreements;
- .3 Accept assignment of subcontracts pursuant to Section 5.4; and
- .4 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor reasonable documentation of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case

may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

**§ 14.3 Suspension by the Owner for Convenience**

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

**§ 14.3.2** The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

**§ 14.4 Termination by the Owner for Convenience**

**§ 14.4.1** The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

**§ 14.4.2** Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

**§ 14.4.3** Upon such termination, the Contractor shall recover, as its sole remedy, payment for Work properly performed in connection with the terminated portion of the Work prior to the effective date of termination and for reasonable and actual increased cost of early demobilization directly attributable to the termination. The Contractor hereby waives and forfeits all other claims for payment and damages, including, without limitation, anticipated profits and lost overhead. The Owner shall be credited for (i) payments previously made to the Contractor for the terminated portion of the Work, (ii) claims that the Owner or other Contractors have against the Contractor under the Contract, and (iii) the value of the materials, supplies, equipment, or other items that are to be disposed of by the Contractor that are part of the Contract Sum.

**§ 14.4.4** Upon termination by the Owner under this Section, the Contractor shall submit a final payment application for (a) all reasonable costs and direct jobsite expenses incurred through the date of termination; (b) reasonable direct jobsite costs incurred in connection with demobilization, restocking and securing the site; (c) a reasonable rental for the Contractor's equipment, tools, construction equipment and machinery retained by the Owner at termination, which will be returned to the Contractor on or before final completion; (d) retainage earned as of the date of termination; and (e) the percentage of overhead and profit earned to date based upon the percentage of completion of the Contractor's Work as of the date of termination as determined by the Architect and the Owner. The Owner shall withhold such amounts as the Architect and/or the Owner deem appropriate for such matters as pending claims or defective work or as otherwise allowed by the Contract Documents.

**§ 14.4.5** The Contractor will include in each of its subcontracts and purchase order, a provision which allows termination for convenience on the same terms as set forth above.

**§ 14.5** Termination of the contract by the Owner will not excuse the Contractor or its surety for compliance with the Contract Documents for Work performed prior to the date of termination.

**§ 14.6** In the event that Owner purports to terminate this Agreement for cause and it is subsequently determined that no grounds for termination for cause exist, such termination shall be deemed a termination by Owner for convenience, and the provisions of Article 14.4 shall be applicable.

## ARTICLE 15 CLAIMS AND DISPUTES

### § 15.1 Claims

#### § 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of terms of the Contract Documents, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

#### § 15.1.2 NOTICE OF CLAIMS

§ 15.1.2.1 Notice of claim by Contractor must be made within seven (7) days after occurrence of the event giving rise to such Claim or within seven (7) days after the Contractor first recognizes (or should have recognized) the condition giving rise to the Claim, whichever is later. Notice of claim must be made in writing.

§ 15.1.2.2 Time is of the essence with respect to providing notice and filing claims by Contractor. The initial notice of claim filed in writing shall provide notice of the event giving rise to the claim with sufficient detail to allow Architect, Owner to investigate such claim. The initial notice of claim filed by Contractor shall also include Contractor's best estimate of the additional cost and impact on the schedule. A final claim shall be filed by Contractor within twenty-one (21) days from completion of the additional work involved in the claim. Such final claim shall be fully documented with support for all costs claimed and shall include an updated schedule showing the effect on the time for completion. Failure of Contractor to strictly comply with this procedure shall constitute a waiver and release of such claim. Any claim shall represent the entire claim for that event, and no additional claims for impact, delay, or cumulative effect shall be made by the Contractor.

#### § 15.1.3 CONTINUING CONTRACT PERFORMANCE

If the Contractor believes that any action or directive of the Owner or Architect entitles Contractor to make Claim for an increase in the Contract Sum or Contract Time, written notice as provided herein shall be given and written authorization from Owner to proceed shall be received before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4. Pending final resolution of a Claim, except as otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents for work and/or claims for Payment not disputed by Owner.

#### § 15.1.4 CLAIMS FOR CONCEALED OR UNKNOWN CONDITIONS

§ 15.1.4.1 Owner may make available to Contractor, either in the Project Manual or otherwise, the results of any site investigation test, borings, analysis, studies or other tests by or in the possession of Owner or Architect. Such materials are for information only and are not part of the Contract. Owner makes no representation or warranty that such materials or information are accurate or accurately represent the actual conditions at the site. Contractor shall verify all information contained herein before commencement of construction. Failure to do so shall constitute a waiver of all claims (to the extent any are available) which Contractor may have at any time. The Project site will be made available to Contractors upon reasonable notice, to conduct such tests and investigations as the Contractors may deem appropriate. The site shall be returned to its prior condition by Contractor immediately after completion of any such testing or investigation.

§ 15.1.4.2 If conditions are encountered at the site which could not have reasonably been discovered as a result of due and diligent testing and investigation and which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which differ materially from those (i) ordinarily found to exist in the area where the Project is located and (ii) generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then written notice describing the condition shall be given by Contractor to Owner and Architect within three (3) days after first observance. The condition shall not be disturbed prior to investigation by Architect and Owner, who will promptly investigate such conditions. If such conditions qualify under this Article 15.1.4.2 and Contractor believes that such conditions will cause an increase in the Contractor's cost of, or time required for, performance of any part of the Work, Contractor shall give notice and file a claim pursuant to Article 15.



## § 15.1.5 CLAIMS FOR ADDITIONAL COST

### § 15.1.5.1 Against Owner:

- .1 If the Contractor believes additional cost is involved for reasons attributable to Owner including, but not limited to (1) an order by the Owner to stop the Work where the Contractor was not at fault, (2) failure of payment by the Owner, (3) termination of the Contract by the Owner, (4) Owner's suspension of the Work, (5) failure of the Owner or Architect to make a decision or act, or (6) other reasonable grounds for which Owner is responsible. Contractor shall notify Architect and Owner within five (5) days of the actions or inactions.
- .2 Owner's exercise of any of its rights pertaining to changes, regardless of the extent or number of such changes, or Owner's exercise of any of its remedies of suspension of the Work, or requirement of correction or re-execution of any defective Work shall not under any circumstances to be construed as interference with Contractor's performance of the Work.

### § 15.1.5.2 Against Architect:

If the Contractor believes that additional cost or delay is involved as a result of the actions, failure to act, errors or omissions of the Architect, for which Contractor claims Architect is responsible including, (1) failure to correct incomplete or ambiguous plans and specifications in a timely manner, (2) failure to respond in a timely manner to requests made by Contractor, (3) improper administration of the Contract, or (4) other reasonable cause, Contractor shall notify Owner and Architect within five (5) days of the date of the actions or inactions of the Architect or the date the errors and omissions in the plans and specifications are discovered.

### § 15.1.5.3 Owner's and Architect's Rights to Cure:

- .1 Contractor shall notify Owner, Program Manager and Architect in writing as early as possible in advance of when decisions or actions are required from Owner or Architect, so as not to delay Contractor's Work.
- .2 Should Contractor be delayed in performance of the Work by Owner or Architect, Contractor shall deliver to Owner and Architect a written notice of such delay within five (5) days of the commencement of such delay. Time is of the essence with respect to notice of delay and the scheduled completion date herein established.
- .3 If Owner and/or Architect removes the cause of delay attributable to Owner and/or Architect within five (5) days from the receipt of such notice, Contractor shall not be entitled to additional compensation or an extension of time. If Owner and/or Architect fails to remove the cause of such delay within five (5) days from receipt of such notice, Contractor may, subject to the requirements and limitations imposed by the Contract Documents, make a claim for additional compensation as provided in Article 15 and request an extension of time for the period of delay as provided herein. Failure of Contractor to adhere strictly to the requirements of this subparagraph shall constitute a waiver of Contractor's claim for extra compensation and an extension of time.

## § 15.1.6 SUBMISSION OF CLAIM TO ARCHITECT

All claims by a Contractor against the Owner or the Architect shall be submitted to the Architect and Owner for decision by the Architect as provided in this Article 15 and Contractor shall strictly comply with the requirements of Article 15.

## § 15.1.7 CLAIMS FOR ADDITIONAL TIME

**§ 15.1.7.1** If the Contractor wishes to obtain an increase in the Contract Time, a Claim should be submitted in strict compliance with Article 15.1.2 and the other applicable requirements of Article 15. Contractor's Claim for delay must be supported by a critical path analysis which shows to the satisfaction of the Architect and Owner that the delay involved was to a critical party activity (or activities), was not caused or materially contributed to in whole or part by Contractor (or anyone for which Contractor is responsible) or any other Prime Contractor, and results in a delay to Substantial Completion of the Work. Contractor will not be entitled to an extension of time or any damages for delay where there is concurrent delay for which a Prime Contractor or Contractor (or anyone for which

Contractor is responsible) is responsible in whole or part. Contractor's claim for additional compensation for delay shall be limited to reasonable actual, additional direct costs incurred at the job site without mark-up for overhead and profit. No consequential damages or home-office overhead or expenses shall be recoverable.

**§ 15.1.7.2** If abnormal, adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the critical path of construction. The determination of the allowability of a claim for an increase in the Contract Time due to adverse weather conditions shall be made as follows:

- .1 .Acceptable data for substantiating a claim for additional time due to abnormal weather conditions will be the records of the National Oceanographic and Atmospheric Administration (NOAA) for the prior five (5) years. In the absence of NOAA records for the specific Project site, upon mutual agreement, local official records will be the basis. Furthermore, the effect of such abnormal weather must be demonstrated. Claims for extensions of construction time due to adverse weather conditions shall include National Oceanic and Atmospheric Administration (NOAA) Climatological Reports for the months involved, plus a report indicating the precipitation, temperature, etc., for the past five (5) years from the nearest reporting station. This data will be used to determine the number of adverse weather days which the Contractor would normally expect to encounter. Extensions of time may be requested for any month of construction for days lost, which affect the critical path of construction, due to adverse weather in excess of the expected lost time. The Contractor agrees that an extension of time is the only compensation due him for an adverse weather delay.
- .2 Actual adverse weather delay days are those on which adverse weather prevents work on critical path activities for fifty percent (50%) or more of the Contractor's scheduled work day. The number of actual adverse weather delay days shall be calculated chronologically from the first to the last day of each month, and be recorded as full days.
- .3 In calculating the number of days to be added to the Contract Time due to the impacts of adverse weather for any prior or subsequent month(s) in which the number of actual adverse weather delay days is (are) less than the anticipated number of adverse weather delay days, the Owner shall be credited with the difference between the anticipated and actual adverse weather delay days experienced in said month(s).
- .4 Upon commencement of on-site activities and continuing throughout construction, the Contractor shall record daily the occurrence of adverse weather and resultant impact to critical path activities. Adverse weather days must be calculated each month from the onset of the project. Only days on which the actual inclement weather occurs are considered adverse weather days. Subsequent days with wet ground conditions or other "impact days" shall not be considered adverse weather days.
- .5 Within twenty-one (21) consecutive calendar days of the last day of any month (hereinafter referred to as the "Reporting Month"), Contractor shall submit a written adverse weather report, including copies of the Contractor's daily weather reports and applicable Climatological data from the National Oceanic and Atmosphere Administration (NOAA) or similar data for the project location. Notwithstanding any other provisions, failure to submit the required written report within the time specified above shall be deemed to be and shall constitute a waiver by Contractor of any and all claims for delay due to adverse weather conditions occurring during said Reporting Month.
- .6 Contractor agrees that dates under this Contract will not be extended due to normal inclement weather. For a time extension to be granted for abnormal, inclement weather; a) Such weather must, in the opinion of the Architect and Owner's Representative, actually have an adverse effect upon the progress of the Contractor's work which is of a critical nature (critical path activity) and; b) in the opinion of the Architect and Owner's Representative, the adverse effect must not be due to any fault or negligence of Contractor and could not have been avoided by the Contractor through proper planning, coordination and implementation of adequate weather protection necessary to allow the Work to be continued without adverse effect upon labor production. Contractor agrees that the fact that abnormal inclement weather may occur does not, to itself, justify any time extension further.
- .7 Requests for extensions of Contract Time due to adverse weather conditions ("weather extremes") shall be submitted with each monthly Application for Payment. The Contractor agrees that adverse weather shall be determined by the number of days in a particular month with adverse weather due to excessive precipitation shall be the number of days recorded with 0.50 inches or more of precipitation in excess of

the normal daily average for the month, or the number of days in excess of the normal number of days with 0.10 inches of precipitation, whichever is less. Any days with less than 0.10 inches of precipitation will not be considered as an adverse weather day and will not count as a rain day in these calculations. The weather data from the closest station will be used to perform the calculations. Snow and ice shall be converted to water based on 1 inch snow/ice equals 1/10th inch of water.

- .9 No extension of time will be made for abnormal inclement weather (adverse weather) after principal portions of the Work are enclosed except for site work which remains on the critical path and critically affects the Contract Time or specific dates. For the purpose of this Paragraph, the term “enclosed” is defined to mean when the Work is sufficiently closed in (exterior walls up and roof in place) so as to permit any structure or major portion thereof which is part of the Work, to be adequately conditioned so as to allow the various trades to perform their work. The Architect shall determine, with concurrence of Owner’s Representative, when the structure is “enclosed” and shall issue, upon the request of the Contractor, a letter certifying the date the Work became enclosed for the purpose hereof.
- .10 The Construction Progress Schedule shall be updated each month that inclement weather days accrue.
- .11 Claims for extension of Contract Time for delays and excessive inclement weather (adverse weather) delay days shall be deemed to be satisfied by the Owner granting an extension of time only and do not entitle the Contractor to reimbursement for extended overhead or direct field supervision or other costs.

#### **§ 15.1.8 Waiver of Claims for Consequential Damages**

The Contractor waives Claims against the Owner for consequential damages arising out of or relating to this Contract. This waiver includes damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This waiver is applicable, without limitation, to all consequential damages due to either party’s termination in accordance with Article 14. Nothing contained in this Section 15.1.8 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

#### **§ 15.2 Initial Decision**

**§ 15.2.1** Claims by the Contractor, including those alleging an error or omission by the Architect shall be referred initially to the Architect for decision in accordance with Section 15.1.6. Except as herein provided, an initial decision by the Architect shall be required as a condition precedent to mediation, arbitration or litigation (as may be applicable) instituted by Contractor of Claims arising prior to the date final payment is due, unless thirty (30) days have passed after the Claim has been referred to the Architect with no action having been taken by the Architect. Claims by the Owner may, but are not required to be submitted to the Architect for decision in accordance with Section 15.1.6.

**§ 15.2.2** The Architect will review Claims and within ten (10) days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Architect is unable to resolve the Claim if the Architect lacks sufficient information to evaluate the merits of the Claim or if the Architect concludes that, in the Architect’s sole discretion, it would be inappropriate for the Architect to resolve the Claim.

**§ 15.2.3** In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner’s expense.

**§ 15.2.4** If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten (10) days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within thirty (30) days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within thirty (30) days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

### § 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4 and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of sixty (60) days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

### § 15.4 Arbitration

§ 15.4.1 Any Claim subject to, but not resolved by, mediation shall be subject to arbitration or litigation at the sole election of the Owner. Unless the parties mutually agree otherwise, any arbitration shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded. Any arbitration hearing or other arbitration proceeding shall be held in Greensboro, Guilford County, North Carolina unless otherwise agreed by the parties.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The Owner's right to demand arbitration shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

#### § 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party

provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

**§ 15.4.4.2** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

#### **ARTICLE 16 NON-DISCRIMINATION**

**§ 16.1** 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.

**§ 16.2** The Contractor 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 contractor 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.

#### **ARTICLE 17 COORDINATION**

##### **§ 17.1 OWNER'S DELEGATION OF COORDINATION.**

Owner has delegated and assigned to the General Construction Contractor all of Owner's duties and obligations for coordination of the Work of all Contractors as well as Owner's own forces. Owner shall have no coordination obligations in connection with the Project.

##### **§ 17.2 COORDINATION BY CONTRACTORS**

Each Contractor shall coordinate its construction activities with those of other Contractors and other entities involved to assure efficient and orderly installation of each part of the Work and the earliest possible completion of the Project. Each Contractor shall coordinate its operations with operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation. Failure of any Contractor to perform the coordination responsibilities as required by this Article 17 and as otherwise required in the Contract Documents shall constitute a breach of Contract.

- a. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, each Contractor shall schedule its construction activities in the sequence required to obtain the best results.
- b. Where availability of space is limited, each Contractor shall coordinate installation of different components with other Contractors to assure maximum accessibility for required maintenance, service, and repair.
- c. Each Contractor shall make adequate provisions to accommodate items scheduled for later installation.
- d. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include items such as required notices, reports, and attendance at meetings.

##### **§ 17.3 CONSERVATION**

The Contractor shall coordinate construction activities to ensure that operations are carried out with consideration

given to conservation of energy, water, and materials.

#### § 17.4 ADMINISTRATIVE AND SUPERVISORY PERSONNEL AND DUTIES

§ 17.4.1 In addition to its Project Superintendent, each Contractor shall provide other administrative and supervisory personnel required for proper performance of the Work, including special personnel required for coordination of operations with the other Contractors.

§ 17.4.2 Project Coordinator: The General Construction Contractor shall be the Project Expediter and shall designate a Project Coordinator, experienced in administration and supervision of all aspects of building construction, including mechanical, plumbing and electrical Work. The Project Coordinator shall be authorized to act as the coordinator of all construction activities between the separate Contractors and shall expedite all construction activities.

- .1 Construction activities requiring coordination by the Project Coordinator include but are not limited to:
  - a. Scheduling and sequencing all Work for the entire Project.
  - b. Sharing access to Work spaces.
  - c. Installations.
  - d. Protection of each other's Work.
  - e. Cutting and patching.
  - f. Selections for compatibility.
  - g. Preparation of Coordination Drawings.
  - h. Inspections and tests.
  - i. Temporary services and facilities.

§ 17.4.3 **OTHER COORDINATORS.** The Heating, Ventilating and Air Conditioning (HVAC) Contractor, the Electrical Contractor, the Plumbing Contractor, the Fire Protection Contractor (if separate), and any other specialty contractor (as required by the Owner) shall each designate a Coordinator for their own Work experienced in administrative and supervisory coordination of their particular Work. This experience shall include coordination of the type of operations required for this Project, and coordination of their Work with other types of operations. Each Coordinator shall be required to act as the specialized Coordinator of construction activities for their Work, and between those activities and activities of other separate Contracts. Construction activities requiring coordination by each Coordinator include but are not limited to:

- a. Scheduling and sequencing of their Work;
- b. Sharing access to Work spaces;
- c. integration of their Work into limited spaces available to other Contractors;
- d. Protection of each Contractor's Work;
- e. cutting and patching;
- f. tolerances;
- g. preparation of Drawings for their Work;
- h. inspections and tests;

- i. utilization of temporary services and facilities for their Work.

## § 17.5 COORDINATION MEETINGS

§ 17.5.1 No less frequently than on a monthly basis, the General Construction Contractor shall schedule and conduct Project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings. The General Construction Contractor shall provide notice of such meetings sufficiently in advance to allow Owner and Architect to attend if they so desire.

§ 17.5.2 The General Construction Contractor shall request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved. The Contractors (and their Subcontractors) so requested shall attend.

§ 17.5.3 The General Construction Contractor shall record meeting results, and within three days following each meeting, distribute copies to everyone in attendance and to the others affected by decisions or actions resulting from each meeting, with a copy to the Owner and Architect.

## § 17.6 RESOLUTION OF COORDINATION DISPUTES

In the event that, despite the Project Coordinator's and the other Contractor's coordinators' best efforts, they are unable to obtain proper cooperation from or coordination with other Contractors or necessary parties, the General Construction Contractor shall, in a prompt manner so as not to delay construction progress, submit to the Architect and Owner a written report detailing the problems involved and the General Construction Contractor's recommendations and proposed solution. Upon receipt of such report and after conducting such investigation, if any, as the Architect may deem necessary, the Architect shall issue a final decision resolving all issues addressed in the report, and all parties affected will promptly comply with the Architect's final decision. Owner shall have no responsibility for coordination, or resolving coordination disputes, or for any claims, damages or expenses incurred by anyone in connection therewith. Should any Contractor feel that it has a claim as a result of the failure of any other Contractor as a result of that Contractor's failure to provide the required coordination, it shall be submitted to the Architect for decision as provided in Article 15. Any amounts awarded by Architect shall be charged against the responsible Contractor's Contract as provided in Article 15 along with all damage, claims, costs and expenses (including reasonable attorneys' fees) incurred by Owner.

## ARTICLE 18 DAMAGES

§ 18.1 Contractor recognizes and acknowledges that if the Work is not completed and available for occupancy by the required completion date, the Owner will incur substantial actual and consequential damages including, but not limited to, the cost of moving and relocating students or providing temporary facilities, etc. The Owner shall be entitled to actual and consequential damages in the event it is not entitled to recover liquidated damages.

§ 18.2 The Owner will also incur additional architectural fees and extended fees for Owner's consultants and Project/Program Manager. Contractor acknowledges and agrees that unlike damages compensated through liquidated damages, additional architectural fees and extended consultant's fees are easily ascertainable, and therefore not included in liquidated damages figure set forth in the Agreement. As such, in addition to the damages set forth in Article 18.1 or liquidated damages, Owner will be entitled to collect the cost of additional and/or extended Architect, Consultant or Project Manager fees and expenses. Contractor shall also be responsible for all damages costs and expenses incurred by Owner as a result of Contractor's failure to perform strictly as required by the Contract Documents, including, but not limited to attorneys' fees and expenses and costs and expenses incurred in mediation, arbitration or litigation including additional Architect fees and all discovery costs and expert witness fees.

**Name of Contractor or Construction Manager**  
**HUB Participation Report**  
**Project Name**

Report shall include ALL known subcontractor and supplier commitments regardless of MWBE/HUB status or tier level.

GMP or Prime Contract Award TOTAL:

Total Value of HUB Trade/Supply Contracts: \$ - #DIV/0! HUB Percentage of Total GMP or Prime Contract  
 Total Value of ALL trade/supply contracts: \$ - #DIV/0! HUB Percentage of subcontracted effort

**HUB Participation**  
 Input the full Contract value in the appropriate column (only one column); (% is calculated as portion of PRIME contract value.)

	Trade Contractor/Supplier	Scope of Work	Non- HUB Participation <small>Input full contract value (less any lower tier HUB participation)</small>		African American (B)		Hispanic (H)		Asian (A)		Native American (AI)		Socially & Economically Disadvantaged (SE)		White Female (WF)		HUB Contract Amount	HUB %	Affidavit A or B	Affidavit C, D, or NA
			\$	%	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%				
1				#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!	\$ -	#DIV/0!		
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																	\$0			



**BOND No.** \_\_\_\_\_

**PERFORMANCE BOND**

Date of Contract: \_\_\_\_\_

Date of Execution: \_\_\_\_\_

Name of Principal  
(Contractor) : \_\_\_\_\_ (**“Principal”**)

Name of Surety : \_\_\_\_\_ (**“Surety”**)

Name of Contracting  
Body : **Guilford County Board of Education** (**“Owner”**)

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 Owner, 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 Owner, identified as shown above, (the “Contract”), the terms of which are hereby incorporated by reference and made a part hereof, for work on the above referenced Project.

NOW, THEREFORE, Principal and Surety agree as follows:

- 1) Principal and Surety jointly and severally hereby bind themselves to Owner for the full and complete performance of all undertakings, covenants, terms, conditions and agreements of such Contract. 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 Owner, with or without notice to the Surety, and during the life of any guaranty or warranty 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.

- 2) The responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by the Owner of the balance of the Contract Sum, the Surety is obligated without duplication for all of Contractor's obligations and responsibilities under the Contract, including, but not limited to:
  - (a) The responsibilities of the Contractor for correction of defective work and completion of the Contract within the time required;
  - (b) Other costs and expenses resulting from the Contractor's default as allowed by the Contract; and
  - (c) Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the Contractor
- 3) The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators or successors.
- 4) The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

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.

Witness :

\_\_\_\_\_  
(Proprietorship or Partnership)

Attest: (Corporation)

By: \_\_\_\_\_

Title: \_\_\_\_\_  
(Corp. Sec. or Asst. Sec.. only)

(Corporate Seal)

\_\_\_\_\_  
Contractor: (Trade or Corporate Name)

By: \_\_\_\_\_

Title: \_\_\_\_\_  
(Owner, Partner, or Corp. Pres. or Vice Pres. only)

\_\_\_\_\_  
(Surety Company)

Witness :

\_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_  
(Attorney in Fact)

Countersigned :

\_\_\_\_\_

(Surety Corporate Seal)

\_\_\_\_\_  
(N.C. Licensed Resident Agent)

\_\_\_\_\_

\_\_\_\_\_  
Name and Address-Surety Agency

\_\_\_\_\_

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

BOND No. \_\_\_\_\_

**PAYMENT BOND**

Date of Contract: \_\_\_\_\_  
Date of Execution: \_\_\_\_\_  
Name of Principal (Contractor) \_\_\_\_\_ (**“Principal”**)  
Name of Surety: \_\_\_\_\_ (**“Surety”**)  
Name of Contracting Body: Guilford County Board of Education (**“Owner”**)  
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 Owner, 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 Owner, identified as shown above, (the “Contract”), the terms of which are hereby incorporated by reference and made a part hereof, for work on the above referenced Project.

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.

Witness :

\_\_\_\_\_  
Contractor: (Trade or Corporate Name)

\_\_\_\_\_  
(Proprietorship or Partnership)

By: \_\_\_\_\_

Attest: (Corporation)

Title: \_\_\_\_\_  
(Owner, Partner, or Corp. Pres. or Vice Pres. only)

By: \_\_\_\_\_

Title: \_\_\_\_\_  
(Corp. Sec. or Asst. Sec.. only)

(Corporate Seal)

\_\_\_\_\_  
(Surety Company)

Witness :

By: \_\_\_\_\_

\_\_\_\_\_

Title: \_\_\_\_\_  
(Attorney in Fact)

Countersigned :

(Surety Corporate Seal)

\_\_\_\_\_  
(N.C. Licensed Resident Agent)

\_\_\_\_\_  
Name and Address-Surety Agency

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

## SECTION 230510 - BASIC MECHANICAL REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 REFERENCES & INTENT

- A. All work of this Division shall comply with the requirements of the Drawings, General Conditions, Supplementary General Conditions and Division 01 Specifications section.
- B. Study all drawings and specifications before submitting bids.
- C. Work under this Division includes all essential labor, materials, tools, equipment, transportation, insurance, temporary protection, supervision and incidental items for proper installation and operation of all systems even though not specifically mentioned or indicated.
- D. Drawings are diagrammatic. Drawings are not intended to be absolutely precise and do not specify or show every offset, fitting, and component. The purpose of the drawings is to indicate a system concept, the main components of the systems, and the approximate geometrical relationships. Based on the systems concept, the main components, and the approximate geometrical relationships, the contractor shall provide all other components and materials necessary to make the systems fully complete and operational. Contractor shall route piping or provide offsets to avoid interference with structural elements, equipment, electrical panels and junction boxes, etc. Verify locations, dimensions, flow directions, etc. before construction.
- E. It is the intent of these specifications and drawings to provide for finished systems of the quality specified, properly tested, balanced and ready for operation. This includes all devices and accessories required to make the work complete even though such items may not be expressly shown or specified. Drawings and specifications are complementary and must be so construed to determine the full scope of work.
- F. Jobsite Conditions: The Contractor shall visit the site and familiarize himself with the existing conditions before submitting his bid. Failure to do so does not relieve the Contractor from completing the work as specified herein and after. Requests for additional payments due to the Contractor's failure to allow for work conditions will be rejected.

#### 1.2 WORK INCLUDED

- A. The following work is specifically included without limiting the generality implied by these specifications and drawings.
  - 1. All mechanical scope of work specified herein and as shown on the plans. Contractor should review all drawings and include all items that are a part of his scope.
  - 2. All associated wiring, cutting and patching.
- B. Bidders shall examine equipment plans and specifications and include in their bids all labor and material required for complete installation and connection of equipment which is properly a part of their trade even if it is not provided in the equipment specifications.

### 1.3 STANDARDS AND CODES

- A. All equipment with electrical components shall bear the UL label.
- B. The following minimum standards apply wherever applicable:
  - 1. ANSI American National Standards
  - 2. ASTM American Society for Testing Materials
  - 3. NBFU National Board of Fire Underwriters
  - 4. NEC National Electric Code
  - 5. NEMA National Electrical Manufacturers Association
  - 6. NFPA National Fire Protection Association
  - 7. OSHA Occupational Safety and Health Act
  - 8. SMACNA Sheet Metal/Air-Conditioning Contractors National Ass., Inc.
  - 9. North Carolina Building Code
  - 10. Any Other Applicable local and State Codes
- C. In the event there are conflicts between specifications and standards or codes, standards or codes shall govern unless specifications are in excess of standards.

### 1.4 PERMITS AND FEE

- A. Make application for all necessary permits and pay applicable fees.

### 1.5 STRUCTURAL STEEL AND CONCRETE

- A. Structural members may not be pierced without prior written approval of the Engineer.

### 1.6 WATERPROOFING

- A. Waterproofed floors and walls may not be cut.

### 1.7 WORK SCHEDULE

- A. Work schedule shall be in accordance with Division 01.
- B. Any demolition or installation work producing excessive dust or noise deemed to be disruptive or possibly unsafe to building operations must be, at the Owner's discretion, performed after normal working hours.

### 1.8 PROTECTION OF EQUIPMENT

- A. Provide all necessary protection and be fully responsible for material and equipment stored or installed on the site. Material or equipment stolen or damaged shall be replaced at no additional cost to the Owner.
- B. Provide protection against theft, physical damage and the entry of dirt, water or corrosive fumes into the material and equipment. Maintain protective covers for the duration of construction. Store equipment, such as controls, subject to damage by moisture and temperature extremes in a dry, heated space.

### 1.9 FIRE SAFETY

- A. Fire Watch: Provide a fire watch wherever welding, brazing, cutting or other

processes involving an open flame or potential for generating sparks is used. Fire watch shall consist of a person with a 10-pound carbon dioxide fire extinguisher. While on fire watch, the person so assigned shall have no other duties or assignments.

- B. Fire Blanket: In addition to providing a fire watch, use an approved fire blanket to cover any combustible materials in the immediate area.

#### 1.10 GUARANTEES

- A. Furnish written guarantee in accordance with requirements of General Conditions. Partial approval of a portion of work does not affect the validity of guarantee.

#### 1.11 SHOP DRAWINGS

- A. It shall be noted that shop drawing submittals processed by the Engineer are not change orders; that the purpose of shop drawing submittals is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install, and by detailing the fabrication and installation methods he intends to use. If deviations, discrepancies or conflicts between shop drawing submittals and the contract documents in the form of design drawing and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed. The Engineer may also require the contractor to submit samples of proposed or specified equipment for approval with the samples to be returned to the contractor upon request.
- B. Prior to procurement or manufacturing, submit for approval appropriate shop drawings and/or descriptive literature giving performance data, physical size, wiring diagrams, configuration, capacity, material, etc., for all items under this Division including the following:
  1. Hydronic Piping & Piping Specialties
  2. General Duty Valves for HVAC
  3. Variable Speed Drives
  4. Mechanical Painting & ID
  5. Testing & Balancing
  6. HVAC Insulation
  7. DDC Controls, Valves and Actuators
  8. Ductwork, Dampers, & Louvers
  9. Air Inlets and Outlets
  10. AHU
  11. Packaged RTU
  12. Variable Air Volume Boxes
- C. The contractor shall visit the site and familiarize himself with the project requirements and the field conditions before preparing shop drawings and ordering equipment. Field verify the characteristics of all specified or existing equipment before preparing shop drawings. This shall include available space, available voltages, suitability of substrate for receiving the specified equipment, etc. Where existing equipment is re-used, he shall verify dimensions, capacities, horsepower, etc. and bring any discrepancies to the attention of the Engineer.
- D. Where different products have to work together, it is the Contractor's responsibility



to select manufacturers whose products are visually and/or technically compatible.

- E. Prepare listing of all equipment and materials for the project. A sample schedule is included at the end of this section to complete this requirement. Provide all information represented.

#### 1.12 RECORD DRAWINGS

- A. During construction, keep an accurate record of all changes and deviations from contract documents. Upon completion of this installation, the contractor shall submit to the Engineer marked up prints indicating any installed work that is different from what is shown on the drawings. Complete and accurate drawings shall be submitted to the Owner at the conclusion of this project. All changes will be reflected in CAD format. Marked-up as-built drawings will not be permitted.

### PART 2 - PRODUCTS

#### 2.1 QUALITY OF MATERIAL

- A. Equipment of the same general type shall be of the same make. Reference is made to relays, motors, valves, motor starters, contactors, etc.
- B. Brand names and catalog numbers included with equipment or material specifications are used to indicate quality, rating or operating characteristics of the equipment or material.
- C. All materials provided shall be new and shall be approved and labeled by the Underwriter's Laboratories, Inc., or other accredited third-party agency, wherever such agency has applicable standards. All work shall be accomplished in a neat, workmanlike manner by experienced journeymen. All work shall be performed at such times as are required by the progress of the job.
- D. All components, equipment and systems shall comply with ASHRAE 90.1 and any other applicable ASHRAE standard.

### PART 3 - EXECUTION

#### 3.1 CLEARANCE AND RESTORATION OF SITE

- A. It may be required to temporarily remove existing ceiling tiles, piping, duct, conduits, etc. to introduce new work as specified in this Division. Contractor, after installation of new work, shall reinstall, reconnect removed items to match the existing. Installation of any new equipment shall not compromise existing fire ratings of rated assemblies. All penetrations shall be sealed to existing conditions per UL guidelines for penetration protections. Provide offsets if required in existing piping, ducts etc. to introduce new work.

#### 3.2 COORDINATION

- A. Install all work to permit removal of equipment without damage to the equipment or the building. Verify equipment space requirements, condition of substrate, voltages, etc. at the time of shop drawing submission and advise the Engineer of any conflict.

- B. Coordinate equipment locations as well as piping and conduit routing with Owner's representative to optimize all present and foreseen future space usage and clearance requirements.
- C. Do not rough prior to receipt of approved shop drawings.

### 3.3 EQUIPMENT INSTALLATION AND SUPPORT

- A. Install all equipment where indicated, in accordance with manufacturer's published installation instructions, and with recognized industry practices to ensure that equipment complies with requirements and serves intended purposes. Consult with Engineer if said instructions or practices conflict with the drawings/specifications.
- B. Support plumb, rigid and true to line all work and equipment furnished under this Division. Study thoroughly architectural, mechanical drawings and all related drawings to determine how equipment, piping, ductwork, etc., are to be supported, mounted or suspended. Provide extra steel bolts, inserts, pipe stands, brackets and accessories for proper support as required whether or not shown on drawings. When directed, furnish for approval a drawing showing supports.
- C. Any system component which may require maintenance, such as control valves, manual valves, strainers, etc. shall not be installed over electrical equipment, machinery, control panels or floor openings.

### 3.4 FINAL ADJUSTMENT AND TESTING

- A. General: Provide all testing, preliminary and final adjustment of instrumentation for this purpose. Conduct all tests in full compliance with applicable codes prior to covering or concealing work by insulation, enclosures, etc. Material found to be defective shall not be repaired. It shall be replaced with new material which tests satisfactorily. Defective workmanship shall be corrected.
- B. Working Tests: Subject all equipment and controls to simultaneous and continuous working tests for a period of one day prior to final inspection. Make adjustments, repairs and equipment replacements as required.

### 3.5 LABELS, IDENTIFICATION AND TAGS

- A. All components or equipment shall be identified using 3/4-inch high permanent engraved bakelite nameplates or 3/4 inch high anodized aluminum nameplates, white letter, black background, with minimum 1/4 inch high letters. Nameplates shall be permanently attached with pin-head screws to device or to wall or mounting panel above device. Stick-on type labels will not be acceptable.

### 3.6 OWNER'S RIGHT TO TEST SYSTEMS

- A. Should, in the opinion of the Engineer, and during the guarantee period, reasonable doubt exist as to the proper functioning of any equipment installed under this Contract, the right is reserved for the Owner and Engineer to perform any test deemed practical to determine whether such equipment is functioning properly and performing at required capacity. If such tests show proper functioning, the cost of the test will be paid by the Owner. If the tests indicate a deficiency in equipment capacity or performance, the Contractor shall pay the cost of the test and also make good any deficiencies shown by the test to the full satisfaction of the Owner and the

Engineer.

### 3.7 CLEANING UP

- A. The contractors performing work under this section shall at all times keep the premises and the building in a neat and orderly condition and any instructions of the Engineer in regard to the storing of material, protective measures, cleaning up of debris, etc. shall be explicitly followed. At the completion of the job, all equipment shall be cleaned to the satisfaction of the Owner.
- B. The building will be occupied during installation of the new addition and/or alterations as described hereinafter. Thus, special care shall be taken during installation to protect equipment and other furniture in the buildings from dust and debris generated during installation of work specified in this Division.

### 3.8 INSPECTION CERTIFICATES

- A. Obtain all inspections required by law, ordinances, rules, and regulations of the Authorities having jurisdiction and obtain and furnish to the Engineer certificates of such inspections, pay all fees, charges, and other expenses in connection therewith.

### 3.9 FINAL REVIEW

- A. Final review and tests of the completed construction shall be performed in the presence of the Engineer or his representative and shall be at such times as are convenient to the Engineer. Final tests shall show conclusively that all equipment performs its intended and specified function and that all work complies with the provisions of these specifications. All material, equipment, and instruments required for the tests shall be furnished by the Contractor at his own expense.

### 3.10 EQUIPMENT DELIVERY AND PROTECTION

- A. All material shall be delivered and unloaded by the Contractor within the project site as directed by the Owner. The Contractor shall protect all material and equipment from breakage, theft or weather damage.

### 3.11 OPERATING INSTRUCTIONS

- A. The Contractor shall provide a minimum of six (6) hours of personal instruction to Owner's personnel in the proper operation of all equipment specified and provided. The instruction shall be provided by factory trained and certified competent personnel.
- B. Maintenance Manuals shall be submitted in three (3) copies in vinyl 3-ring binders. Each binder shall have the following:
  - 1. Service telephone number of the installing company, including an emergency number.
  - 2. Contact person, phone number, and address of manufacturer or distributor where equipment was purchased.
  - 3. The manufacturing company's operating and maintenance manuals for each piece of equipment.
  - 4. Copies of all approved shop drawings.
- C. Furnish for each building permanent type charts, framed under glass, mounted

where directed as follows:

1. Service organizations with day and night telephone numbers.

**PRODUCTS LISTING FORM**

**INSTRUCTIONS**

Do not use the terminology "as specified", rather indicate specifically the product proposed.

Prepared by: \_\_\_\_\_  
\_\_\_\_\_

Date: \_\_\_\_\_ Project: \_\_\_\_\_

<u>SPEC. SECTION</u>	<u>ITEM</u>	<u>MANUFACTURER</u>

**END OF SECTION**

## **SECTION 230520 - PIPING SPECIALTIES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-1 Specification section, and other Division 23 sections apply to work of this section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent of piping specialties required is indicated on drawings and/or specified in other Division 23 sections, and by requirements of this section.

#### **1.3 SUBMITTALS**

- A. Manufacturer's Data: Submit manufacturer's technical product data, including installation instructions, and dimensioned drawings for each type of manufactured piping specialty. Include pressure drop curve or chart for each type and size of piping specialty. Submit schedule showing manufacturer's figure number, size, location, and features for each required piping specialty.

### **PART 2 - PRODUCTS**

#### **2.1 PIPE ESCUTCHEONS**

- A. General: Provide pipe escutcheons as specified herein with inside diameter closely fitting pipe outside diameter, or outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls, or ceilings; and pipe sleeve extension, if any. Furnish pipe escutcheons with nickel or chrome finish for occupied areas, prime paint finish for unoccupied areas.
- B. Pipe Escutcheons for Moist Areas: For waterproof floors, and areas where water and condensation can be expected to accumulate, provide cast brass or sheet brass escutcheons, solid or split hinged.
- C. Pipe Escutcheons for Dry Areas: Provide stamped steel escutcheons, solid or split hinged, 22 gauge minimum.

#### **2.2 DIELECTRIC UNIONS**

- A. General: Provide brass ball valves where piping material changes from ferrous to non-ferrous material in order to prevent galvanic action and stop corrosion. Non-metallic dielectric unions shall not be used.

#### **2.3 FIRE BARRIER PENETRATION SEALS**

- A. Provide seals for any opening through fire-rated walls, floors, or ceilings used as passage for mechanical components such as piping or ductwork in accordance with UL penetration protection guidelines with UL approved components. Refer to fire barrier penetration detail(s) in construction drawings.

## 2.4 THERMOMETERS

- A. Provide solar digital thermometers for all water temperature display applications as shown on plans and/or as otherwise required by field conditions.

## 2.5 THERMOMETER WELLS

- A. Provide thermometer wells constructed of stainless steel, pressure rated to match piping system design pressure. Provide 2" extension for insulated piping. Provide cap nut with chain fastened permanently to thermometer well.

## 2.6 FABRICATED PIPING SPECIALTIES

- A. Drip Pans: Provide drip pans fabricated from corrosion-resistant sheet metal with watertight joints, and with edges turned up 2-1/2". Reinforce top, either by structural angles or by rolling top over 1/4" steel rod. Provide hole, gasket, and flange at low point for watertight joint and 1" drain line connection.
- B. Pipe Sleeves: Provide pipe sleeves of one of the following: (except where allowed otherwise in non-load bearing and non-fire barrier partitions).
  1. Steel-Pipe: Fabricate from Schedule 40 galvanized or black steel pipe; remove burrs
  2. Iron-Pipe: Fabricate from cast-iron or ductile iron pipe; remove burrs.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF PIPING SPECIALTIES

- A. Pipe Escutcheons: Install pipe escutcheons on each pipe penetration through floors, walls, partitions, and ceilings where penetration is exposed to view and on exterior of building. Secure escutcheon to pipe or insulation so escutcheon covers penetration hole and is flush with adjoining surfaces.
- B. Dielectric Unions: Install at each piping joint between ferrous and non-ferrous piping. Comply with manufacturer's installation instructions.
- C. Fire Barrier Penetration Seals: Comply with UL guidelines and refer to details in drawings.

### 3.2 INSTALLATION OF TEMPERATURE GAGE

- A. General: Install temperature gages in vertical upright post and tilted so as to be easily read by observer standing on floor.
- B. Thermometer Wells: Install in piping tee where indicated, in vertical upright post. Fill well with oil or graphite, secure cap. Install a spare well within twelve inches of each temperature sensor installed under the temperature control section.

### 3.3 INSTALLATION OF FABRICATED PIPING SPECIALTIES

- A. Drip Pans: Locate drip pans under piping passing over or within 3' horizontally of electrical equipment, and elsewhere as indicated. Hang from structure with rods and building attachments, weld rods to sides of drip pan. Brace to prevent sagging or

swaying. Connect 1" drain line to drain connection and run to nearest plumbing floor drain or elsewhere as indicated.

- B. Pipe Sleeves: Install pipe sleeves where piping passes through walls, floors, ceilings, and roofs. Do not install sleeves through structural members of work, except as detailed on drawings, or as reviewed by Engineer. Install sleeves accurately centered on pipe runs. Size sleeves so that piping and insulation (if any) will have free movement in sleeve, including allowance for thermal expansion; but not less than 2 pipe sizes larger than pipe run. Where insulation includes vapor-barrier jacket, provide sleeve with sufficient clearance for installation. Install length of sleeve equal to thickness of construction penetrated, and finish flush to surface, except floor sleeves. Extend floor sleeves 1/4" above level floor finish and 3/4" above floor finish sloped to drain. Provide temporary support of sleeves during placement of concrete and other work around sleeves and provide temporary closure to prevent concrete and other materials from entering sleeves.
- C. All interior pipe sleeves shall be schedule 40 steel, unless otherwise noted.
- D. Install iron-pipe sleeves at exterior penetrations, both above and below grade.

#### 3.4 ADJUSTING AND CLEANING

- A. Adjusting: Adjust faces of meters and gages to proper angle for best visibility.
- B. Cleaning: Clean windows of meters, gages and factory-finished surfaces. Replace cracked or broken windows and repair any scratched or marred surfaces with manufacturers' touch-up paint.

#### **END OF SECTION**



## **SECTION 230523 - GENERAL DUTY VALVES FOR HVAC PIPING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-1 Specification sections and other Division 23 specification sections, apply to work of this section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent of valves required is indicated on drawings and/or specified in other Division - 23 sections, and by requirements of this section.

#### **1.3 QUALITY ASSURANCE**

- A. Valve Types: Provide valves of same type by same manufacturer.
- B. Valve Identification: Provide valves with manufacturer's name (or trademark) and pressure rating clearly marked on valve body.

#### **1.4 CODES AND STANDARDS**

- A. MSS Compliance: Mark valves in accordance with MSS-25 "Standard Marking System for Valves, Fittings, Flanges and Unions."
- B. ANSI Compliance: For face-to-face and end-to-end dimensions of flanged or welded-end valve bodies, comply with ANSI B16.10 "Face-to-Face and End-to-End Dimensions of Ferrous Valves."

#### **1.5 SUBMITTALS**

- A. Manufacturer's Data: Submit manufacturer's technical product data, including installation instructions for each type of valve. Include pressure drop curve or chart for each type and size of valve. Submit valve schedule showing Manufacturer's figure number, size, location, and valve features for each required valve.

### **PART 2 - PRODUCTS**

#### **2.1 VALVES**

- A. General: Provide factory-fabricated valves recommended by manufacturer for use in service indicated. Provide valves of types and pressure ratings indicated; provide proper selection as determined by Installer to comply with installation requirements. Provide end connections which properly mate with pipe, tube, and equipment connections. Where more than one type is indicated, selection is Installer's option.
- B. Sizes: Unless otherwise indicated, provide valves of same size as upstream pipe size.
- C. Operators: Provide handwheels, fastened to valve stem, for valves other than quarter-turn. Provide lever handle for quarter-turn valves, 6" and smaller, other than

plug valves. Provide gear operators for quarter-turn valves 8" and larger. Provide chain-operated sheaves and chains for overhead valves 8" and larger or as indicated.

## 2.2 GATE VALVES

- A. Comply with the following standards:
  1. Cast-Iron Valves: MSS SP-7
  2. Bronze Valves: MSS SP-80
  3. Steel Valves: ANSI B16.34

## 2.3 GLOBE VALVES

- A. Comply with the following standards:
  1. Cast-Iron Valves: MSS SP-85
  2. Bronze Valves: MSS SP-80
  3. Steel Valves: ANSI B16.34

## 2.4 BALL VALVES

- A. Comply with the following standards:
  1. Cast-Iron Valves: MSS SP-72
  2. Steel Valves: ANSI B16.34

## 2.5 BUTTERFLY VALVES

- A. Comply with MSS SP-67, "lug" type.

## 2.6 SWING CHECK VALVES

- A. Comply with the following standards:
  1. Cast-Iron Valves: MSS SP-71
  2. Bronze Valves: MSS SP-80
  3. Steel Valves: ANSI B16.34

## 2.7 WAFER CHECK VALVES

- A. General: Provide wafer style, butterfly type, spring actuated check valves designed to be installed with gaskets between 2 standard class125 flanges.

## 2.8 LIFT CHECK VALVES

- A. Conform to FCI 74-1 for design, rating, and testing.

## 2.9 VALVE FEATURES

- A. General: Provide valves with features indicated and, where not otherwise indicated, provide proper valve features as determined by Installer for installation requirements. Comply with ASME B31.9 for building services piping and ASME B31.1 for power piping.
- B. Bypass: Comply with MSS SP-45, and except as otherwise indicated, provide manufacturer's standard bypass piping and valving.

- C. Drain: Comply with MSS SP-45 and provide threaded pipe plugs.
- D. Flanged: Valve flanges complying with ANSI B16.5, (steel), or ANSI B16.24 (bronze).
- E. Threaded: Valve ends complying with ANSI B2.1.
- F. Butt-Welding: Valve ends complying with ANSI B16.25.
- G. Socket-Welding: Valve ends complying with ANSI B16.11.
- H. Solder-Joint: Valve ends complying with ANSI B16.18.
- I. Flangeless: Valve bodies manufactured to fit between flanges complying with ANSI B16.5 (steel), or ANSI B16.24 (bronze).
- J. Pressure Ratings: Unless indicated otherwise, valve pressure ratings shall be as follows:
- K. Water System: Class 150 for bronze valves, Class 125 for iron valves.
- L. Steam Systems: Bronze gate, check, and globe valves in lines with operating pressures to 150 psi SWP shall be 150-pound class and 200-pound class for higher pressures. Cast iron gate valves in lines with operating pressures to 125 psi SWP shall be 125-pound class and 250-pound class for higher pressures.

NOTE: All piping valves, fittings, and steam specialties furnished under this contract shall be as required for the installation of 150 psi boilers operating between 125 psi and 150 psi SWP. (Refer to Section 15570 and 15571 for additional requirements)

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Except as otherwise indicated, comply with the following requirements:
  - 1. Install valves where required for proper operation of piping and equipment, including valves in branch lines to isolate sections of piping.
  - 2. Locate valves so as to be accessible and so that separate support can be provided when necessary.
  - 3. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward from horizontal plane unless unavoidable.
  - 4. Install valve drains with hose-end adapter for each valve that must be installed with stem below horizontal plane.
- B. Insulation: Where insulation is indicated, install extended- stem valves, arranged in proper manner to receive insulation.
- C. Mechanical Actuators: Install mechanical actuators with chain operators where indicated. Extend chains to about 5' above floor and hook to clips to clear aisle passage.
- D. Selection of Valve Ends (Pipe Connections): Except as otherwise indicated, select and install valves with the following ends or types of pipe/tube connections:

1. Tube Size 2" and Smaller: Soldered-joint valves.
  2. Pipe Size 2" and Smaller: Threaded valves.
  3. Pipe Size 2-1/2" and Larger: Flanged valves.
- E. Valve Stems: Select and install valves with outside screw and yoke stems, except provide inside screw non-rising stem valves where headroom prevents full opening of OS&Y valves.
- F. Non-Metallic Disc: Shall not be used, except where indicated.
- G. Renewable Seats: Select and install valves with renewable seats, except where otherwise indicated.
- H. Fluid Control: Except as otherwise indicated, install gate and butterfly valves to comply with ANSI B31.9. Where throttling is indicated or recognized as principal reason for valve, install butterfly valves.

### 3.2 INSTALLATION OF CHECK VALVES

- A. Swing Check Valves: Install in horizontal position with hinge pin horizontally perpendicular to center line of pipe. Install for proper direction of flow.
- B. Wafer Check Valves: Install between two flanges in horizontal or vertical position, position for proper direction of flow.
- C. Lift Check Valves: Install in piping line with stem vertically upward, position for proper direction of flow.

### 3.3 VALVE SCHEDULE

- A. Subject to compliance with "Pressure Ratings" required by Page 15100-3 of these specifications.

### 3.4 GATE VALVES

- A. Refer to Supplementary Valve Schedule for Equivalents.
- B. 2" and Smaller: Class 150, Bronze, screw-in bonnet, rising stem, solid wedge, equivalent to Stockham B-100 for threaded ends or Stockham B-108 for solder ends. Milwaukee 148, Milwaukee 1149 or Grinnel 3010, Grinnel 3010-SJ, respectively.
- C. 2-1/2" and Larger: Class 125, flanged ends, iron body, bolted bonnet, solid wedge, bronze mounted, OS&Y rising stem, equivalent to Stockham G-623.
- D. Hose End, 2-1/2" and smaller: FM, UL-listed, 175 psi, bronze body, solid wedge, inside screw, non-rising stem, equivalent to Jenkins 707.
- E. Threaded End, 2" and smaller: FM, UL-listed, 175 psi, bronze body, solid wedge, outside screw and yoke, rising stem, equivalent to Stockham B-133, Nibco T-1040, or Crane 459.
- F. Flanged End, 2-1/2" and larger: FM, UL-listed, 175 psi, iron body, bronze mounted, solid wedge, outside screw and yoke, rising stem, equivalent to Stockham G-634.

### 3.5 GLOBE VALVES

- A. 2" and Smaller: Class 150, Bronze body, screw-in bonnet, integral seat, renewable disc, equivalent to Jenkins 746 for threaded ends or Jenkins 1200 for solder ends.
- B. 2-1/2" and Larger: Class 125, flanged ends, iron body, bolted bonnet, renewable seat and disc, bronze mounted, equivalent to Jenkins 613.

### 3.6 DRAIN VALVES

- A. Bronze body, screw-in bonnet, rising stem, composition disc, 3/4" hose outlet, equivalent to NIBCO 73 for threaded ends or NIBCO 72 for solder ends.

### 3.7 PLUG VALVES

- A. 2" and Smaller: 150 psi, bronze body, straightaway pattern, square head, threaded ends, equivalent to Lunkenheimer 454.
- B. 2-1/2" and Larger: 175 psi, lubricated plug type, semi-steel body, single gland, wrench operated, flanged ends, equivalent to Powell 2201.

### 3.8 BALL VALVES

- A. 1" and Larger: 400 psi WWP, bronze body, full port, bronze trim, TFE seats and seals. Valves shall be CONBRACO "Appollo" series, or equivalent.

### 3.9 BUTTERFLY VALVES

- A. Butterfly Valves shall be full-tapped lug design suitable for dead-end service. Valves through 6" shall have infinite position handles equipped with adjustable memory stops.
- B. Valves for working pressure up to 150 psi and 275 F shall have cast iron body, ductile iron or aluminum bronze discs, stainless steel shaft, and elastomeric seats and o-rings.
- C. Valves for working pressure above 150 psi shall have carbon steel body and disc, stainless steel stem, reinforced TFE pressure actuated seat with backing ring, and stuffing box with elastomeric packing, follower, and gland.
- D. Valves shall be Jamesbury or equivalent.

### 3.10 CHECK VALVES

- A. 2" and Smaller: Class 150, bronze body, horizontal swing, regrind type, Y-pattern, renewable disc, equivalent to Stockham B-319 for threaded ends or Stockham B-309 for solder ends.
- B. 2-1/2" and Larger: Class 125, iron body, bolted bonnet, horizontal swing, renewable seat and disc, flanged ends, equivalent to Stockham G-931.
- C. 2-1/2" and Larger: Class 175, iron body, bronze mounted, renewable composition disc and bronze seat ring, bolted cover, flanged ends, equivalent to Stockham G-940.

3.11 WAFER CHECK VALVES

- A. All Sizes: Cast-iron body, aluminum bronze or plated iron plates, stainless steel stem, Buna-N seat, stainless steel springs, equivalent to Stockham WG-970.

3.12 LIFT CHECK VALVES

- A. 2" and Smaller: Class 150, Bronze body, lift type, spring loaded, renewable disc, threaded ends, equivalent to Jenkins 655A.

3.13 SUPPLEMENTARY VALVE SCHEDULE

- A. General: Provide selections from the following valves for various valve type listed in Division-23 piping sections.

3.14 GATE VALVES

- A. 2" and Smaller: Class 150, bronze, screw-in bonnet, rising stem, solid wedge.

	<u>Threaded Ends</u>	<u>Solder Ends</u>
Fairbanks:	0252	0282
Grinnel:	3010	3010-SJ
Hammond:	IB640	IB635
Jenkins:	47	1242
Lunkenheimer:	2127	2132
Milwaukee:	148	1149
Nibco:	T-111	S111
Powell:	500-S	1821-S
Stockham:	B-100	B-108
Walworth:	55	55-SJ

- B. 2" and Smaller: Class 150, bronze, screw-in bonnet, non-rising stem, solid wedge.

	<u>Threaded Ends</u>	<u>Solder Ends</u>
Fairbanks:	0250	0280
Grinnel:	3000	3000-SJ
Hammond:	IB645	IB647
Jenkins:	370	1240
Lunkenheimer:	2129	2133
Milwaukee:	105	1145
Nibco:	T-113	S113
Powell:	507	1822
Stockham:	B-103	B-104
Walworth:	55	4-SJ

- C. 2-1/2" and Larger: Flanged ends, Class 125, iron body, bolted bonnet, solid wedge, bronze-mounted.

	<u>OS&amp;Y Rising Stem</u>	<u>Non-Rising Stem</u>
Fairbanks:	0405	0403
Grinnel:	6020	6060
Hammond:	IR1140	IR1138
Jenkins:	651C	326
Lunkenheimer:	1430	1428
Milwaukee:	F-2885	F-2882
Nibco:	617	619
Powell:	1793	1787
Stockham:	G-623	G-612

Walworth: 8726-F 8719-F

- D. Hose-End, 2-1/2": FM, UL-listed, 175 WWP, bronze body, solid wedge, inside screw, non-rising stem. Provide cap and chain.
- |               |          |
|---------------|----------|
| Fairbanks:    | 0210     |
| Jenkins:      | 707      |
| Lunkenheimer: | 366      |
| Nibco:        | T-113-HC |
| Walworth:     | 115      |
- E. Threaded End, 2" and Smaller: FM, UL-listed, 175 WWP, bronze body, solid wedge, outside screw and yoke, rising stem.
- |            |         |
|------------|---------|
| Crane:     | 459     |
| Fairbanks: | 0222    |
| Hammond:   | IB681   |
| Jenkins:   | 275U    |
| Nibco:     | T-104-0 |
| Stockham:  | B-133   |
| Walworth:  | 904     |
- F. Flanged End, 2-1/2" and Larger: FM, UL-listed, 175 WWP, iron body bronze mounted, solid wedge, outside screw and yoke, rising stem.
- |            |         |
|------------|---------|
| Crane:     | 467     |
| Fairbanks: | 0412    |
| Hammond:   | IR1154  |
| Jenkins:   | 825-A   |
| Nibco:     | F-607-0 |
| Stockham:  | G-634   |
| Walworth:  | 8713-F  |

3.15 BUTTERFLY VALVES

- A. 6" and Smaller: 150 psi, cast-iron body, extended neck, aluminum bronze disc, reinforced resilient EDPM seat, manual lever and lock.
- |               | <u>Wafer</u>        | <u>Lug</u>  |
|---------------|---------------------|-------------|
| Fairbanks:    | 302                 | 502         |
| Grinnell:     | WC-8211             | LC-8211     |
| Hammond:      | 3804                | 3824        |
| Jamesbury:    | 815W                | 815L        |
| Nibco:        | WL-082-3            | NL-082-3    |
| Powell:       | Series 1000         | Series 5000 |
| Stockham:     | LG-511-BS3E         | LG-711-BS3E |
| Grooved Ends: | Vitaulic Series 700 |             |
- B. 8" and Larger: 150 psi, cast-iron body, extended neck, aluminum bronze disc, reinforced resilient EDPM seat, gear operator.
- |               | <u>Wafer</u>        | <u>Lug</u>  |
|---------------|---------------------|-------------|
| Fairbanks:    | 402                 | 602         |
| Grinnell:     | WC-8212             | LC-8212     |
| Nibco:        | WL-082-5            | NL-082-5    |
| Powell:       | Series 1000         | Series 5000 |
| Stockham:     | LG-521-B@3E         | LD-721-BS3E |
| Grooved Ends: | Vitaulic Series 701 |             |

3.16 CHECK VALVES

- A. 2" and Smaller: Class 150, bronze body, horizontal swing, regrinding type, Y-pattern, renewable disc.

	<u>Threaded Ends</u>	<u>Solder Ends</u>
Fairbanks:	0640	0680
Grinnel:	3300	3300-SJ
Hammond:	IB940	IB941
Jenkins:	92-A	1222
Lunkenheimer:	2144	2145
Milwaukee:	509	1509
Nibco:	T-413	S413
Powell:	578	1825
Stockham:	B-319	B-309
Walworth:	3406	3406-SJ

- B. 2-1/2" and Larger: Class 125, iron body, bolted bonnet, horizontal swing, renewable seat and disc, flanged ends.

Fairbanks:	0702
Grinnell:	6300
Hammond:	IR1124
Jenkins:	629
Lunkenheimer:	1790
Milwaukee:	F2971
Nibco:	F-918
Powell:	559
Stockham:	G931
Walworth:	8928-F

- C. 2-1/2" and Larger: FM, UL-listed, 175 WWP iron body bronze mounted, renewable composition disc and bronze seat ring, bolted cover, flanged ends.

Fairbanks:	071
Jenkins:	729
Nibco:	F-908-W
Stockham:	G-940
Walworth:	8883-LT

**END OF SECTION**



## SECTION 230529 - SUPPORTS, ANCHORS AND VIBRATION ISOLATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-01 Specification sections, and other Division 23 specification sections apply to work of this section.

#### 1.2 QUALITY ASSURANCE

- A. Codes and Standards:
  - 1. Code Compliance: Comply with applicable codes pertaining to product materials and installation of supports and anchors.
  - 2. UL and FM Compliance: Provide products which are UL-listed and FM approved where required.
  - 3. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS) Standard Compliance: Provide pipe hangers and supports of which materials, design, and manufacture comply with MSS SP-58.
- B. Select and apply pipe hangers and supports, complying with MSS SP-69.
- C. Fabricate and install pipe hangers and supports, complying with MSS SP-89.
- D. Terminology used in this section is defined in MSS SP-90.
- E. Acceptable Manufacturers: Vibration Mountings and Controls, Inc., Grinnell, Modern, or approved equal.

#### 1.3 SUBMITTALS

- A. Manufacturer's Data: Submit manufacturer's technical product data, including installation instructions for each type of support and anchor.

### PART 2 - PRODUCTS

#### 2.1 HORIZONTAL-PIPING HANGERS AND SUPPORTS

- A. General: Except as otherwise indicated, provide factory-fabricated horizontal-piping hangers and supports complying with MSS SP-58, of one of the following MSS types listed, selected by Installer to suit horizontal-piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated hangers and supports for copper-piping systems.
  - 1. Adjustable Steel Clevis Hangers: MSS Type 1.
  - 2. Yoke Type Pipe Clamps: MSS Type 2.
  - 3. Steel Double Bolt Pipe Clamps: MSS Type 3.
  - 4. Steel Pipe Clamps: MSS Type 4.
  - 5. Adjustable Swivel Pipe Rings: MSS Type 6.
  - 6. Adjustable Steel Band Hangers: MSS Type 7.

7. Adjustable Band Hangers: MSS Type 9.
8. Adjustable Swivel Rings, Band Type: MSS Type 10.
9. Split Pipe Rings: MSS Type 11.
10. Extension Split Pipe Clamps: MSS Type 12.
11. U-Bolts: MSS Type 24.
12. Clips: MSS Type 26.
13. Pipe Slides and Slide Plates: MSS Type 35, including one of the following plate types:
  - a. Plate: Unguided type.
  - b. Plate: Guided type.
  - c. Plate: Hold-down clamp type.
14. Pipe Saddle Supports: MSS Type 36, including steel pipe base- support and cast-iron floor flange.
15. Pipe Stanchion Saddles: MSS Type 37, including steel pipe base support and cast-iron floor flange.
16. Adjustable Pipe Saddle Supports: MSS Type 38, including steel pipe base support and cast-iron floor flange.
17. Single Pipe Rolls: MSS Type 41.
18. Adjustable Roller Hangers: MSS Type 43.
19. Pipe Roll Stands: MSS Type 44.
20. Adjustable Pipe Roll Stands: MSS Type 46.

## 2.2 VERTICAL-PIPING CLAMPS

- A. General: Except as otherwise indicated, provide factory- fabricated vertical-piping clamps complying with MSS SP-58, of one of the following types listed, selected by Installer to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.
  1. Two-Bolt Riser Clamps: MSS Type 8.
  2. Four-Bolt Riser Clamps: MSS Type 42.

## 2.3 HANGER-RODS AND ATTACHMENTS

- A. General: Except as otherwise indicated, provide factory-fabricated hanger-rod attachments complying with MSS SP-58, of one of the following MSS types listed, selected by Installer to suit horizontal-piping hangers and building attachments, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hanger-rod attachments to suit hanger rods. Provide galvanized steel hanger rods. Provide copper-plated hanger-rod attachments for copper-piping systems.
  1. Steel Turnbuckles: MSS Type 13.
  2. Swivel Turnbuckles: MSS Type 15.
  3. Malleable Iron Sockets: MSS Type 16.

## 2.4 BUILDING ATTACHMENTS

- A. General: Except as otherwise indicated, provide factory-fabricated building attachments complying with MSS SP-58, of one of the following MSS types listed, selected by Installer to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper-piping systems.

1. Concrete Inserts: MSS Type 18.
2. Channel Clamps: MSS Type 20.
3. Welded Beam Attachments: MSS Type 22.
4. C-Clamps: MSS Type 23.

## 2.5 SADDLES AND SHIELDS

- A. General: Except as otherwise indicated, provide saddles and shields under piping hangers and supports, factory-fabricated, for all insulated piping. Size saddles and shields for exact fit to mate with pipe insulation.
- B. Protection Shields: MSS Type 40; of length recommended by manufacturer to prevent crushing of insulation.

## 2.6 ROOF CURBS AND PENETRATIONS

- A. Prefabricated roof curbs for penetrations shall be provided by this Division. The curbs shall be installed by the general contractor.

## 2.7 MISCELLANEOUS MATERIALS

- A. Metal Framing: Provide products complying with NEMA STD ML 1.
- B. Steel Plates, Shapes and Bars: Provide products complying with ASTM A 36.
- C. Heavy-Duty Steel Trapezes: Fabricate from steel shapes selected for loads required; weld steel in accordance with AWS standards.

## 2.8 VIBRATION ISOLATION

- A. General: Equipment shall be isolated from the structure by means of resilient vibration and noise isolating supports. Supports shall be such that vibration is isolated and expansion and contraction is accommodated without creating excessive stresses in piping or equipment connections.
- B. All isolators shall be designed or treated for resistance to corrosion. Steel components shall be PVC coated or phosphated and painted with industrial grade enamel. All nuts, bolts and washers shall be zinc-electroplated. Structural steel bases shall be thoroughly cleaned of welding slag and primed with zinc chromate or metal etching primer. A finish coat of industrial enamel shall be applied over the primer. All isolators exposed to the weather shall have steel parts PVC coated, hot-dipped galvanized or zinc-electroplated plus coating of neoprene or bitumastic paint. Aluminum components for outdoor installation shall be etched and painted with industrial grade enamel. Nuts, bolts, and washers may be zinc-electroplated.
- C. Isolators shall be installed in such a manner that loaded deflections are compensated for initially.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF HANGERS AND SUPPORTS

- A. General: Install hangers, supports, clamps and attachments to support piping properly from building structure with maximum loading as shown below. Arrange for

grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Install supports with maximum spacings complying with MSS SP-69. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping.

- B. Provide all fascia boards, cleats, brackets, backing in partitions, toggle bolts, expansion shields, screws, clamps and rods, etc., for hanging of all piping and equipment included under this Division.
- C. Hangers and braces shall adequately support the piping system horizontally and vertically and shall allow for expansion and contraction without binding in sleeves or misalignment. Provide for expansion of piping with swing joints and ample sleeves.
- D. Vertical Piping: Supports for vertical piping 1-1/2 inches and smaller from wall with malleable split ring hanger. Nipples cut to fit each case. Two hangers per floor, minimum. Use clamps on every floor for pipes 2 inches and larger. In crawl spaces, support stacks on base fitting placed securely on concrete piers or masonry blocks and with pipe clamps.
- E. Horizontal piping shall be supported with hangers as follows:

<u>STEEL PIPE SIZE</u>	<u>ROD DIAMETER</u>	<u>MAXIMUM SPACING</u>
Up to 1 inch	3/8 inch	7 feet
1-1/4" inches	3/8 inch	8 feet
1-1/2 inches	3/8 inch	9 feet
2 inches	3/8 inch	10 feet

- F. Load carrying capacities of threaded steel rod based on allowable stress of 12,000 psi.  
 ROD SIZE-INCHES: 3/8 1/2 5/8 3/4 7/8 1 1-1/8 1-1/4  
 ALLOW LOAD-LBS: 610 1130 1810 2710 3770 4960 6230 8000
- G. Generally, pipes shall be individually supported. Trapeze hangers may be used where approved. Piping shall be individually bolted to trapeze with U bolts.
- H. Piping along wall: From approved wall brackets fastened to wall with Phillips anchors or inserts.
- I. Installation: Provide pipe bars, angles, etc. as required. Anchor piping to localize expansion and prevent undue strain on piping and branches. Provide spring type hangers for vibration isolation where shown on plans and as specified in vibration isolation section. Locate hanger not more than 4 feet from elbow or tee on screwed piping. Space hangers on 3-foot center on horizontal piping 1-1/2 inch and smaller exposed at corridor ceilings and less than 8 feet from floor in finished rooms.
- J. Support from Concrete Construction: All main piping runs shall be supported from hangers secured to cast-in-place concrete inserts. Branch piping hanger supports may be field drilled using self drilling type expansion shields equal to Phillips concrete fasteners or approved equal. Expansion shields shall not cut or unduly displace reinforcement.
- K. Support from Precast Concrete: Use toggle bolts mounted in core sections of

precast concrete. Absolutely no ramset or any other power-driven fasteners will be allowed in precast planks.

- L. Support from Existing Concrete: Piping may be attached to the structure using power driven fasteners. All fasteners into concrete shall penetrate the slab for a distance equal to 6 to 8 times the diameter of the shank. Power driven fasteners will not be used in concrete encased steel beams.
- M. Support from Structural Steel: Make use of existing steel members for pipe support. Provide additional structural steel members where required to accommodate hangers.
- N. Anchors: Anchor piping as shown or required to isolate expansion and prevent pipe strain due to expansion. Anchors shall be separate from other supports.
- O. Expansion Joints and Pipe Guides: Install in accordance with manufacturers recommendation. Locate additional guide within recommended distance of the first guide integral to the expansion joint. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories. Except as otherwise indicated, for exposed continuous pipe runs, install hangers and supports of same type and style, as installed for adjacent similar piping.
- P. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated, or by other recognized industry methods.

### 3.2 PROVISIONS FOR MOVEMENT

- A. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.
- B. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

### 3.3 PIPE EXPANSION

- A. Provide pipe expansion products to make allowance for expansion and contraction of pipe. Provide bellows type or flexible expansion loop as required.
- B. Insulated Piping: Comply with the following installation requirements.
- C. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ANSI B31.
- D. Shields: Where low-compressive-strength insulation or vapor barriers are indicated on cold or chilled water piping, install coated protective shields.

### 3.4 EQUIPMENT SUPPORTS

- A. Modify structural steel Stands to support equipment mounted on the roof. Construct of structural steel members to match existing. Provide factory fabricated tank saddles for tanks mounted on steel stands. Provide shop drawings for structural steel stands for Engineer's approval.

## END OF SECTION

## **SECTION 230550 - VARIABLE SPEED DRIVES**

### **PART 1 - GENERAL**

#### **1.1 RELATED WORK SPECIFIED ELSEWHERE**

- A. All work of this Division shall comply with the requirements of the Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division 1 Specification Sections.
- B. Section 230510 - General Provisions.
- C. Section 230530 - Electrical Provisions of Mechanical Work
- D. Division 26 - Electrical

#### **1.2 RELATED SECTIONS**

- A. Division 26 - Electrical Identification: Engraved nameplates.

#### **1.3 REFERENCES**

- A. NEMA ICS 3.1 - Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable Speed Drive Systems.
- B. NEMA - Enclosures for Electrical Equipment (1000 Volts Maximum).
- C. CSA Approved
- D. IEEE Standard 444 (ANSI-C343)
- E. IEC: 146A

#### **1.4 SUBMITTALS**

- A. Submit under provisions of Section 01340.
- B. Shop drawings shall include wiring diagrams, front and side views of enclosures, overall dimensions, conduit entrance locations and requirements, nameplate legends, and enclosure details.
- C. Product Data: Provide data sheets showing; voltage, ratings and size of switching and overcurrent protective devices, short circuit ratings, and weights.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under regulatory requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of adjustable speed drive.

#### **1.5 QUALITY ASSURANCE**

- A. ASD shall have a minimum MTBF (mean time between failure) rating of 100,000 hours.

- 1.6 OPERATION AND MAINTENANCE DATA
- A. Submit under provisions of Section 230510.
  - B. Include instructions for starting and operating ASD, and describe operating limits, that may result in hazardous or unsafe conditions.
- 1.7 QUALIFICATIONS
- A. Manufacturer must have a minimum of 10 (ten) years documented experience, specializing in adjustable speed drives.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Deliver, store, protect and handle products to site, under provisions of Section 230510.
  - B. Accept ASD on site in original packing. Inspect for damage.
  - C. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover, to protect units from dirt, water, construction debris, and traffic.
  - D. Handle carefully, in accordance with manufacturer's written instructions, to avoid damage to components, enclosure, and finish.
- 1.9 WARRANTY
- A. Provide ASD warranty for three years from date of final acceptance. Warranty shall include parts and labor.
- 1.10 WORK INCLUDED
- A. Provide adjustable speed drives for the following equipment. See mechanical schedules for motor sizes and voltages.
    - 1. 20 hp total 208/3 tower fans
    - 2. 15 hp 208/3 condenser pump

## PART 2 – PRODUCTS

- 2.1 MANUFACTURERS
- A. ASD shall be manufactured by owner preferred manufacturer ABB. All ASDs on the project shall be by the same manufacturer.
- 2.2 DESCRIPTION
- A. Provide enclosed adjustable speed drives suitable for operating at the current, voltage, and horsepower indicated on the plans. Conform to requirements of NEMA ICS 3.1.
- 2.3 RATINGS
- A. ASD must operate at full output, without fault or failure, when voltage varies plus or

minus 10 percent from rating, and frequency varies plus or minus 2 percent from rating.

- B. ASD must not be damaged when an open circuit is introduced on the output of the ASD while the drive is actively controlling a motor or device.
- C. ASD shall be 60 Hz, voltage as indicated on the plans.
- D. Displacement Power Factor: 0.98 over entire range of operating speed and load.
- E. Operating Ambient Temperature: -10°C. to 40°C. (14°F. to 104°F.)
- F. Humidity: non-condensing to 90%.
- G. Altitude: to 3300 feet, higher by derating.
- H. Minimum Efficiency: 96% at half speed; 98% at full speed.
- I. Starting Torque: 100% starting torque shall be available from 0.5 Hz. to 60 Hz.
- J. Overload capability: 110% of rated F.L.A. (full load amps) for 60 seconds; 160% of rated F.L.A., for 0.5 seconds.
- K. The ASD must meet the requirements for Radio Frequency Interference (RFI) above 7 MHz as specified by FCC regulations, part 15, subpart J, Class A devices.
- L. In compliance with IEEE 519, the Total Harmonic Distortion for the ASD shall be no greater than 5%. When the THD is above 5% the supplier of the ASD shall provide line reactors.
- M. The ASD provided must be capable of outputting up to a 70hz signal

## 2.4 DESIGN

- A. ASD shall employ microprocessor-based inverter logic.
- B. Control circuit shall be isolated from all power circuits.
- C. ASD shall include surface mount technology, with conformal coating.
- D. ASD shall employ a PWM (pulse width modulated) inverter system, consisting of:
  - 1. Input Section:
    - a. ASD input power stage shall convert three-phase AC line power into a fixed DC voltage via a solid-state full wave diode rectifier.
  - 2. Intermediate Section:
    - a. DC bus as a supply to the ASD Output Section shall maintain a fixed voltage with filtering and short circuit protection.
    - b. DC Bus shall be interfaced with the ASD diagnostic logic circuit, for continuous monitoring and protection of the power components.
  - 3. Output Section
    - a. Insulated gate bipolar transistors (IGBT's) shall convert DC bus voltage to variable frequency and voltage.
    - b. PWM sine coded output to the motor.
- E. The ASD shall have D.C. link reactors on both the positive and negative rails of the



D.C. bus to minimize power line harmonics. ASD without D.C. link reactors shall provide a minimum 3% impedance line reactor.

- F. ASD shall be rated for 100,000 amp interrupting capacity (AIC).
- G. The ASD must be amp rated at carrier frequencies at or above 10 kHz. Exception to this requirement is allowed only for ASDs providing 104 amps or more.
- H. The ASD must be selected for operation at carrier frequencies at or above 10 kHz to satisfy the conditions for current, voltage, and horsepower as indicated on the equipment schedule.
- I. ASD shall have an adjustable carrier frequency. The carrier frequency shall be automatically adjusted to optimize motor and ASD efficiency while reducing noise.
- J. ASD shall include two independent remote reference inputs. One shall be 4-20 ma. The other shall be 0-10 VDC. Either input shall respond to a programmable bias and gain.
- K. ASD shall include a minimum of three multi-function input terminals, capable of being programmed, to determine their function when their state is changed. These terminals shall provide up to 20 functions, including, but not limited to:
  - 1. Remote/Local operation selection.
  - 2. Detection of external over-heat condition.
- L. ASD shall include a 0-10V DC analog output, proportional to frequency or current, for either monitoring, or "speed tracking" the ASD.
- M. ASD shall provide terminals for remote contacts, to allow starting in the automatic mode.
- N. ASD shall include at least one external fault input, which shall be programmable, for either a normally open, or a normally closed contact, for connection to firestats, freezestats, etc.
- O. ASD shall include a minimum of three multi-function output terminals, one of which shall be a fully rated form "C" contact, capable of being programmed, to determine what conditions must be met, in order for them to change their state. These terminals shall provide up to 15 functions, including, but not limited to:
  - 1. Zero speed detection.
  - 2. Low and high frequency detection.
  - 3. Missing frequency reference detection.
  - 4. Overtorque detection
- P. ASD shall include a power loss ride thru of 2000 milliseconds (2 seconds).
- Q. ASD shall be capable of restarting automatically after a power failure. ASD shall include a front mounted, sealed keypad operator, with a digital display, to provide complete programming, operating, monitoring, and diagnostic capability. Keys provided shall include commands for RUN, STOP, and RESET. Operating mode (auto or manual) and speed setting functions shall also be provided. Keypad may be of the removable type.
- R. ASD display shall provide readouts of; output frequency in hertz, output voltage in volts, output current in amps, output power in kilowatts, D.C. bus voltage in volts,

interface terminal status, and fault codes.

- S. ASD shall be capable of PID (Proportional, Integral, Derivative) logic, to provide closed loop setpoint control capability, from a remote reference.
- T. ASD shall include loss of input signal protection, with a speed default to 80% of the most recent speed.
- U. ASD shall include electronic thermal overload protection for both the drive and motor, profilable for variable or constant torque.
- V. ASD shall include the following programming functions:
  - 1. Critical frequency rejection capability: 3 selectable, adjustable bands
  - 2. Auto restart capability: 0 to 10 attempts
  - 3. Stall prevention capability
  - 4. "S" curve soft start capability
  - 5. "Speed search" capability, in order to start a rotating load
  - 6. 15 preset volts per hertz patterns
  - 7. One adjustable volts per hertz pattern
  - 8. Current limit adjustment capability, from 30 % to 200 % of rated full load current of the ASD
  - 9. Anti "wind milling" function capability
- W. ASD shall include factory settings for all parameters, and the capability to be reset back to those settings.
- X. ASD shall include the capability to adjust the following functions, while the ASD is running:
  - 1. Acceleration adjustment from 0 to 600 seconds
  - 2. Deceleration adjustment from 0 to 600 seconds
  - 3. A minimum of three different preset speeds
  - 4. Analog output gain, to calibrate the signal for the application used
- Y. Manual Bypass shall be provided. ASD and bypass components shall be mounted in a side-by-side arrangement, inside a common NEMA 1 enclosure, fully pre-wired, and ready for installation as a single UL listed device. Bypass shall include the following:
  - 1. Input, output, and bypass contactors, to disconnect power to the ASD when the motor is running in the bypass mode.
  - 2. 115 V.A.C. control transformer, with fused primary thermal overload relay, to protect the motor while operating in the bypass mode.
  - 3. Fused disconnect switch.
  - 4. Control and safety circuit terminal strip.
  - 5. "Drive-Off-Bypass-Test" selector switch.
  - 6. Pilot lights for "Power On", "Running On Drive", "Running On Bypass" and "Fault".

## 2.5 PRODUCT OPTIONS

- A. Current limiting, fast acting input fusing, for the protection of ASD semiconductor devices.
- B. Serial communications gateway, for either RS-232 or RS-485, to provide interface from an ASD to; a computer, a Program Logic Controller (PLC), or Building Automation System, for those units which need to interface with such.

- C. PID EPROM for those units which shall be controlled directly by pipe or duct static pressure sensors.

## 2.6 FABRICATION

- A. Enclosure: NEMA Type 1 for indoor application, NEMA 3R for outdoor application.

## 2.7 SOURCE QUALITY CONTROL

- A. In-circuit testing of all printed circuit boards shall be conducted, to ensure the proper mounting and correct value of all components.
- B. All printed circuit boards shall be burned in for 96 hours, at 85°C.
- C. Final printed circuit board assemblies shall be functionally tested, via computerized test equipment. All tests and acceptance criteria shall be preprogrammed. All test results shall be stored as detailed quality assurance data.
- D. All fully assembled controls shall be functionally tested, with fully loaded induction motors. The combined test data shall then be analyzed, to insure adherence to quality assurance specifications.
- E. Inspect and production test, under load, each completed ASD assembly.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that surface is suitable for ASD installation.
- B. Do not install ASD until the building environment can be maintained, within the service conditions required by the manufacturer.

### 3.2 INSTALLATION

- A. Install ASD where indicated, in accordance with manufacturer's written Instructions and NEMA ICS 3.
- B. Tighten accessible connections and mechanical fasteners after placing ASD.
- C. Provide neatly typed label on each ASD, identifying nameplate horsepower, full load amperes, model number, service factor and voltage/phase rating.
- D. Where a disconnect is provided between the ASD and the controlled equipment, provide a contactor to turn off ASD when the disconnect is opened.

### 3.3 FIELD QUALITY CONTROL

- A. Field inspection and testing to be performed under provisions of Section 15010.
- B. Inspect completed installation for physical damage, proper alignment, anchorage, and grounding.

### 3.4 MANUFACTURER'S FIELD SERVICES

- A. Provide factory trained and authorized startup technician to startup, tune, and test ASD and its interface to the building automation system. Coordinate with engineer for scheduling. Tuning shall include adjustment to reduce noise.

3.5 ADJUSTING

- A. Adjust work under provisions of Section 15010. Make final adjustments to installed ASD to assure proper operation of systems.

3.6 TRAINING

- A. In addition to initial startup, provide a minimum of two (2) hours of training for the physical plant staff in the startup, operation, adjustment, and troubleshooting of the ASD. Provide written certification of the training with the signatures of the attendees.

**END OF SECTION**

## **SECTION 230700 - MECHANICAL INSULATION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-1 Specification sections and other Division 23 specification sections, apply to work of this section.

#### **1.2 RATING**

- A. All insulation systems, including jackets and adhesives shall be U.L. rated and FM approved. All insulation for indoor use shall have a maximum permanent flame spread rating of 25 or less and a smoke developed rating of 50 or less, as tested by ASTM E 84 (NFPA 255) method. Outdoor mechanical insulation may have flame spread index of 75 and smoke developed index of 150. Submit smoke and flame ratings for every material proposed for use.
- B. Make: Certain Teed, Owens Corning, Johns Manville, Knauf and PPG.

#### **1.3 SCOPE**

- A. Furnish and install insulation for the following: Note scope varies depending on alternates selected.
  - 1. Exterior condenser piping
  - 2. Exterior make-up water piping

#### **1.4 QUALITY ASSURANCE**

- A. Insulation contractor shall be member of either the National Insulation Association (NIA) or the Southeastern Insulation Contractors Association (SEICA).

#### **1.5 SUBMITTALS**

- A. Submit evidence of membership in NIA or SEICA.
- B. Submit manufacturer's technical product data and installation instructions for each type of mechanical insulation. Submit schedule showing manufacturer's product number, k-value, thickness, and furnished accessories for each mechanical system requiring insulation.
- C. Submit, if requested by Designer, manufacturer's sample of each piping insulation type required, and of each duct and equipment insulation type required. Affix label to sample completely describing product.

### **PART 2 - PRODUCTS**

- 2.1 Type 1: Thermal Pipe Insulation with Jacket. Preformed Fiberglass Pipe insulation complying with ASTM C547, Class 3, rigid, molded pipe insulation, noncombustible. Maximum K-factor of .24 at mean temperature of 75° F. All insulation shall have a jacket of white kraft paper reinforced with a glass fiber yarn and bonded to an

aluminum foil, with self sealing longitudinal laps and butt strips. Jacket shall comply with ASTM C1136 (Type 1). Insulation and jacket shall be equal to Johns Manville Micro-Lok with AP-T Plus.

2.2 Insulate all fittings, valves and strainers with molded fittings, mitered segments of pipe insulation or over- sized pipe insulation held in place with wire. Finish in accordance with manufacturer's recommendations to comply with the UL Systems listing. Preformed jackets of PVC material as manufactured by Zeston, Inc., may be used at fittings.

- A. Type 2: Flexible Pipe Insulation:
1. Material – Flexible, closed cell, elastomeric thermal insulation, minimum k value .27 at 75 degrees F. conforming to ASTM C 534.
  2. Fittings - Sleeve type fitting covers and miter cut tubular form.
  3. Insulation Adhesive – As recommended by manufacturer.
  4. Make: Armstrong AP Armaflex, Rubatex No. R-180-J, or approved equal.

2.3 FIELD APPLIED JACKETS

- A. PVC Plastic: Zeston 2000 or equal. One-piece molded type fitting covers and jacketing material, gloss white.
- B. Canvas Jacket: UL listed fabric, 6 oz/sq yd, plain weave cotton treated with dilute fire retardent lagging adhesive.
- C. Aluminum Jacket: 0.016-inch-thick sheet, corrugated finish, with longitudinal slip joints and 2 inch laps, die shaped fitting covers with factory attached protective liner.
- D. Stainless Steel Jacket: Type 304 Stainless steel, 0.10-inch, corrugated finish.

2.4 TYPE 1 PIPE INSULATION THICKNESS

- A. Insulate hot and chilled water pipe and condensate drain pipe sizes with wall thicknesses as indicated in the following table.


2.5 TYPE 2 PIPE INSULATION THICKNESS

- A. Insulate sizes with wall thicknesses as indicated in the following table.

	1" and smaller	1 1/4" to 2"	Runouts up to 2" diameter and 12' long
		1"	1"
Exterior Condenser Water		1"	1"
Make up water	1"	1"	1"

2.6 DUCT INSULATION-NA

- A. Type A - Vapor Seal Duct Insulation
  - 1. Material: Fiberglass duct wrap 1 lb. density with FSK facing complying with ASTM C1290. Maximum K-factor of .31 at 75°F. Jacket shall be FSK aluminum foil reinforced with fiber glass yarn and laminated to fire resistant kraft paper, secured with UL listed pressure sensitive tape and outward clinch expanding staples and vapor barrier mastic. Johns Manville Microlite or equal by Owens Corning or Knauf.
  - 2. Thickness shall be 2 inches.
  
- B. Type B - Vapor Seal Duct Insulation - Rigid
  - 1. Fiberglass ductboard complying with ASTM C612, Type I. 3 lb. density with maximum K-factor of 0.23 at 75°F mean temperature. Jacket shall be FSK aluminum foil reinforced with fiber glass yarn and laminated to fire resistant kraft paper, secured with UL listed pressure sensitive tape and outward clinch expanding staples and vapor barrier mastic. Johns Manville 800 or equal by Owens Corning or Knauf.
  
- C. Type E - Acoustic Insulation
  - 1. Ductliner complying with ASTM C1071. Made from inorganic glass fiber, min. NRC 0.85, 1- inch thick, minimum R-value of 4.0. Johns Manville Permacote Linacoustic or equal by Owens Corning or Knauf.
  - 2. The air stream surface shall have a 100% coverage coating of acrylic polymer formulated with an immobilized EPA registered anti-microbial agent proven resistant to microbial growth as determined by ASTM G21 and G22.

## PART 3 - EXECUTION

### 3.1 GENERAL REQUIREMENTS

- A. All insulation shall be applied by experienced pipe coverers and journeymen in accordance with best trade practice. Work shall be as recommended by manufacturer's latest printed installation directions. Test, inspect, and clean all surfaces to be insulated before applying insulation. Take all possible precautions to protect work of other trades. Provide protective covering as required to accomplish this and be responsible for returning all equipment and material to its original new condition and appearance where damage occurs due to neglect.
  
- B. For refrigerant suction piping saddle shall be integral with pre-compressed, 12 to 20 percent density fiberglass segment as manufactured by Insulcoustic.
  
- C. Where subjected to freezing, insulate piping with double the thickness specified in this section.
  
- D. Apply adhesive to exposed risers to prevent slipping and turning.
  
- E. Butt covering neatly to walls, floors, ceiling. Apply bands at end and position so band covers gap between surface and insulation where exposed.
  
- F. At butt ends of insulation the jacket material shall be pulled over exposed ends and secured with bands to give a neat and finished appearance. Exposed fiberglass material will not be permitted. In location where it will be exposed to view do not apply insulating cement until there is heat on lines.

- G. Do not cover nameplates on equipment.
- H. Do not insulate vibration eliminators.
- I. Insulation on all cold surfaces must be applied with a continuous, unbroken vapor seal. Any hangers, supports, anchors, etc. that are secured directly to cold surfaces must be adequately insulated and vapor sealed to prevent condensation. Seal pipe terminations every four sections using Foster 30-35 or equal by Miracle or Mon-Eco Industries, Inc.
- J. Provide PVC jacket on all exposed piping mounted below 10' in finished areas. Owner will select color from chart offered by manufacturer.
- K. Provide aluminum jacket on all exterior piping.
- L. Provide canvas jacket in mechanical rooms and on all exposed piping above 10'.
- M. Insulation on piping below ground shall receive 15# felt paper wired every 12" O/C with 18-ga. Stainless steel wire. Felt paper shall be coated with an asphalt-based vapor and weather barrier equal to Chil-Pruf (CP-22/23/24) insulation coating manufactured by Childers Products Company, Inc. Felt and insulation coating shall continue for two feet where pipe comes up above ground.
- N. Overlap aluminum jacket over the above-ground vapor barrier.

### 3.2 PIPE INSULATION SHALL BE APPLIED AS FOLLOWS

- A. Type 1 - Thermal Pipe Insulation with Jacket.
  - 1. .
- B. Type 2 - Flexible Pipe Insulation
  - 1. Condenser and make up water piping

### 3.3 DUCT INSULATION SHALL BE APPLIED AS FOLLOWS

- A. Type A - Vaporseal Duct Insulation.
  - 1. All concealed supply air ducts or outdoor air ducts inside the building.
  - 2. All concealed return air or outside air ducting in unconditioned spaces.
- B. Type B - Vapor Seal Duct Insulation - Rigid.
  - 1. Air conditioning return and supply air ducts and outdoor air located in the mechanical room or otherwise indicated on the drawings. Provide canvas jacket.
- C. Type E- acoustical liner
  - 1. NA

### 3.4 SPECIFIC REQUIREMENTS

- A. Type A Insulation: Fiberglass duct wrap insulation shall be applied over clean, dry sheet metal duct. Before applying the insulation, all joints and seams shall be sealed airtight. Duct wrap shall be installed to allow maximum fullness at corners. Minimum thickness at corners is one inch.



- B. Insulation shall be butted tightly at joints and vapor barrier facing shall be overlapped at minimum of 2 inches. Insulation should be removed from lap prior to stapling.
- C. All seams shall be stapled approximately 6 inches on center with outward clinching staples then sealed with a foil vapor barrier tape, or vapor barrier mastic.
- D. Where ducts are over 24 inches in width, the duct wrap shall be additionally secured to the bottom of rectangular ducts with mechanical fasteners spaced on 18-inch centers (maximum), to prevent sagging of insulation. Seal penetrations so as to provide a vapor-tight system.
- E. Insulation shall be installed according to manufacturer recommendations.
- F. Insulation over the expansion joint and the flexible section shall be loose and of adequate length to permit the movement of pipe.
- G. Provide insulation shield equivalent to Fee and Mason Fig. 81 at each support.

3.5 DO NOT INSULATE

- A. Vibration eliminators.

**END OF SECTION**

## SECTION 230923 - DIRECT DIGITAL CONTROL

### PART 1 - GENERAL

#### 1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. All work of this Division shall comply with the requirements of the Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division 1 Specification Sections.
- B. Section 230510 - General Provisions.
- C. Division 26 - Electrical

#### 1.2 DESCRIPTION

- A. Furnish and install as herein specified, a web based Energy Monitoring and Control System with point and click graphics to provide night setback, demand limiting, optimized startup and other control functions. The system shall be complete in all respects, including thermostats, relays, contacts, etc. to provide the function described hereinafter regardless of whether thermostats, relays, etc. are specifically mentioned or not.
- B. Alternate proposals or substitutions, where provided, must conform to plans or specifications in detail, and any deviation, no matter how minor, must be included in the list of deviations submitted with the bid. Any proposed system with deviations which, in the opinion of the Owner and/or the Engineer, alter the basic intent of the specifications will not be accepted.
- C. Reuse existing controllers to the extent possible if they will achieve required sequence. The system being installed shall be compatible with current and future plans for control and monitoring of the HVAC systems in the building.
- D. Provide the following electrical work as work of this section, complying with requirements of Section 230530 and Division 26 sections:
  - 1. Control wiring between field-installed controls, sensors, relays, transducers, indicating devices, and unit control panels. Include power wiring from nearest electrical breaker panel with available capacity to temperature control panels or other terminal devices.
  - 2. Interlock wiring between electrically-operated equipment units and between equipment and field-installed control devices.

#### 1.3 WORK INCLUDED

- A. The following work is specifically included without limiting the generality implied by these specifications and drawings.
  - 1. Installation of a microprocessor based direct digital control (DDC) system to control HVAC equipment and systems for space temperature control, night setback, demand limiting, etc.
  - 2. Cutting and patching as required for the introduction of work as shown on the plans and as specified in this Division.
  - 3. Tie system controller to owner's Ethernet switch to allow access over the internet.

4. Provide all internal and external wiring for the Direct Digital Control System.
5. Provide Control Valves, Sensor Wells (in other project) and other items of equipment indicated on the Drawings or in the Specifications to the Mechanical Contractor for installation.

#### 1.4 SHOP DRAWING

- A. Submit for approval, apparatus bulletins and data sheets for all controls components, valves, damper, and room schedules showing size, configuration, capacity and location of all equipment. Include complete control diagrams with system description, wiring diagrams and installation and maintenance instruction.
- B. All control wires on the line side of relay, starter or contactor coils, pilot lamps or other utilization components shall be color coded and labeled. All control wires on the neutral side of utilization components shall be white.

#### 1.5 ELECTRICAL WIRING

- A. Refer to Electrical Specifications for wiring required under this Section.
- B. All wiring shall be done in accordance with the latest edition of National Electric Code, Division 26 and the North Carolina State Building Code.
- C. All wiring associated with direct digital control and Micro-Processor System shall be by this Division.
- D. Wiring methods:
  1. All line voltage wiring shall be in conduit.
  2. All low voltage control wiring shall be in conduit in mechanical rooms,
- E. All penetrations of rated walls and floors shall be firestopped in accordance with the UL details indicated on the drawings.

#### 1.6 GUARANTEE

- A. Control system specified herein shall be guaranteed free from original defects in material and workmanship for a period of two years of normal use and service after final inspection and acceptance of the project. Provide a paid in full-service agreement in the name of the Owner, including material and labor, for two years to run concurrently with guarantee period. This service is to include both "break down maintenance" initiated by a telephone call from the Owner and a minimum of two preventative maintenance inspections and adjustments per year. Same-day service shall be guaranteed if a service call, from the Owner to Contractor, is placed before 12:00 noon.
- B. The control system manufacturer shall state that equipment compatible with that being bid will be available for at least three years after acceptance of this work. Support and spare parts shall be available for at least five years.
- C. The manufacturer shall provide, free of cost, any upgrades to the software for a period of three years from acceptance of this work.

#### 1.7 QUALIFICATION FOR MICROPROCESSOR BASED ENERGY MANAGEMENT EQUIPMENT SUPPLIER

- A. Any manufacturer which intends to provide a Microprocessor Based Energy Management and Control system shall have been in the business of providing similar equipment for at least five (5) years. The manufacturer shall be prepared to submit the following information upon request.
  - 1. A complete architectural specification of the Microprocessor System, listing all deviations from the specifications. Any proposed system with deviations which, in the opinion of the Owner and/or the Engineer, alter the basic intent of this specification will not be accepted.
  - 2. Names, addresses, phone numbers, etc., of at least 10 installations where a similar system, as the manufacturer is proposing to use in this project, has been in service for at least one year.
  - 3. The Engineer or Owner will have the right to verify the performance of the equipment.
  
- B. If the system is not installed by the manufacturer, the installing contractor's primary business shall be the installation of Temperature Control and Direct Digital Control Systems, and he shall have a minimum of three years experience in the installation and service of microprocessor-based systems. Upon request, the contractor should be able to provide a list of at least three other installations where he has installed a system of similar size and scope. Failure to show at least three successful installations will disqualify the contractor.
  
- C. The contractor shall have a local office within a 125-mile radius of the job, staffed with factory trained engineers capable of providing instruction, routine maintenance and emergency maintenance service. The local office shall also maintain an adequate stock of spare parts needed for normal servicing and repairs.

## PART 2 - PRODUCTS

### 2.1 MICROPROCESSOR BASED CONTROL SYSTEM (MPS) FOR ENERGY MANAGEMENT

- A. General Requirements: Furnish and install a networking microprocessor-based Energy Management System hereinafter referred to as MPS for the monitoring and control of the mechanical and electrical equipment designated. It is the intent of this specification to describe the performance requirements of the MPS. Therefore, these specifications describe the operational functions of the system and present minimal requirements for equipment to accomplish these functions. The MPS shall be comprised of the hardware and the software required to perform all designated tasks as described hereinafter. The installation may consist of one or more individual MPS panels. The term MPS refers to each individual panel as well as the entire installation. An MPS shall be able to communicate with other MPS by local network through a twisted pair or shielded wire. A local network may be comprised of more than thirty (30) MPS. The local network shall be able to interface through the Web via an Ethernet port. The MPS system shall be a true distributive processing system and each MPS shall be a self-contained programmable control and monitoring system. Each MPS shall be able to perform its control, energy management and alarming functions independently from other units. The MPS shall consist of one or more logic panels depending upon control strategy and number of points controlled and/or monitored. The MPS shall not be dependent upon master unit or CPU for control logic or data. A failure of one MPS will not adversely affect the operation of other MPS of the distributed network.

- B. Hardware: Each MPS controller shall be UL listed or shall comply with UL 916 standard for Energy Management. Power Supply to the panel shall be isolated with UL labeled Class II transformer. The primary side of the transformer shall be protected by overcurrent protection, and the secondary side shall have fused disconnect. Circuit breaker type disconnect at the secondary side will not be acceptable. Primary side protection shall not be required on small Application Specific Controllers (ASC's) used to control small individual pieces of equipment (fan coil units, etc.) The MPS shall be provided as a networking stand-alone energy management system enclosed in one or more sturdy metal enclosures containing a microcomputer, separate peripheral ports for CRT, printer and auto answer/auto dial modems, a network communications port, programmers keyboard, alpha-numeric display, power supplies, battery backup, and input/output control boards. Each MPS shall be able to gather information and/or update minimum four (4) times a second. All stand-alone units shall be accessible via the network through peripheral ports on the network units following proper password access code entry. All peripheral communication (CRT, printer, modem) as well as global data transfer between network units shall be accomplished through the local network. For owner-operator independence, the microcomputer shall be completely field-programmable through integral keyboard entries or through the maintenance department's laptop computers.
- C. Status Indication: Annunciator light for each load, indicating controlled equipment operation. The MPS shall include a 24-hour time-of-day clock with standard calendar and full battery backup maintaining clock, building operating program and RAM memory for a minimum of thirty hours. A built-in charging circuit shall maintain battery at a full charge. All network units in the local network shall synchronize their time of day clocks each 24 hours. Each network port on the network will allow access and programming to each of the other MPS units. A separate access code is maintained for each MPS unit. All system memory shall be programmable through these network ports and data entered into memory shall be recalled and displayed for operator review. Additions or deletions shall be made when the system is on-line. Systems requiring shutdown of any part shall not be acceptable. The programs and data sets, once entered into the MPS shall be capable of being stored on a disk through an on-site memory dump process and therefore be available to the operator for reloading as needed. The MPS supplier shall provide the necessary parts and the disk drives needed for this purpose. Check sum verification shall insure data integrity during loading operation. This dump/reloading process shall not require the use of the central console. A memory dump/reload should also be obtainable at a remote site through the telephone modem. The MPS input/output hardware shall be compatible with electronic HVAC control systems for total building optimization, energy management and facilities management, such as abnormal condition alarm reporting. The MPS shall be capable of communication through the internet via an Ethernet link provided in the building. The MPS shall be furnished with a user programmable language and sufficient internal memory to provide at least the following software capabilities: electric demand limiting, time programmed commands to include two state and setpoint control, duty cycle control, optimum start-up control, holiday scheduling, time of day, password entry, direct digital control with P.I.D, and any other programs specified in the Input/Output schedule. In addition to the above EMS and HVAC control programs, provisions shall be made for on-line programming and override, memory dump/ reload, and trend log output to the central console or the modem. The data shall be stored on a digital storage media after performing the memory dump procedure. Data that is unique for the particular facility shall reside in RAM which will enable the operator to enter the

individual program parameters, such as on/off times, demand setpoint limits, etc. These entries shall be protected by a minimum 30-hour battery backup on all volatile memory components in the event of building power failure. The software shall be capable of communication via the web. It will be possible to interrogate memory, change memory elements, or manually override building equipment via the web. Program upload/download shall be possible between MPS on the network.

- D. Surge and Lightning Protection Line voltage protection: The DDC system control panels shall be powered by 120 VAC circuits provided with surge protection. This protection is in addition to any internal protection provided by the manufacturer. The protection shall be a TE/100 manufactured by Advanced Protection Technologies or an approved equal. Line voltage protection shall not be required on small Application Specific Controllers (ASC's) used to control small individual pieces of equipment (fan coil units, etc.).

## 2.2 GENERAL APPLICATION PROGRAMS

- A. Each stand-alone networking unit shall be programmable through the integral keyboard or peripheral terminal. Software architecture shall allow both standard setups of point types, EMS Programs, loops or related parameters as well as custom program linking with math and logic. In addition, the MPS shall allow the building operators a means of interrogating input/output sensor conditions, such as interrogating the values of analog sensor input upon request, or the status of control via the standard keyboard and display unit, or through a remote CRT Terminal Unit. The MPS shall not be dependent upon a master control unit or CPU for control logic or data. The system access shall be restricted by at least three levels of password security. As a minimum, the system shall be programmed for six users each with designated three letter Operator ID and four- character password.
- B. Each of the MPS units on the network shall be able to access global information. Such information as outside air temperature, demand shed commands, and enthalpy changeover etc. routines can be shared by all units on the Network.
- C. Network data can be trended from each MPS on the network for central printout and alarm through locally connected printers on the network or over phone lines with dial-up modems for remote alarming.
- D. Local Network status shall monitor all communication in the network. Loss of any data transfer will trigger alarms as well as default sequences to maintain system integrity. MPS will execute a pre-defined mode of operation if the system fails.
- E. Building alarm monitoring and reporting shall be generated based upon the presence of abnormal alarm conditions such as high/low temperature input or abnormal change of state such as freeze stats, fire stats, filter alarm switches, etc. Printed report upon alarm condition shall be generated and reported to designated terminal via Local Network System.

## 2.3 SPECIFIC APPLICATION PROGRAMS

- A. Electric Demand Limiting (EDL): The MPS shall contain a sliding window program and shall be programmed to reduce the peak demand for consumption and demand as user definable target values are approached.

- B. The EDL program shall automatically shed non-critical deferrable loads, on the network, such as electric heating coils, lights, battery chargers, HVAC systems, motors, etc., as outlined in the schedule, during high electrical usage periods. This sequence shall automatically restore the loads after a critical demand period has passed. The program should also have the capability of restoring loads based on any other data. This data could consist of time of day, outdoor or space temperatures, etc. The operator shall have the ability to select either the rolling (first off, first on) or the sequential (last off, first on) load shed tables for load assignment. Each load shall have its own minimum on, maximum off and minimum off time.
- C. The EDL program shall be capable of providing proportional voltage outputs which will change setpoints of HVAC control systems, and/or reset hot water or limit the number of operating compressors. Target demand limits shall be user definable.
- D. The EDL program shall be provided with a minimum of three times of day shifts, each containing unique KW target setpoints. These times of day target shifts will allow the target to be changed in accordance with the utility time of day metering schedule, such that during off hours EDL will allow a higher KW demand, if required, without being penalized for additional demand charges. The time of start and finish for each of the three times of day target values shall be user definable. Trend log may be programmed to store for future recall, the peak demand value, the day of month of occurrence and the time of day of occurrence.

#### 2.4 TIME PROGRAMMED COMMANDS (TPC)

- A. The MPS system shall provide automatic start-up and/or shutdown of selected remote equipment and automatic adjustment of setpoint data according to pre-set schedules stored in the computer. All remote fans, pumps, motors, lights, HVAC systems, boilers, chillers, etc. or any device which operates on a preset time basis can be assigned to this program.
- B. TPC shall operate in accordance with a yearly calendar with automatic adjustment for daylight savings time and leap year.
- C. TPC shall incorporate holiday schedules capability which will automatically bring up predefined holiday schedules of operation. Holidays can be scheduled up to one year in advance and shall be capable of any number of holidays per year. The technique for scheduling holiday operation shall be to specify the date of the beginning day of the holiday and the date of the ending day of the holiday. For each of those days specified as a holiday, time clock will follow its unique holiday schedule.
- D. TPC shall provide time dependent programmable two state control. This time program shall contain unique schedules which may be defined with appropriate start/stop times for each piece of controlled equipment. There should not be any limitation of number of schedules or number of start/stop per schedule. In addition to the time dependent two state control, TPC shall also provide time dependent setpoint control. This control provides the capability of outputting proportional setpoint values of a pre-determined, pre-defined setting in accordance with the time of day and day of week. This program shall be used to accomplish night setback, morning warm-up, and normal daily operating setpoints of all control system loops, controlled by the MPS.
- E. As with the two-state control, time dependent setpoint control shall be subject to the

holiday schedule. The setpoints desired shall be user definable. The operator shall be capable of reading and/or altering all stored data pertaining to time of day, day of week, on/off times, setpoint values, and holiday designation.

## 2.5 OPTIMUM START PROGRAM (OS)

- A. The optimum start-up time of assigned equipment shall be determined based on a software calculation which takes into consideration outdoor air conditions, space conditions, and building R factor. Any or all zones and their associated loop control shall be capable of being optimized by the optimum start program. The software program shall be capable of precisely determining the ideal start-up time in the heating and cooling system. Each zone being optimized may have its own unique set of variables, such as temperature and occupancy time.
- B. The optimum start program shall control the start-up of the HVAC cooling and heating equipment to achieve the target occupancy space temperature at the precise time of building occupancy. By use of the central console keyboard or from a remote terminal the operator shall have the ability to program the occupancy time and target temperature for each zone to be optimized. A unique built-in "learning" technique shall allow the MPS to automatically adjust itself to the most effective time to start equipment in order to achieve the desired occupancy target temperature. Each zone being optimized shall have its own learning curve. For zones served by heat pumps, OS program shall utilize a strategy to start equipment early from heating setback to avoid the use of auxiliary electric resistance heaters.

## 2.6 CUSTOM CONTROL

- A. The MPS shall utilize real-time calendar year time functions. The processor shall be able to evaluate seconds, minutes, hours, days of week, days of month, and years. The MPS shall make an automatic adjustment for leap years. The battery back-up shall accurately maintain all time functions in the event of power loss. The MPS software shall allow individual programmability of each load as well as coordinated control of loads within one MPS, as well as between different MPS. The MPS software must be of a user programmable type which will permit the user/operator easy communication with the processor. The MPS software will provide an editing feature so that the user can enter control programs as well as alter, delete, or add to control programs. The MPS software will provide a control simulation feature thereby allowing the user to pre-test the system software prior to, or while external wiring connections are being made to the system. The system shall have the ability to perform the following pre-tested control algorithms:
  - 1. Two-position control
  - 2. Proportional control
  - 3. Proportional plus integral control
  - 4. Proportional, integral, plus derivative control
  - 5. Automatic loop tuning
- B. The MPS software must make available elapsed seconds and minute timers for use in control software. Such timers will provide for the elimination of equipment short cycling.
- C. The MPS software must be structured in such a manner as to allow the user to develop his own user programs to fit the energy management and control strategy needs of the specific installation at hand. The MPS software must use a straightforward English format. The MPS software must have the capability of



performing program control strategies based upon any or all analog and digital inputs and/or outputs within the specific MPS, or via the inter-communications lines, any or all analog and digital inputs and/or outputs from different MPS units. The MPS must have a programmable Daylight Savings Time feature which is user definable.

- D. The MPS shall allow the user to input full English identifications of all digital inputs, analog inputs, digital outputs, analog outputs, and counters. When the printout of data is requested, the full English identification will be printed with the data. The user shall be able to directly identify equipment status, system operation, digital and analog input data, without the need to reference tables or wiring diagrams.
- E. The MPS shall be able to perform special priority actions and strategies upon return of power after a power loss at the facility.
- F. The MPS software shall have the capability to execute control strategies based upon boolean logic statements. The MPS software will execute full addition, subtraction, multiplication, division, greater-than, less-than, and equals-to statements. The MPS will also be able to process "and", "or", and "else" logic functions in the determination of control sequences.
- G. The MPS shall support an expanded math area where the user may input numeric values, decimal and negative numbers, and mathematical expressions. The MPS shall therefore allow the user to input user defined formulas for proportional, integral and derivative control including combinations of these controls. The MPS shall be able to utilize stored number values and the calculated values of user-defined formulas in the execution of the control strategies. The conversion of analog and digital information to customer-defined engineering unit shall include, and not be limited to, KWH, %RH, GPM, CFM, etc.
- H. The MPS software shall be capable of performing special control strategies and alarming based upon occurrence of one or more emergency conditions such as equipment failure and temperature, pressure, flow or humidity readings which are determined by the processor to be out of a pre-determined range. The user must have the ability to adjust the emergency conditions at any time.
- I. The MPS software shall be capable of scheduling hours of occupancy for a full year in advance. The software must have the capability of scheduling 20 or more holiday schedules and vacation periods. Such events must be user-adjustable. The user will have the capability of adjusting such events at any time.
- J. The MPS software shall employ internal machine diagnostics and parity checks to detect hardware or software faults. Upon itemization of such failure, the MPS shall shut down in a fail-safe manner as described hereinafter.
- K. Alarming Requirements:
  - 1. All alarms shall be immediately displayed on the central console.
  - 2. The MPS shall have the capability to initiate an alert to service personnel.
  - 3. The sending of the alarm report may be activated by user-defined "out of limits" conditions as determined by the input and output data to the MPS.
  - 4. The alarm report shall be user-definable and will include the facility identification, the specific MPS identification, time of alarm activation and the alarm condition. Each MPS shall maintain up to 16 different alarm reports.
  - 5. The MPS shall also store the time of alarm activation and the time at which

the alarm is cleared in its data file.

6. Each MPS of the distributed processing network shall have the capability to activate the sending of an alarm report to a remote site.

L. Control Points:

1. Output: As required to perform control function outlined in the system description hereinafter. The processor shall be capable of expanding the output control points as required for future growth.

## 2.7 DIRECT DIGITAL CONTROL (DDC)

- A. Direct control capability using a custom control program, manual command, or time program initiated commands shall be provided as a standard feature of this system. The Digital Output board shall be used for two state commands to loads, such as stop/start, day/night, open/close, etc. The digital output board shall provide a normally closed or open dry contact output with a minimum contact rating of 1 amp at 24 volts. The Digital Input board shall accept an input voltage of 0 to 2V for OFF and 10 to 24V for an ON, which can represent status or alarm signals from monitored devices, or can count pulses from an energy demand generator. The analog input board shall accept 1 to 11 volts or 4 to 20 ma dc. Analog inputs will be scaled to readout in engineering units, as appropriate. The analog output board shall be used for varying outputs (4-20 mA, 0-20 VDC, etc.) used for controlling modulating valves, dampers, etc.
- B. Enclosure: The MPS shall be in a NEMA 1, 16-gauge steel cabinet. The cabinet door shall include a key lock latch and shall be made of steel with welded seams and corners. The cabinet will contain sufficient terminal strips for input/ output wiring and for an enclosed block for connection of 120 volts 60 Hz power. The I/O terminal shall be designed for easy installation of field cables. Terminal strips shall be clearly marked for ease of installation. The field breakdown of the panel must be possible without the need to disconnect the field wiring.
- C. Make: Control system shall be by Alerton.
- D. Inclusion above does not constitute automatic pre-qualification. Suppliers still have to prove that they meet the specifications.

## 2.8 SENSORS AND TRANSMITTERS

- A. Space Temperature Sensors shall be electronic type. Accuracy of the transmitter shall be plus or minus 0.7 deg. F at ambient temperature 77 deg. F. Sensors shall have a temperature range of -40 to 160 deg. F. The sensor shall be complete with a steel plated flush mounted cover. Sensors shall have a setpoint slide adjustment bar or knob and manual override button.
- B. Outdoor Sensor shall be mounted in the outdoors on the north side of the building where natural air flow occurs, away from any artificial affect from mechanical sources. The temperature range shall be -40 to 220 deg. F. A sun shield and weatherproof assembly for mounting to 1/2-inch rigid conduit must be provided.
- C. Humidity sensor shall be duct mounted devices that produce a linear output over the complete range of 0 - 100% RH. A thin film polymer sensing element shall respond quickly to changes in humidity and shall be protected from contamination with periodic field re-calibration capability. The sensor shall be mounted in a duct probe

assembly and be installed only after the construction or renovation area is free of contamination. Accuracy of measurement shall be +2% for 0 - 80% RH at 68 deg. F, +3% for 80 - 100 % RH.

- D. Differential Liquid Pressure Switches shall be piped in parallel across all water circuits for positive indication of flow. Snap action SPDT switches shall operate from a neoprene slack diaphragm, corrosion-resistant stainless-steel diaphragm or copper diaphragm capable of being adjusted through the total pressure range.
- E. Duct Temperature Sensors shall have an insertion measuring probe 6 inches long with a temperature range of -40 to 250 deg. F. The sensor shall include a utility box and gasket to prevent leakage and vibration noise. For all mixed air and preheat air applications, install bendable averaging duct sensors with a minimum 5-foot-long sensor element.
- F. Water Temperature Sensors shall have a temperature range of -40 to 250 deg. F. Provide brass or stainless steel thermowells and install sensor probe with heat conductive grease. Probe and sensor shall be removable without breaking fluid seal. Install sensors in top of pipe for horizontal runs to prevent condensation from flowing to sensor head.
- G. Differential Air Pressure Switches shall be piped in parallel across fans for positive indication of flow. Static pressure sensing tips shall be used for both high & low inputs. Pressure range shall be adjustable between .07 and 1.0" W.C. Snap acting contact shall be rated at 300 VA at 120 VAC.
- H. Differential Pressure and Pressure Sensors: Sensors shall have a 4-20 mA output proportional signal with provisions for field checking. Sensors shall withstand up to 150% of rated pressure, without damaging the device. Accuracy shall be within 2% of full scale.
- I. Pressure Switches: Pressure switches shall have a repetitive accuracy of  $\pm 2\%$  or range and withstand up to 150% of rated pressure. Sensors shall be diaphragm or bourdon tube design. Switch operation shall be adjustable over the operating pressure range. The switch shall have an application rated Form C, snap- acting, self-wiping contact of platinum alloy, silver alloy, or gold plating.

## 2.9 CONTROL AND COMPUTER INTERFACE RELAYS

- A. Relays shall be plug-in type with blade type terminals (not pin type). Relays shall be furnished with separate relay base for ease of serving. Relays shall be furnished with SPDT, DPDT, 3PDT or 4PDT configuration as may be required. Relays shall have a minimal contact rating of 10 amps at 240 volts. Relay mechanical life expectancy shall be rated for 50,000,000 or more operations.
- B. Coil resistance shall be low VA type.

## 2.10 ELECTRIC OPERATORS

- A. Size electric actuators to operate their appropriate dampers or valves with sufficient reserve power to provide smooth modulating action or two-position action as specified. Actuators shall be Belimo or approved equal. Where two or more actuators are to be operated in sequence to each other, provide position feedback positive positioners with adjustable startpoint and operating range.

## PART 3 - EXECUTION

### 3.1 STARTUP

- A. Calibrate and adjust all control equipment and place systems into operation. This shall include a systematic operational check of all control devices with particular attention to the following:
  - 1. Tag all equipment involved with this contract with permanent Bakelite lamichord tags. Stick-on type labels will not be acceptable.
  - 2. Check out sequence of all equipment in all operating modes.
  - 3. Set clock for proper operation.
  - 4. Program the system with initial schedules and setpoints after discussions with the Owner.

### 3.2 SYSTEM TESTING

- A. The contractor shall perform the following tests with the Commissioning Agent and the Owner's representative. The contractor shall provide one week's notice before testing shall occur. The contractor shall provide a report on all discrepancies/errors that were uncovered and corrected during the system testing.
- B. Temperature Sensors: Measure temperature with calibrated thermometer or temperature sensor. Touch or otherwise disturb the sensor to verify the sensor being measured is connected to the correct point. Verify operation of the manual override and manual adjustment where applicable.
- C. Pressure Sensors and Transducers: Verify offset and gain calibration of every device.
- D. Verify output operation of all relays and verify they are connected to the correct point.
- E. Valves and damper strokes: Verify valve and damper stroke as compared to as-builts. Verify software stroke data corresponds with actual valve and damper strokes.
- F. Provide graphical trends of all setpoint control, both PID, two position, and floating. Verify PID loops have been "loop tuned."
- G. Verify each process in the Sequence of Operation.

### 3.3 GENERAL REQUIREMENTS

- A. Install temperature sensors and manual overrides at locations shown on the drawings.
- B. Manual overrides shall switch systems from unoccupied mode to occupied mode for a programmable length of time. Activation of the manual override for a particular system shall automatically bring on and control all other equipment needed by the system. This will include all needed hot water generators chillers, pumps, etc.
- C. Provide alarms and trend logs as detailed in the Input/Output Schedules shown on the plans. The points shown in the Input/Output Schedule are the minimum points to be provided. The Contractor shall provide additional Input/Output points, as

required, to provide the performance described in this section and sequences of operation shown on plans.

- D. In the event of the MPS failure, all systems controlled by the particular MPS panel shall fail in the occupied mode of operation.
- E. Equipment serving a specific building zone shall be run according to the zone's own occupancy schedule. The Owner shall provide initial occupancy schedules for each zone to the Contractor. The Contractor shall include each specific zone schedule in the initial programming of the MPS. The Owner shall have the capability of modifying these schedules whenever desired.
- F. Laminate one copy of the panel layout and install in pouch in each control panel.
- G. Provide graphical programming of the system, including automatically updating graphic screens that demonstrate building conditions and the operation of each piece of equipment and system.
- H. Upon startup of the system, the Owner's maintenance personnel shall be provided with 4 hours of a planned and progressively advanced on-site training by a factory trained manufacturer's representative on the operation and maintenance of the DDC Control System. System startup time shall not apply toward this training time. Additional 1 hour training sessions shall be provided 3 months and 6 months after acceptance of the system. These must be scheduled before completion of the project.

#### 3.4 SEQUENCE OF OPERATION

- A. The scope of the control work will vary depending on the Alternates that are taken.
- B. The Contractor shall examine the Sequence of Operation in the contract documents and advise the Engineer of any anticipated problems in programming the sequence and submit specific recommendations for modifying the sequence. The Contractor shall participate in discussions with the Owner and Engineer to develop the final Sequence of Operation. It shall be the contractor's responsibility to program the sequence and make any necessary changes for proper and optimal system performance. The Contractor shall use controllers that are capable of providing the full final sequence of operation for each particular application. Any installed controllers that are proven not to have that full capability shall be replaced by the Contractor with the appropriate controllers.
- C. See drawings for Sequence of Operation.
- D. A meeting shall be scheduled prior to installation and programming of the DDC system between the mechanical contractor, controls subcontractor, engineer, commissioning agent, and owner to refine control strategies and determine zoning and scheduling.

**END OF SECTION**

## **SECTION 232160 - PIPES AND PIPE FITTINGS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division-1 Specification sections, apply to work of this section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent of pipes and pipe fittings required is indicated on drawings and/or specified in other Division-23 sections.

#### **1.3 QUALITY ASSURANCE**

- A. Welding: Qualify welding procedures, welders and operators in accordance with ASME Boiler and Pressure Vessel Code, Section IX, for shop and project site welding of piping work. Owner reserves the right to perform nondestructive testing of welded pipe joints by radiographic inspection whether or not explicitly required by code.
- B. All welding of piping up to the second stop shall be done by the holder of an ASME "PP" Stamp.
- C. Owner reserves the right to utilize any testing procedure listed in Chapter VI ANSI/ASME B31.1 to verify structural integrity of any weld(s) not meeting Engineer's approval. If integrity of weld(s) is found to be in compliance with ANSI B31.1, Owner will pay for the additional testing cost. If weld(s) is found to be deficient, contractor shall be responsible for all costs associated with the testing and repair of the weld(s).

### **PART 2 - PRODUCTS**

#### **2.1 GENERAL**

- A. Where called for in the scope or where shown in drawings, use applicable products from those specified below. All pipes shall be American made.
- B. Piping Materials: Provide pipe and tube of type, joint type, grade, size and weight (wall thickness or class) indicated for each service. Where type, grade or class is not indicated, provide proper selection as determined by Installer for installation requirements, and comply with governing regulations and industry standards.
- C. Pipe/Tube Fittings: Provide factory fabricated fittings of type, materials, grade, class and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve or equipment connection in each case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and with pipe manufacturer's recommendations where applicable.

#### **2.2 STEEL PIPES AND PIPE FITTINGS**

- A. Applications (Chilled and Hot Water – 2 1/2 inches and larger)
  - 1. Carbon Steel Pipe: Schedule 40 (minimum) ASTM A 53 for piping 4" and larger, A 106 or A 120 for piping 3" and smaller; except comply with ASTM A 53 or A 106 where close coiling or bending is required.
  - 2. Malleable-Iron Threaded Fittings: ANSI B16.3; plain or galvanized as indicated.
  - 3. Malleable-Iron Threaded Unions: ANSI B16.39; selected by Installer for proper piping fabrication and service requirements, including style, end connections, and metal-to-metal seats (iron, bronze or brass); plain or galvanized as indicated.
  - 4. Threaded Pipe Plugs: ANSI B16.14.
  - 5. Steel Flanges/Fittings: ANSI B16.5, including bolting and gasketing of the following material group, end connection and facing, except as otherwise indicated.
    - a. Material Group: Group 1.1
    - b. End Connections: Buttwelding
    - c. Facings: Raised-face
  - 6. Forged-Steel Socket-Welding and Threaded Fittings: ANSI B16.11, except MSS SP-79 for threaded reducer inserts; rated to match schedule of connected pipe
  - 7. Pipe Nipples: Fabricated from same pipe as used for connected pipe; except do not use less than Schedule 80 pipe where length remaining unthreaded is less than 1-1/2", and where pipe size is less than 1-1/2", and do not thread nipples full length (e.g., no close-nipples)

### 2.3 COPPER TUBE AND FITTINGS

- A. Copper Tube: ASTM B 88; Type (wall thickness) as indicated for each service; hard-drawn temper, except as otherwise indicated.
  - 1. DWV Copper Tube: ASTM B 306.
  - 2. ACR Copper Tube: ASTM B 280.
  - 3. Cast-Copper Solder-Joint Fittings: ANSI B16.18.
  - 4. Wrought-Copper Solder-Joint Fittings: ANSI B16.22.
  - 5. Cast-Copper Solder-Joint Drainage Fittings: ANSI B16.23.
  - 6. Wrought-Copper Solder-Joint Drainage Fittings: ANSI B16.29.
  - 7. Cast-Copper Flared Tube Fittings: ANSI B16.26.
  - 8. Bronze Pipe Flanges/Fittings: ANSI B16.24.
  - 9. Copper-Tube Unions: Provide standard products recommended by manufacturer for use in service indicated.

### 2.4 MISCELLANEOUS PIPING MATERIALS/PRODUCTS

- A. Provide welding materials to comply with Section II, Part C, ASME Boiler and Pressure Vessel Code for welding materials.
- B. Provide Blue, Black or equal pipe joint compound.
- C. Soldering Materials: Provide soldering materials as follows:
  - 1. Tin-Antimony Solder: ASTM B 32, Grade 95TA. (for pipe size 1-1/2" & under)
  - 2. Brazing Alloy: Silver 15%, copper 80%, phosphorous 5%. (for pipe size 2" and larger)
  - 3. Gaskets for Flanged Joints: ANSI B16.21; raised-face for steel flanges, unless otherwise indicated

## 2.5 DISSIMILAR PIPE UNIONS

- A. Piping Connectors for Dissimilar Non-Pressure Pipe: Elastomeric annular ring insert, or elastomeric flexible coupling secured at each end with stainless steel clamps, sized for exact fit to pipe ends and subject to approval by plumbing code.
- B. Piping Connectors for Dissimilar Pressure Pipe (Dielectric Union to be full-port, teflon seat ball brass valves): Provide brass ball valves to effectively isolate ferrous from non-ferrous piping (electric conductance), prevent galvanic action, and stop corrosion. Do not use rubber gasket type Dielectric Unions

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install pipes and pipe fittings in accordance with recognized industry practices which will achieve permanently leak-proof piping systems, capable of performing each indicated service without piping failure. Install each run with minimum joints and couplings, but with adequate and accessible unions for disassembly and maintenance/replacement of valves and equipment. All 90-degree elbows shall have long radius. Two 45-degree elbows in lieu of one 90-degree elbow are not permitted where short elbows are used. Reduce sizes (where indicated) by use of reducing fittings. Align piping accurately at connections, within 1/16" misalignment tolerance. Comply with ANSI B31 Code for Pressure Piping.
- B. Locate piping runs, except as otherwise indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs unless such routing is clearly indicated on the drawings. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and notations or, if not otherwise indicated, run piping in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold piping close to walls, overhead construction, columns and other structural and permanent enclosure elements of building. Provide manual air vents at all high points in the piping. Provide a system drain and drains at all low points in the piping to allow complete system drainage. All vent and drain piping within the mechanical room shall run down the wall to the floor drain with shut-off ball valves located four feet above the ground. All other vents shall be piped to a nearby location facing downwards.

### 3.2 PIPING SYSTEM JOINTS

- A. Thread pipe in accordance with ANSI B2.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound, or pipe joint tape (Teflon) where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave not more than 3 threads exposed.
- B. Solder copper tube-and-fitting joints where indicated, in accordance with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in manner which will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens.
- C. Weld pipe joints in accordance with ASME B31.1 or ASME B31.9, as applicable.
  - 1. Welding: Pipe welding in sizes 2 inches and smaller may be either by the



Manual Metallic Arc Process or the Oxyacetylene Welding Process and in sizes larger than 2 inches shall be by the Manual Metallic Arc Process with coated electrodes.

2. All welding of steam piping shall be done in conformance with Chapter V of the latest edition of the ANSI/ASME Code for Power Piping B31.1.
- D. Operators who are to do the welding must be properly qualified to do satisfactory work. Proof of an operator's qualifications shall be either the Contractor's record of suitable tests passed within the preceding 90 days while in the employ of the Contractor, or maintaining his qualifications by welding at least every 90 days since last test. Any workman considered by the Engineer as not having the skill necessary for the work shall be required to pass an appropriate qualification test or shall be at once barred from further welding on the job.
  - E. Joints shall be properly beveled, thoroughly cleaned of rust or other foreign matter, and degreased before welding. Metallic arc-welding electrodes shall conform to ASTM A233. Oxyacetylene welding rods shall be commercial steel gas welding rods and shall conform to ASTM A251, GA60.
  - F. All piping connections shall be with pre-manufactured fittings (T, elbow, etc.) or with "weldolets," "threadolets" or "sockolets." This includes instrumentation such as thermometer wells, etc.
  - G. "Weldolets" with outlet size 2-1/2" and larger and "Threadolets" or "Sokolets" with outlet size 2" and smaller may be used for branch takeoff up to one half (1/2) diameter of main. Use "Threadolets" where threaded fittings are specified and use "Sokolets" where socket weld fittings are specified. Materials of "Weldolets" and "Threadolets" shall match material of piping.
  - H. Mitered ells, welded branch connections, notched tees and "orange peel" reducers are not allowed. Unless specifically indicated, reducing flanges and reducing bushings are not allowed.
  - I. Flanged Joints: Match flanges within piping system, and at connections with valves and equipment. Clean flange faces and install gaskets. Tighten bolts to provide uniform compression of gaskets.

### 3.3 CLEANING, FLUSHING, INSPECTING

- A. Clean exterior surfaces of installed piping systems of superfluous materials, and prepare for application of specified coatings (if any). Flush out piping systems with clean water before proceeding with required tests. Flush system with water until it runs clean. If Owner desires, introduce chemicals provided by Owner unless specific section of this Division dictates otherwise. Fill, vent, and circulate system while increasing temperature. Drain and refill system. Clean all strainers and check valves, etc. before refilling. Inspect each run of each system for completion of joints, supports and accessory items. Remove start up strainers and leave for owner's inspection.
- B. Inspect pressure piping in accordance with procedures of ASME B31.1 or ASME B31.9, as applicable. Owner reserves the right to perform radiographic inspections of welded joints in pressure piping.

### 3.4 PIPING TESTS

- A. Test pressure piping in accordance with ASME B31.1 or ASME B31.9, as applicable. Minimum test pressure shall be 1-1/2 times the normal operating pressure or 100 psi, whichever is greater, unless otherwise indicated.
- B. Notify Owner at least 24 hours in advance of pressure test to allow for Owner observation. If Owner is not properly notified, contractor shall repeat pressure test in Owner's presence.

**END OF SECTION**

## **SECTION 232712 - INDUCED DRAFT COOLING TOWER**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division-1 Specification sections, apply to work of this section.

#### **1.2 SUBMITTALS**

- A. Manufacturer's Data: Submit manufacturer's technical product data, including rated capacities, pressure drop, fan performance data, weights (shipping, installed, and operating), installation and start-up instructions, and rating curves with selected points clearly indicated.

#### **1.3 WARRANTY**

- A. All mechanical parts of the cooling tower shall carry a five-year guarantee. This includes the fan, drive system, fan shaft, motor, etc.

### **PART 2 - PRODUCTS**

#### **2.1 COOLING TOWER**

- A. Provide factory assembled, induced-draft, crossflow cooling tower with vertical air discharge. Principal construction shall be of heavy gauge, G210 hot-dip galvanized steel.

#### **2.2 CAPACITY**

- A. See drawings for required cooling tower capacity.

#### **2.3 COLD WATER BASIN**

- A. Base Bid: The cold-water basin shall be heavy-gauge Type 300 stainless steel and shall include the number and type of suction connections required to accommodate the outflow piping as indicated. Suction connections shall be equipped with galvanized debris screens and an integral anti-vortexing hood to prevent air entrainment. A factory-installed, float operated, mechanical make-up valve shall be included, where indicated. A 4" diameter PVC pipe overflow shall be provided in each cell of the tower. The basin shall include a depressed center section into which accumulated silt can be flushed and overflow standpipes shall be removable to permit flush-out cleaning of the basin. All items that project into the basin shall be stainless steel.
- B. The cold-water basin shall have factory-installed sump sweeper piping with hydro boosters cleaning system.

#### **2.4 HOT WATER BASIN**

- A. The cooling tower shall be equipped with two hot water basins, one above each bank of fill. These basins shall be installed and sealed at the factory, and shall be equipped with removable, galvanized steel covers. The basins shall be gravity type constructed of heavy gauge galvanized steel. Polypropylene nozzles installed in the floor of these basins shall provide full and even coverage of the fill. Heavy duty flow-regulator valves shall be provided at the hot water inlet connections.

## 2.5 FILL, LOUVERS, AND DRIFT ELIMINATORS

- A. Fill shall be film-type 15 mil thick PVC with louvers formed as part of each fill sheet.
- B. Fill shall be suspended from structural tubing supported from the tower structure.
- C. Drift eliminators shall be PVC, triple pass, and shall limit drift losses to no more than .005% of the design GPM flow rate.

## 2.6 CASING, FAN DECK, AND FAN CYLINDER

- A. The casing, fan deck, and fan cylinder shall be heavy-gauge galvanized steel. The top of the fan cylinder shall be equipped with a removable fan guard, hot dipped after fabrication.

## 2.7 MECHANICAL EQUIPMENT

- A. The fan shall be propeller type with heavy duty, cast aluminum blades. Blades shall be individually adjustable. Fan shall be driven through a right-angle, industrial-duty, oil lubricated, gear speed reducer.
- B. Fan motor shall be as specified in the schedule, TEFC, 1.15 service factor, and specially insulated for cooling tower duty. Motor shall operate in the shaft-vertical position. Nameplate horsepower shall not be exceeded at design operation. Motor shall be energy efficient, as specified in section 15030, and shall be designed for being controlled by a variable frequency drive. The motor shall be mounted inside the casing of the tower with heavy duty belt drive. An internal ladder system shall provide access.

## 2.8 BASIN HEATER

- A. Provide electric immersion heaters and controls to prevent freezing of water in the collection basin during periods of shutdown. The system shall consist of one or more stainless steel electric immersion heaters installed in threaded couplings provided in the side of the basin. A NEMA 4 enclosure shall house a magnetic contactor to energize heaters, a transformer to provide 24-volt control circuit power, and a solid-state circuit board for temperature and low water cutoff. A control probe shall be located in the basin to monitor water level and temperature. The system shall be capable of maintaining 40°F water temperature at 0°F ambient air temperature.

## 2.9 ACCESS

- A. A 30" x 36" galvanized steel access door shall be located in each end-wall casing for entry into the cold-water basin and fan plenum area. Access doors shall be operable from inside as well as outside the tower.

B. NA.

C. NA

2.10 ADJUSTABLE SPEED DRIVE (ASD)

A. A complete variable frequency drive system shall be provided to control the fan motor from 10% to 110% of the motor base speed. The ASD system shall be provided by the cooling tower manufacturer and matched to the cooling tower. Critical frequencies shall be locked out and a minimum speed shall be set to prevent the motor from running too slow and overheating. The ASD shall include a manual bypass. The ASD shall be remote mounted. The tower will have mounted on it separate fan and basin heater disconnects.

B. See section 15171 for more requirements for the ASD.

**PART 3 - EXECUTION**

3.1 Installation shall be in full accordance with the manufacturer's recommendations. Modifications in piping, valving, controls, accessories, and arrangement from that indicated and required by integration of the unit proposed into the system as designed shall be the responsibility of the Contractor. The equipment manufacturer's factory installed wiring shall be fully coordinated with field wiring. All safety devices, interlocks, etc., required by the Specifications and Drawings and as recommended by the equipment manufacturer shall be provided.

3.2 Provide the Owner's maintenance personnel with a minimum of 4 hours of training on start-up and shut-down procedures, troubleshooting procedures, VFD operation, and servicing and preventative maintenance schedules and procedures. Review with the Owner's personnel the data contained in the Operating and Maintenance Manuals.

3.3 The cooling tower manufacturer shall supply a start-up engineer to identify and lock out critical speeds, to verify correct operation, and to instruct the facility maintenance personnel in proper startup and operation of the Variable Frequency Drive.

**END OF SECTION**

## SECTION 260000 - GENERAL REQUIREMENTS

### PART 1 - GENERAL

- 1.1 This section is intended to supplement or modify the conditions and requirements defined in the General or Project Requirements given in the General Requirements.
- A. All work, materials, etc., shall be furnished and installed, whether or not specifically shown on the drawings and/or called for in the specifications, which may be necessary to comply with all of the requirements, due to the exigencies of the work, to complete the work and the contract in a satisfactory and approved manner.
  - B. The work to be done under this contract shall consist of furnishing all equipment, labor, materials required for the items listed in the proposal, and/or as shown on the contract drawings, together with all devices, connectors, splices and appurtenances, required for a safe, clean, complete and ready for service, reliable, substantial and rugged working installation, to the satisfaction of the Engineer and to execute the intent of this contract and these specifications.
  - C. The Contractor shall be responsible for determining the proper connection points for all power, control, and signal wiring installed under this contract, regardless of whether the connection points are in equipment furnished under this contract, existing equipment, or equipment furnished by others. The Contractor shall include in his bid prices any field surveys, wire tracing or other work required to ascertain the proper connection points for all wiring.
  - D. It is the intent of these specifications that the Contractor shall furnish equipment and material which is suitable for the purpose and for installation in the location as is.
  - E. It is also the intent of the specification that the equipment, materials, and accessories, as furnished, shall be complete in all respect and ready to operate.
  - F. The specifications cover the general design, construction arrangement, and certain particular features, but do not purport to cover all details entering into the design of the equipment and accessories.
  - G. Minor revisions in construction details will be made to accommodate equipment proposed and approved on the drawings thereof, submitted by the Contractor. Major revisions shall not be made, nor shall equipment be submitted for approval which cannot be installed in structures of the approximate dimensions and character specified herein.
  - H. Further, it is also the intent of these specifications to provide a complete contract including items which may be omitted or not shown but which are considered normal and accepted engineering practice for this type of contract at no additional cost to the Owner.
  - I. All work shall be done in a thorough and workmanlike manner and shall conform to the best modern practice in the manufacture and installation of high-grade equipment and materials. Wherever possible, all parts shall be made according to standard gauge to facilitate replacement and repair.

- J. All materials furnished under these items shall be the best of their respective kinds and shall be free from defects in design and workmanship.
- K. All materials or equipment not meeting the specified requirements shall be rejected and shall be replaced at once by the Contractor with materials or equipment of the specified type and quality, at no cost to the Owner.
- L. All materials for which no detailed specifications are given herein shall be of the quality and character best adapted and suitable for the purpose for which they are to be used and shall be subject to the approval of the Engineer.
- M. Where any material or article or the maker or distributor thereof is specified by name, this is done for the purpose of more clearly describing the type or quality desired. Any material or article of equal quality, merit, and performance, in the opinion of the Engineer, will be acceptable, if approval is given in writing.
- N. All materials furnished and work done by the Contractor shall be subject to the inspection of the Engineer. Defective materials shall be removed from the site of the work and defective work repaired or replaced as directed. Facilities for handling and inspection of materials and equipment and for access to the work in progress, shall at all times be furnished by the Contractor.
- O. Where any delay is encountered in carrying out work due to unfavorable operating conditions, the Contractor shall not be entitled to additional compensation therefore, but the time allowed equivalent to the period of actual delay.

## 1.2 DESCRIPTION OF WORK

- A. Work includes all labor and electrical equipment to install the Cooling Tower.
- B. Unless specifically dimensioned, the work shown on the drawings is diagrammatic, and is intended only to show general arrangement.
- C. Include in the work, all accessories and devices necessary for the intended operation or perfection of any system, whether or not specifically shown or specified.
- D. The term "Furnish" shall mean to obtain and supply to the job site. The term "Install" shall generally mean to fix in position and connect for use. Where language indicates that one party or trade is to "install" and another is to "connect", the term "install" shall mean only to fix in position, and "connect" shall mean to make electrical connections to. The term "Provide" shall mean to furnish and install.
- E. Furnish all documentation, such as shop drawings, as-built drawings, operation and maintenance manuals, certification and perform all required testing as herein specified.
  - 1. Testing & Start-Up: Assist MC in startup of all equipment. Provide As-Built Documentation, start-up, and test protocol.
  - 2. As Built Documentation: Provide a minimum of (4) sets of Ring Binders per each system with the following minimal content:
    - a. Floorplans, Partial Floorplans
    - b. Elevations of Control Cabinets

- c. General schematic and detailed loops wiring diagrams and associate termination lists for the basement and 1<sup>st</sup> Floor wiring.
- d. CD with all programming and conclusive documentation. Every line of code shall be properly commented on to facilitate future debugging and modifications.

### 1.3 STANDARD OF QUALITY

- A. The specifications establish the standards of quality required, either by description or by references, to brand name, name of manufacturers or manufacturer's model number. All materials shall be new unless noted otherwise.
- B. Where one product only is specifically identified by name or manufacturer's model number, the Contractor shall base his bid on the use of the named product. Where multiple names are used, the Contractor shall base his bid on the use of any of those products named.
- C. The Contractor may submit, with his bid, the names of products which are proposed as substitutions for products named in the specifications. Each proposed substitution shall be accompanied by a written sum of money to be added or deducted from his bid. The Owner reserves the sole right to accept or reject said substitutions with or without cause.
- D. When equipment and/or materials are proposed to be purchased from a manufacturer other than those specified, the Contractor shall provide complete data adequate for the Engineer's evaluation of the proposed substitution.
- E. When the equipment other than that specified is used, the Contractor shall be responsible for any extra cost of required revisions such as structural steel, concrete, electrical, piping, etc. Such additional costs shall be identified at the time such substitutions are proposed.

### 1.4 SUBMITTALS

- A. Engineer's review of shop drawings is solely for the benefit of the Owner and in no way relieves the contractor from his obligations to furnish materials which satisfy the requirements of his contract and the design intent.
- B. Shop drawings, product data and samples shall be submitted as required by the General Conditions or Project Requirements and as supplemented by this section.
- C. When a specific specification section identifies that no submittal is required, the contractor shall provide the specified materials without submittals.
- D. Provide to the Engineer, a schedule of shop drawing submissions identifying submittal target dates.
- E. The Contractor shall review, approve, and submit shop drawings, with promptness so as to cause no delay in his work or in that of others. No submissions will be accepted by the Engineer without the signed review and approval of the Contractor.
- F. The Contractor shall check and verify pertinent field measurements, and quantities of equipment and materials required.



- G. Submittals shall be identified by reference to the drawing(s), section(s) of specifications, or equipment symbols to which they relate.
- H. Shop drawings, when required, shall include:
  - 1. Verification of information given in Contract Documents such as performance, dimensions, weight, materials, construction, types, models, manufacturer, etc.
  - 2. Equipment layouts drawn to scale as may be required.
  - 3. Wiring diagrams and schematics for equipment.
  - 4. Any special construction conditions.
  - 5. Other information/data, as may be requested.
- I. All submittals shall identify the specific details of the product or assembly. All optional features being provided or proposed shall be so noted or the submittal will be rejected.
- J. The Engineer will return submittals with one of the following notations stamped thereon; REVIEWED, REVIEWED AS NOTED, REJECTED RESUBMIT.
- K. Review is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for:
  - 1. dimensions which shall be confirmed and correlated at the job site.
  - 2. fabrication processes and techniques of construction.
  - 3. coordination of his work with that of all other trades.
  - 4. the satisfactory performance of his work.
- L. The work involved may proceed when submittals are marked REVIEWED, or NO EXCEPTIONS TAKEN with no further submission required.
- M. The work involved may proceed when submittals are marked REVIEWED AS NOTED providing corrections are made and submittals are resubmitted for record. Review does not authorize changes to Contract Sum unless stated in a separate letter or Change Order. In the event that any notes placed on the submittals by the Engineer are believed to result in a change in the Contract Sum, the Engineer shall be notified immediately, and fabrication may not be undertaken until written authorization to proceed is issued by the Owner.
- N. The work involved may not proceed when submittals are marked REVISE AND RESUBMIT. Submittals must be corrected and resubmitted for review.
- O. Submittals marked REJECTED are not in accordance with the Contract Documents and require a new submittal for review.
- P. For items being resubmitted, clearly identify changes made from the initial submittal requested by the Engineer. The Engineer will review only those changes requested and identified by the Contractor.

## 1.5 PROTECTION OF WORK

- A. Each Contractor is responsible for the protection of his materials, equipment, and completed work as defined in the General or Project Requirements and as supplemented herein.

- B. All openings into any part of the conduit systems, all fixtures and equipment must be securely covered or otherwise protected to prevent damage due to dropped tools or materials, work by others or intrusion of grit, dirt, water, snow, ice or other foreign matter. Remove burrs, dirt, paint spots and debris. The Contractor shall be held responsible for all damage done to unprotected work or materials.

## 1.6 STEEL AND CONCRETE WORK FOR ELECTRICAL EQUIPMENT

- A. Steel: Provide all miscellaneous steel supports and anchors required for equipment and materials installed under this Specification. Manual of Construction by American Institute of Steel Construction latest edition shall be followed in design and construction except that the second sentence of paragraph 4.2.1., Section 4 of Division 5, page 5-177 will not apply. Structural steel members shall conform to ASTM A36 and shall have a shop applied coat of rust inhibiting paint. Welding of steel shall conform to American Welding Society, Standard Code for Arc and Gas Welding in Building Construction. Bolts, nuts and washers for structural steel framing and concrete embedment shall be high tensile type minimum 3/4" diameter conforming to ASTM A325. Slotted-steel channel supports shall have flange edges turned toward web, and 9/16-inch diameter slotted holes at a maximum 2 inches o.c., in webs.
- B. Channel depth: 2-1/2 inches minimum.
- C. Channel thickness: Selected to suit structural loading.
- D. Fittings and Accessories: Products of the same channel manufacturer. Channel supports and fittings shall be hot dip galvanized steel.
- E. Concrete work and anchors: Refer to Section 16050 and Section 03300 for concrete work and anchors.

## 1.7 COUNTERFLASHING

- A. Where conduits or other items pass through any roof, wall or other exterior component, provide counter flashing as required.

## 1.8 EQUIPMENT BY OTHERS

- A. Summary of Work, together with other technical sections in the Project Manual, describe equipment that will be furnished by the Owner or from other sources.
- B. The responsibility for setting, installation and protection of such equipment will be defined in other sections of the Project Manual.
- C. Provide services rough-in for and make final connections to this equipment as shown and specified.
- D. Provide coordination to assure clearances required for moving equipment to final location.

## 1.9 MOVING OF EQUIPMENT

- A. Verify that electrical equipment will pass through all restricting openings, and

when equipment or sections of equipment are larger than these openings, install this equipment prior to construction of enclosing walls, floors or roofs.

- B. Use planking or cribbing as required to protect adjoining construction from damage.
- C. Provide rigging and expert rigging personnel as required for equipment installation in difficult locations. Rigging shall include any necessary structural investigation and temporary structural support.

#### 1.10 CUTTING AND PATCHING

- A. Provide all openings through walls, floors and ceilings, etc. required for the installation of work defined on the drawings and specifications.
- B. Following installation and testing, restore floors, walls, and ceilings with materials equal to the original construction and finish to match existing surfaces.
- C. Cutting and patching shall be performed only by tradesmen familiar with the construction involved.

#### 1.11 IDENTIFICATION

- A. Nameplates:
  - 1. Provide each new normal power load break switch, automatic transfer switch, starter, circuit breaker, panel, remote start-stop station, pilot light or safety switch with an engraved laminated black and white phenolic nameplate, white letters on black background. Provide similar emergency and normal/emergency equipment with an engraved laminated red and white phenolic nameplate, white letters on red background.
  - 2. Compose the legend so as to clearly indicate the function of the equipment. Letters and numbers to be at least 3/16 inch high.
  - 3. Locate the nameplate in a position so as to be clearly visible and secure with screws. Rivets and adhesives are not acceptable.
  - 4. Submit proposed nameplate legend for review.
  - 5. Provide a nameplate on the main switchgear indicating names of the electrical contractor and the engineer and project year.
- B. Stenciling:
  - 1. Paint bright red, all exposed pull/splice boxes, conduits, duct banks and raceways containing high voltage conductors over 600 volts.
  - 2. Provide 1 inch high stenciling, white letters on red background as follows:
    - a. "HIGH VOLTAGE \*\*\*\* VOLTS"
  - 3. The stenciling shall occur 10 feet on center on each side of the raceway and on the front face of pull/splice box.

#### 1.12 FINAL ACCEPTANCE

- A. The Contractor shall perform and complete work in accordance with the Contract Documents without fault or defect of any kind. In the absence of more specific directives, the work shall:
  - 1. be completed in a first-class manner.
  - 2. be placed in a thoroughly clean and unmarred condition.

3. be checked out in a step-by-step manner to ascertain that fastenings, controls, parts, safety devices, operating devices and other required appurtenances have been provided in accordance with the Contract Documents.
  4. be free of previously condemned or rejected parts and be properly restored to an acceptable condition.
  5. be adjusted for proper operation wherever adjustments or calibrations exist in the work.
- B. All systems shall be operated to demonstrate that the requirements of the Contract have been met and that the systems have been adjusted and will operate in accordance therewith.

#### 1.13 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Furnish for review, three hard bound copies of complete written instructions for the operation, care, and maintenance of each piece of equipment and/or system. Include recommended frequency of inspection, cleaning, oiling, greasing, and adjustment and other action as may be required in accordance with manufacturer's recommendations. Material shall include manufacturer's brochures, catalog cuts, parts lists, wiring diagrams, service organizations, etc.

#### 1.14 PERMITS, FEES, AND CERTIFICATES OF APPROVAL

- A. Contractor shall acquire all permits and certificates. Submit a final inspection certificate from Middle-Atlantic Inspections or other NFPA affiliated agency with request for final payment.
- B. Contractor shall provide all power, labor and instruments required for tests and cleaning of systems.
- C. Whenever tests are required, three (3) copies of the test reports shall be submitted to the Engineer.
- D. Tests may be observed by the Engineer or his representative. Notify the Engineer a minimum of three weeks in advance of test dates.

#### 1.15 COMPLIANCE WITH CODES, STANDARDS AND REGULATIONS

- A. In the absence of specific instruction in the technical specifications, equipment and installation shall conform to the following applicable codes, standards and regulations, latest editions:
1. American Society for Testing and Materials (ASTM)
  2. American National Standard Institute (ANSI)
  3. Underwriter's Laboratories, Inc. (UL)
  4. American Welding Society Code (AWSC)
  5. NFPA 70, "National Electrical Code", latest edition
  6. National Electrical Manufacturer's Association (NEMA).
  7. Occupational Safety and Health Act (OSHA).
  8. National Fire Protection Association (NFPA).
  9. National Electrical Safety Code (NESC)
  10. National Building Code (BOCA) – 1996
  11. Institute of Electrical and Electronics Engineers (IEEE)
  12. Illuminating Engineering Society of North American (IESNA)
  13. State and Local Building, Electric, and Fire Codes and Regulations.

1.16 PAINTING

- A. Cabinet trims and similar prefabricated equipment shall be factory primed and finish painted with baked enamel in color selected. This equipment shall not be painted in the field unless the factory finishes have been marred or as otherwise directed. Do not paint over UL or similar labels or mechanical/electrical nameplates.

1.17 COORDINATION OF WORK

- A. Coordinate installation of conduit runs and equipment with other trades and conditions in the building and participate in all coordinated shop drawings. Variance from work shown on drawings will be subject to approval. Where interference occurs and electrical work is directed to be relocated, provide such relocation without additional cost.
- B. It is the System Integrator's responsibility to coordinate with the manufacturers of all new and existing pieces of equipment the different aspects of their interfaces. All additional costs for equipment manufacturer's redesign of interfaces caused by the System Integrator's failure to properly coordinate all aspects of the interfaces shall be borne by the System Integrator.

1.19 ACCESS PANELS

- A. Furnish access panels where required, to concealed pull boxes, junction boxes, or similar equipment located above dry wall board ceiling or behind walls. Installation of access panels shall be by mechanics of the pertinent trade under General Construction.
- B. Access panels shall be 18" x 18" minimum, 16 gage wall or ceiling frame and a 14-gage panel door with not less than 1/8" fire proofing secured to the inside of the door. The door shall be provided with concealed hinges and cylinder lock, and prime-coated steel prepared for painting. Each door shall be capable of opening 180 degrees. Doors for wall panels shall be secured with suitable clips and counter sunk tamperproof screws.
- C. Access panels shall have "label" fire rating equal to the ceiling or wall surface.

1.20 WARRANTY

- A. The contractor and equipment manufacturers shall jointly guarantee all wiring and equipment to be free of defects in workmanship and material for a period of one year from the date of final acceptance, unless otherwise noted.

1.21 PROJECT RECORD DOCUMENTS

- A. Maintain at job site, one copy of record documents and samples as required under the General Conditions of the Contract, including Drawings, Specifications, Addenda and Bulletins, Change Orders, Shop Drawings, Product Data and Samples, Field Orders, Field Test Records and Maintenance and Operating Manuals.
- B. Provide files and racks for storage of documents. Maintain documents in a clean, dry legible condition and in good order. Do not use record documents for

construction purposes. Make record documents and samples available during normal working hours for inspection.

- C. Recording:
1. Label each document "Project Record" in neat large letters and provide final completion date.
  2. Record information concurrently with construction progress.
  3. Do not conceal any work until required information is recorded.
- D. Record Drawings - legibly mark to record actual construction as follows:
1. A print set (blue-line or black-line) of contract drawing or shop drawing mark-ups of actual installations which vary substantially from the work as originally shown. Mark whichever drawing is most capable of showing "field" condition fully and accurately; however, where shop drawing are used for mark-up, record a cross reference at corresponding location on working drawings. Mark with red erasable pencil and, where feasible, use other colors to distinguish between variation in separate categories or work. Mark-up new information, which is recognized to be of importance to Owner, but was for some reason not shown on either contract drawings or shop drawings. Give particular attention to concealed work which would be difficult to measure and record at a later date. Note related change order numbers where applicable.
  2. Record Specifications and Addenda, Bulletins, Requests for Information (RFI's) and Construction Clarification Sketches (CSK's) - legibly mark each Section to record:
    - a. Any variations in actual work in comparison with text of specifications and modifications as issued. Give particular attention to substitutions, selection of options, and similar information work where it is concealed or cannot otherwise be readily discerned at a later date by direct observations. Note related record drawing information and product data, where applicable.
    - b. Changes made by Field Order or by Change Order.
- E. Product Data: Maintain one copy of each product data submittal, and mark-up significant variation in actual work in comparison with submitted information. Include both variations in product as delivered to site, and variations from manufacturer's instruction and recommendations for installation. Give particular attention to concealed products and portions of the work which cannot otherwise be readily discerned at a later date by direct observations. Note related change orders and mark-up of record drawings and specifications.
- F. Record Drawings Submittal at Project Completion: Organize record drawing sheets into manageable sets, bind with durable paper cover sheets and print suitable titles, dates and other identification on cover of each set. Transfer marking required by previous paragraphs to set of reproducible transparencies. Submit complete set of transparencies to the Design Professional and two sets of blue-line prints.
- G. Product Data Submittal at Project Completion: Submit three sets of marked-up product data submittals for record purposes that include resolution of all review notes and field revisions.
- H. Record Sample Submittals: Immediately prior to date of substantial completion Design Professional (and including Owner's personnel where desired) will meet

with Contractor at site and will determine which if any of submitted samples maintained by Contractor during progress of work are to be transmitted to Owner for record purposes. Comply with Design Professionals instruction for packaging, identification marking, and delivery to Owner's sample storage space.

- I. Miscellaneous Record Submittals: Refer to other sections of these specifications for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the work. Immediately prior to date(s) of substantial completion, complete miscellaneous records and place in good order properly identified and bound or filed, ready for continued use and reference. Submit to Architect/Engineer for Owner's records.
  
- J. Maintenance Manuals: Organize maintenance-and-operating manual information into three suitable sets of manageable size and bind into individual binders properly identified and indexed (thumb-tabbed). Include:
  - 1. emergency instructions
  - 2. spare parts listing
  - 3. warranties
  - 4. wiring diagrams
  - 5. recommended "turn-around" cycles
  - 6. inspection and cleaning procedures
  - 7. recommended frequency of testing
  - 8. adjustment and any other maintenance requirements
  - 9. shop drawings
  - 10. product data
  - 11. similarly applicable information.
  
- K. Bind each manual of each set in heavy duty 2-inch, vinyl-covered ring binder, and include pocket folders for folded sheet information. Mark identification on both front and spine for each binder

**END OF SECTION**

## SECTION 260075 - ELECTRICAL IDENTIFICATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes electrical identification materials and devices required to comply with ANSI C2, NFPA 70, OSHA standards, and authorities having jurisdiction.

#### 1.3 SUBMITTALS

- A. No submittals

#### 1.4 QUALITY ASSURANCE

- A. Codes and Standards:
  - 1. Comply with ANSI C2.
  - 2. Comply with NFPA 70.
  - 3. Comply with ANSI A13.1 and NFPA 70 for color-coding.

#### 1.5 PRODUCTS

- A. Raceway and Cable Labels: Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
  - 1. Color: Black letters on orange field.
  - 2. Legend: Indicates voltage and service.
- B. Adhesive Labels: Preprinted, flexible, self-adhesive vinyl with legend overlaminated with a clear, weather- and chemical-resistant coating.
- C. Pretensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the line it identifies and arranged to stay in place by pretensioned gripping action when placed in position.
- D. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide (0.08 mm thick by 25 to 51 mm wide).
- E. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape. Not less than 6 inches wide by 4 mils thick (152 mm wide by 0.102 mm thick). Compounded for permanent direct-burial service. Embedded continuous metallic strip or core. Printed legend indicating type of underground line.
- F. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.
- G. Aluminum, Wraparound Marker Bands: Bands cut from 0.014-inch (0.4-mm)



thick aluminum sheet, with stamped or embossed legend, and fitted with slots or ears for permanently securing around wire or cable jacket or around groups of conductors.

## 1.6 NAMEPLATES AND SIGNS

- A. Safety Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.
- B. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. in. (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes. Engraved legend with black letters on white face. Punched or drilled for mechanical fasteners.
- C. Baked-Enamel Signs for Interior Use: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for the application. 1/4-inch (6.4-mm) grommets in corners for mounting.
- D. Exterior Metal-Backed Butyrate Signs: Weather-resistant, non-fading, pre-printed, cellulose-acetate butyrate signs with 0.0396-inch (1-mm) galvanized-steel backing, and with colors, legend, and size required for the application. 1/4-inch (6.4-mm) grommets in corners for mounting.
- E. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

## 1.7 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking, Type 6/6 nylon cable ties.
  - 1. Minimum Width: 3/16 inch (5 mm).
  - 2. Tensile Strength: 50 lb (22.3 kg) minimum.
  - 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
  - 4. Color: According to color-coding.
- B. Paint: Formulated for the type of surface and intended use.
  - 1. Primer for Galvanized Metal: Single-component acrylic vehicle formulated for galvanized surfaces.
  - 2. Primer for Concrete Masonry Units: Heavy-duty-resin block filler.
  - 3. Primer for Concrete: Clear, alkali-resistant, binder-type sealer.
  - 4. Enamel: Silicone-alkyd or alkyd urethane as recommended by primer manufacturer.

## PART 2 - PRODUCT NOT USED

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and

other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.

- C. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before applying.
- E. Install painted identification according to manufacturer's written instructions and as follows:
  - 1. Clean surfaces of dust, loose material, and oily films before painting.
  - 2. Prime surfaces using type of primer specified for surface.
  - 3. Apply one intermediate and one finish coat of enamel.
- F. Color Banding Raceways and Exposed Cables: Band exposed and accessible raceways of the systems listed below:
  - 1. Bands: Pretensioned, wraparound plastic sleeves; colored adhesive tape; or a combination of both. Make each color band 2 inches (51 mm) wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side.
  - 2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
  - 3. Apply the following colors to the systems listed below:
    - a. Fire Alarm System: Red.
    - b. Fire-Suppression Supervisory and Control System: Red and Yellow.
    - c. Combined Fire Alarm and Security System: Red and Blue.
    - d. Security System: Blue and yellow.
    - e. Mechanical and Electrical Supervisory System: Green and Blue.
    - f. Telecommunication System: Green and Yellow.
- G. Caution Labels for Indoor Boxes and Enclosures for Power and Lighting: Install pressure-sensitive, self-adhesive labels identifying system voltage with black letters on orange background. Install on exterior of door or cover.
- H. Circuit Identification Labels on Boxes: Install labels externally.
  - 1. Exposed Boxes: Pressure-sensitive, self-adhesive plastic label on cover.
  - 2. Concealed Boxes: Plasticized card-stock tags.
  - 3. Labeling Legend: Permanent, waterproof listing of panel and circuit number or equivalent.
- I. Color-Coding of Secondary Phase Conductors: Use the following colors for service feeder, and branch-circuit phase conductors:
  - 1. 208/120-V Conductors:
    - a. Phase A: Black.
    - b. Phase B: Red.
    - c. Phase C: Blue.
  - 2. 480/277-V Conductors:
    - a. Phase A: Brown.
    - b. Phase B: Orange.
    - c. Phase C: Yellow.

3. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG:
  - a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of .6 inches\_ (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use .1-inch\_ (25-mm-) wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.
  - b. Colored cable ties applied in groups of three ties of specified color to each wire at each terminal or splice point starting .3 inches\_ (76 mm) from the terminal and spaced .3 inches\_ (76 mm) apart. Apply with a special tool or pliers, tighten to a snug fit, and cut off excess length.
  
- J. Power-Circuit Identification: Metal tags or aluminum, wraparound marker bands for cables, feeders, and power circuits in vaults, pull and junction boxes, manholes, and switchboard rooms.
  1. Legend: .1/4-inch\_ (6.4-mm-) steel letter and number stamping or embossing with legend corresponding to indicated circuit designations.
  2. Tag Fasteners: Nylon cable ties.
  3. Band Fasteners: Integral ears.
  
- K. Apply identification to conductors as follows:
  1. Conductors to Be Extended in the Future
  2. Indicate source and circuit numbers.
  3. Multiple Power or Lighting Circuits in the Same Enclosure.
  4. Identify each conductor with source, voltage, circuit number, and phase. Use color-coding to identify circuits' voltage and phase.
  
- L. Multiple Control and Communication Circuits in the Same Enclosure:
  1. Identify each conductor by its system and circuit designation.
  2. Use a consistent system of tags, color-coding, or cable marking tape.
  
- M. Apply warning, caution, and instruction signs as follows:
  1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
  
- N. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with .1/2-inch\_ (13-mm-) high lettering on .1-1/2-inch\_ (38-mm-) high label; where two lines of text are required, use labels .2 inches\_ (50 mm) high. Use white lettering on black field. Apply labels for each unit of the following categories of equipment using mechanical fasteners:
  1. Identification of some items listed below is required by NFPA 70.
  2. Panelboards, electrical cabinets, and enclosures.
  3. Access doors and panels for concealed electrical items.
  4. Disconnect switches.

5. Enclosed circuit breakers.
6. Motor starters.
7. Push-button stations.
8. Contactors.
9. Remote-controlled switches.
10. Control devices.

**END OF SECTION**

## **SECTION 260080 - ELECTRICAL TESTING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes general requirements for electrical field testing and inspecting. Detailed requirements are specified in each Section containing components that require testing. General requirements include the following:
  - 1. Qualifications of testing agencies and their personnel.
  - 2. Suitability of test equipment.
  - 3. Calibration of test instruments.
  - 4. Coordination requirements for testing and inspecting.
  - 5. Reporting requirements for testing and inspecting.
- B. Allowances: Electrical tests and inspections specified in various Division 23 and 26 Sections are covered by a testing and inspecting allowance specified in Division 1 Section "Allowances." See Division 1 Section "Allowances" for what is included in allowance amount, the amount of the allowance, payment procedures for allowances, changes to allowance amounts, and disposition of unused portions of allowance.

#### **1.3 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: As specified in each Section containing electrical testing requirements and in subparagraph and associated subparagraph below.
  - 1. Independent Testing Agencies: Independent of manufacturers, suppliers, and installers of components to be tested or inspected.
  - 2. Testing Agency's Field Supervisor for Power Component Testing: Person currently certified by the International Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Division 26 power component Sections.
- B. Test Equipment Suitability: Comply with NETA ATS, Section 5.2.
- C. Test Equipment Calibration: Comply with NETA ATS, Section 5.3.

### **PART 2 - NOT USED**

### **PART 3 - EXECUTION**

#### **3.1 GENERAL TESTS AND INSPECTIONS**

- A. If a group of tests are specified to be performed by an independent testing agency, prepare systems, equipment, and components for tests and inspections, and perform preliminary tests to ensure that systems, equipment, and

components are ready for independent agency testing. Include the following minimum preparations as appropriate:

1. Perform insulation-resistance tests.
2. Perform continuity tests.
3. Perform rotation test (for motors to be tested).
4. Provide a stable source of single-phase, 208/120-V electrical power for test instrumentation at each test location.

B. Test and Inspection Reports: In addition to requirements specified elsewhere, report the following:

1. Manufacturer's written testing and inspecting instructions.
2. Calibration and adjustment settings of adjustable and interchangeable devices involved in tests.
3. Tabulation of expected measurement results made before measurements.
4. Tabulation of "as-found" and "as-left" measurement and observation results.

**END OF SECTION**

## SECTION 260120 - CONDUCTORS AND CABLES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

#### 1.3 SUBMITTALS

- A. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

#### 1.4 QUALITY ASSURANCE

- A. Listing and Labeling: Provide wires and cables specified in this Section that are listed and labeled.
  - 1. The Terms "Listed" and "Labeled" as defined in NDPA 70, Article 100.
  - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.
- B. Comply with NFPA 70.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver wires and cables according to NEMA WC 26.

#### 1.6 COORDINATION

- A. Coordinate layout and installation of cables with other installations.
- B. Revise locations and elevations from those indicated, as required to suit field conditions, and as approved by Engineer.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
  - 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

## 2.2 CONDUCTORS AND CABLES

- A. Manufacturers:
  - 1. American Insulated Wire Corp.; a Leviton Company.
  - 2. General Cable Corporation.
  - 3. Rome Cable Company.
- B. Refer to Part 3 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.
- C. Conductor Material: Copper complying with NEMA WC 5 or 7; solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.
- D. Conductor Insulation Types: Type THW, THHN-THWN, XHHW and SO complying with NEMA WC 5 or 7.

## 2.3 CONNECTORS AND SPLICES

- A. Manufacturers:
  - 1. AFC Cable Systems, Inc.
  - 2. AMP Incorporated/Tyco International.
  - 3. Hubbell/Anderson.
  - 4. O-Z/Gedney; EGS Electrical Group LLC.
  - 5. 3M Company; Electrical Products Division.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

## PART 3 - EXECUTION

### 3.1 CONDUCTOR AND INSULATION APPLICATIONS

- A. Exposed Feeders: Type THHN-THWN, single conductors in raceway.
- B. Feeders Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- C. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspace: Type XHHW-2, single conductors in raceway.
- D. Exposed Branch Circuits, including in Crawlspace: Type THHN-THWN, single conductors in raceway.
- E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- F. Branch circuit homeruns exposed or concealed: Type THHN-THWN, single conductors in EMT or RMC.
- G. Cord Drops and Portable Appliance Connections: Type SO, hard service cord.
- H. Fire Alarm Circuits: Type THHN-THWN, in raceway or Power-limited, fire-protective, signaling circuit cable in steel armor spiral cover.



- I. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- J. Class 2 Control Circuits: Power-limited cable, concealed in building finishes.

### 3.2 INSTALLATION

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.
- E. Support cables according to Division 26 Section "Basic Electrical Materials and Methods."
- F. Seal around cables penetrating fire-rated elements according to Division 7 Section "Through-Penetration Firestop Systems."
- G. Identify and color-code conductors and cables according to Division 26 Section "Electrical Identification."
- H. Direct burial cable is not allowed unless otherwise noted in drawings.
- I. NMC and MC/AC cable are not allowed.

### 3.3 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 and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than un-spliced conductors.

### 3.4 FIELD QUALITY CONTROL

- A. Testing: Perform the following field quality-control testing:
  - 1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
  - 2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.
- B. Test Reports: Prepare a written report to record the following:
  - 1. Test procedures used.
  - 2. Test results that comply with requirements.

3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

**END OF SECTION**

## SECTION 260130 - RACEWAYS AND BOXES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. Related Sections include the following:
  - 1. Division 2 Section "Underground Ducts and Utility Structures" for exterior ductbanks, manholes, and underground utility construction.
  - 2. Division 7 Section "Through-Penetration Firestop Systems" for fire-stopping materials and installation at penetrations through walls, ceilings, and other fire-rated elements.
  - 3. Division 26 Section "Basic Electrical Materials and Methods" for supports, anchors, and identification products.
  - 4. Division 26 Section "Wiring Devices" for devices installed in boxes and for floor-box service fittings.

#### 1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. FMC: Flexible metal conduit.
- C. IMC: Intermediate metal conduit.
- D. LFMC: Liquidtight flexible metal conduit.
- E. RMC: Rigid Metal Conduit.
- F. RNC: Rigid nonmetallic conduit. (Typically PVC)

#### 1.4 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings.

#### 1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

#### 1.6 COORDINATION

- A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by the manufacturers specified.

### 2.2 METAL CONDUIT AND TUBING

- A. Manufacturer:
  - 1. AFC Cable Systems, Inc.
  - 2. Alflex Inc.
  - 3. Anamet Electrical, Inc.; Anaconda Metal Hose
  - 4. Electri-Flex Co.
  - 5. Grinnell Co. /Tyco International; Allied Tube and Conduit Div.
  - 6. LTV Steel Tubular Products Company
  - 7. Manhattan/CDT/Cole-Flex
  - 8. O-Z Gedney; Unit of General Signal
  - 9. Wheatland Tube Co.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. IMC: ANSI C80.6.
- D. EMT and Fittings: ANSI C80.3.
  - 1. Fittings: Compression type.
- E. FMC: Zinc-coated steel.
- F. LFMC: Flexible steel conduit with PVC jacket.
- G. Fittings: NEMA FB 1; compatible with conduit and tubing materials.

### 2.3 METAL WIREWAYS

- A. Manufacturer:
  - 1. Hoffman
  - 2. Square D
- B. Material and Construction: Sheet metal sized and shaped as indicated, NEMA 1 or 3R.
- C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.

- E. Wireway Covers: Screw cover type, Flanged and gasketed type at exterior.
- F. Finish: Manufacturer's standard enamel finish.

#### 2.4 SURFACE RACEWAYS

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Finish with manufacturer's standard grey finish coat.
  - 1. Manufacturer:
    - a. Walker Systems, Inc.; Wiremold Company (The).
    - b. Wiremold Company (The); Electrical Sales Division.
- B. Types, sizes, and channels as indicated and required for each application, with fittings that match and mate with raceways.

#### 2.5 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturer:
  - 1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
  - 2. Emerson/General Signal; Appleton Electric Company
  - 3. Erickson Electrical Equipment Co.
  - 4. Hoffman
  - 5. Hubbell, Inc.; Killark Electric Manufacturing Co.
  - 6. O-Z/Gedney; Unit of General Signal
  - 7. RACO; Division of Hubbell, Inc.
  - 8. Robroy Industries, Inc.; Enclosure Division
  - 9. Scott Fetzer Com.; Adalet-PLM Division
  - 10. Spring City Electrical Manufacturing Co.
  - 11. Thomas & Betts Corporation
  - 12. Walker Systems, Inc.; Wiremold Company (The)
  - 13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary
- B. Sheet Metal Outlet and Device Boxes: NEMA OS 1
- C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, Type FD, with gasketed cover
- D. Nonmetallic Outlet and Device Boxes: NEMA OS 2
- E. Floor Boxes: Cast metal, fully adjustable, rectangular
- F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1
- G. Cast-Metal Pull and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover
- H. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous hinge cover and flush latch
- I. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
- J. Nonmetallic Enclosures: Plastic finished inside with radio-frequency-resistant paint.
- K. Cabinets: NEMA 250, Type 1, galvanized steel box with removable interior panel

and removable front, finished inside and out with manufacturer's standard enamel. Hinged door in front cover with flush latch and concealed hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage and include accessory feet where required for freestanding equipment.

## 2.6 FACTORY FINISHES

- A. Finish: For raceway, enclosure or cabinet components provide manufacturer's standard prime coat finish ready for field painting.
- B. Finish: For raceway, enclosure or cabinet components provide manufacturer's standard gray paint applied to factory-assembled surface raceways, enclosures, and cabinets before shipping.

## PART 3 - EXECUTION

### 3.1 RACEWAY APPLICATION

- A. Outdoors:
  - 1. Exposed: Rigid steel or IMC.
  - 2. Concealed: Rigid steel or IMC.
  - 3. Underground, Single Run: RMC or RNC.
  - 4. Underground, Grouped: RMC or RNC.
  - 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
  - 6. Boxes and Enclosures: NEMA 250, Type 3R or 4.
- B. Indoors:
  - 1. Exposed: EMT.
  - 2. Concealed: EMT.
  - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment):
    - a. FMC; except use LFMC in damp or wet locations.
    - b. Damp or Wet Locations: Rigid steel conduit.
  - 4. Boxes and Enclosures: NEMA 250, Type 1, except as follows:
    - a. Damp or Wet Locations: NEMA 250, Type 4.
  - 5. Minimum Raceway Size: 3/4-inch trade size (DN 21)
  - 6. Raceway Fittings: Compatible with raceways and suitable for use and location.
  - 7. Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated
  - 8. Install nonferrous conduit or tubing for circuits operating above 60 Hz.

### 3.2 INSTALLATION

- A. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping. Complete raceway installation before starting conductor installation. Support raceways as specified in Division 16 Section "Basic Electrical Materials and Methods." Install temporary closures to prevent foreign matter from entering raceways. Protect stub-ups from damage where conduits rise through floor slabs.

Arrange so curved portions of bends are not visible above the finished slab. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.

- B. Terminations: Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.
- C. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb\_ (90-kg) tensile strength. Leave at least .12 inches\_ (300 mm) of slack at each end of pull wire.
- D. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
  - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  - 2. Where otherwise required by NFPA 70.
- E. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used .6 inches\_ (150 mm) above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.
- F. Flexible Connections: Use maximum of .54 inches\_ (1830 mm) of flexible conduit for device connections:
  - 1. For equipment subject to vibration, noise transmission, or movement.
  - 2. For all motors.
  - 3. Use LFMC, with watertight hubs, in damp or wet locations. Install separate ground conductor across flexible connections.
- G. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying raceways to receptacle or fixture ground terminals.
- H. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

### 3.3 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
  - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.4 CLEANING

- A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

**END OF SECTION**



## SECTION 260410 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes individually mounted enclosed switches and circuit breakers, rated 600 V and less, used for disconnecting and protection functions.
- B. See Division 262813 Section "Fuses" for fuses for fusible disconnect switches.

#### 1.2 SUBMITTALS

- A. Product Data and shop drawings: For each type of switch and circuit breaker.
- B. Field quality-control test reports.
- C. Operation and maintenance data.

#### 1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Source Limitations: Obtain switches and circuit breakers through one source from a single manufacturer.
- C. Comply with NFPA 70.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Eaton Corp.; Cutler-Hammer Products.
    - b. General Electric Co.; Electrical Distribution & Control Division.
    - c. Square D Co.

#### 2.2 ENCLOSED SWITCHES

- A. Enclosed, Non-fusible Switch: NEMA KS 1, Type HD and HP, with lockable handle, interlocked with cover.
- B. Enclosed, Fusible Switch, 800 A and Smaller: NEMA KS 1, Type HD and HP, with clips to accommodate specified fuses, and lockable handle, interlocked with cover.
- C. Exterior mounted switches: NEMA 3R rated enclosures with watertight hubs.

- D. Corrosive environments, Kitchens or Division 2 locations: NEMA 4X-SS, Type HD and HP with watertight hubs

## 2.3 ENCLOSED CIRCUIT BREAKERS

- A. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.
  - 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger. KAIC ratings as required by system conditions.
  - 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
  - 3. Current-Limiting Circuit Breakers: Frame sizes 600 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
  - 4. GFCI Circuit Breakers: Single- and two-pole configurations with 5-mA trip sensitivity.
- B. Molded-Case Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.
  - 1. Lugs: Suitable for number, size, trip ratings, and material of conductors.
  - 2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
  - 3. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
  - 4. Shunt Trip: 120-V trip coil (unless otherwise noted) energized from separate circuit, set to trip at 75 percent of rated voltage.

## 2.4 ENCLOSURES

- A. Listed for environmental conditions of installed locations, including:
  - 1. Outdoor Locations: NEMA 250, Type 3R/12.
  - 2. Food Service Areas: NEMA 250, Type 4X, stainless steel.
  - 3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Temporary Provisions: Remove temporary lifting provisions and blocking of moving parts.
- B. Identify components; provide warning signs as specified in Division 260510 Section "Common Work Results."

### 3.2 FIELD QUALITY CONTROL

- A. Testing: After installing disconnect switches and circuit breakers and after electrical circuits have been energized, demonstrate product capability and compliance with requirements.
- B. Inspections and Tests for Switches and Circuit Breakers: Make internal and

external inspections and perform tests, including the following:

1. Inspect for freedom from physical damage, proper unit rating, mechanical condition, enclosure integrity, cover operation, unit anchorage, clearances, and tightness of electrical connections. If a loose electrical connection is observed on any unit, check each electrical connection for each switch and circuit breaker with a torque wrench for compliance with manufacturer's torquing instructions.
2. Test insulation resistance of each pole, phase-to-phase, and phase-to-ground, following manufacturer's written instructions. Test insulation resistance of shunt trip circuits. Use 500-V minimum test voltage for units and circuits rated up to 250 V, 1000-V minimum test voltage for units rated more than 250 V. Measured insulation resistance must be 25 megohms, minimum, for switches rated up to 250 V, and 100 megohms, minimum, for switches rated more than 250 V.
3. Test cover and other interlocks and interlock release devices for proper operation.

C. Additional Inspections and Tests for Switches: Include the following:

1. Inspect for proper rating and fuse provisions.
2. Check adequacy and integrity of fuse-holders.
3. Check integrity of phase barriers.
4. Inspect blade alignment visually while operating switch to observe adequacy of blade pressure.

D. Additional Inspections and Tests for Circuit Breakers: Include the following:

1. Inspect for proper frame, trip, and fault current interrupting rating.
2. Test shunt trip devices, circuits, and actuating components for proper operation.

E. Correct defective and malfunctioning units on-site, where possible, and re-inspect and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

**END OF SECTION**

## **SECTION 260501 - COMMON WORK RESULTS FOR ELECTRICAL**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Supporting devices for electrical components.
  - 2. Concrete equipment bases.
  - 3. Cutting and patching for electrical construction.
  - 4. Touchup painting.

#### **1.3 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

#### **1.4 COORDINATION**

- A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.
  - 1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.
- B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.
- C. Coordinate electrical service connections to existing transformer.
  - 1. Coordinate installation and connection of exterior underground utilities and services.
- D. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces. Access doors and panels are specified in Division 8 Section "Access Doors."
- E. Coordinate electrical connections by mechanical contractor. Reference mechanical specification 230530, Section 1.02.

### **PART 2 - PRODUCT**

#### **2.1 SUPPORTING DEVICES**

- A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to

authorities having jurisdiction.

- B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.
- C. Slotted-Steel Channel Supports: Flange edges turned toward web, and .9/16-inch- diameter slotted holes at a maximum of 2 inches o.c., in webs.
  - 1. Channel Thickness: Selected to suit structural loading.
- D. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.
- E. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.
- F. Cable Supports for Vertical Conduit: Factory fabricated assembly consisting of threaded body and insulating wedging plug for non-armored electrical cables in riser conduits. Plugs have number and size of conductor gripping holes as required to suit individual risers. Body constructed of malleable-iron casting with hot-dip galvanized finish.
- G. Expansion Anchors: Carbon steel wedge or sleeve type.
- H. Toggle Bolts: All steel springhead type.

## 2.2 TOUCHUP PAINT

- A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.
- B. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

## PART 3 - EXECUTION

### 3.1 ELECTRICAL EQUIPMENT INSTALLATION

- A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange, and install components and equipment to provide the maximum possible headroom.
- B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
- C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.
- D. Right of Way: Give to raceways and piping systems installed at a required slope.

### 3.2 ELECTRICAL SUPPORTING DEVICE APPLICATION

- A. Damp Locations and Outdoors: Hot-dip galvanized materials or non-metallic, U-channel system components.

- B. Dry Locations: Steel materials.
- C. Selection of Supports: Comply with manufacturer's written instructions.
- D. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four; minimum of 200-lb. design load.

### 3.3 SUPPORT INSTALLATION

- A. Install support devices to securely and permanently fasten and support electrical components.
- B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.
- C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.
- D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.
- E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.
- F. Install 1/4-inch diameter or larger threaded steel hanger rods, unless otherwise indicated.
- G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.
- H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.
- I. Simultaneously install vertical conductor supports with conductors.
- J. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches from the box.
- K. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.
- L. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated

floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

M. Securely fasten electrical items and their supports to the building structure,

unless otherwise indicated. Perform fastening according to the following unless other fastening methods are indicated:

1. Wood: Fasten with wood screws or screw-type nails.
2. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
3. New Concrete: Concrete inserts with machine screws and bolts.
4. Existing Concrete: Expansion bolts.
5. Light Steel: Sheet-metal screws.
6. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

### 3.4 CUTTING AND PATCHING

- A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.
- B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

### 3.5 FIELD QUALITY CONTROL

- A. Inspect installed components for damage and faulty work, including the following:
  1. Supporting devices for electrical components.
  2. Cutting and patching for electrical construction.
  3. Touchup painting.

### 3.6 REFINISHING AND TOUCHUP PAINTING

- A. Refinish and touch up paint. Paint materials and application requirements are specified in Division 9 Section "Painting."
  1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
  2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
  3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

### 3.7 CLEANING AND PROTECTION

- A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.
- B. Protect equipment and installations and maintain conditions to ensure that

coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

- C. Protect all open device boxes from painter's sprays.

**END OF SECTION**



## **SECTION 260510 - GROUNDING AND BONDING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

#### **1.3 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Field Test Reports: Submit written test reports to include the following:
  - 1. Test procedures used.
  - 2. Test results that comply with requirements.
  - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

#### **1.4 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with UL 467.

### **PART 2 - PRODUCTS**

#### **2.1 GROUNDING CONDUCTORS**

- A. For insulated conductors, comply with Division 260120 Section "Conductors and Cables."
- B. Material: Copper.
- C. Equipment Grounding Conductors: Insulated with green-colored insulation.
- D. Bare Copper Conductors: Comply with the following:
  - 1. Solid Conductors: ASTM B 3.
  - 2. Assembly of Stranded Conductors: ASTM B 8.
  - 3. Tinned Conductors: ASTM B 33.
- E. Copper Bonding Conductors As follows:
  - 1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4 inch in diameter.

2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
  3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; .1-5/8 inches wide and .1/16 inch thick.
- F. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

## 2.2 CONNECTOR PRODUCTS

- A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.
- B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.
- C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

## PART 3 - EXECUTION

### 3.1 APPLICATION

- A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone and similar materials.
- B. In raceways, use insulated equipment grounding conductors.
- C. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections.
- D. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.

### 3.2 EQUIPMENT GROUNDING CONDUCTORS

- A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.
- B. Install an insulated green copper equipment ground in all branch circuits and feeders.

### 3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage. Conductors shall be in EMT conduit, bond conduit at both ends with approved bonding bushings and #6.
- B. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

- C. Bond interior metal piping systems and metal air ducts to equipment grounding conductors of associated pumps, fans, blowers, electric heaters, and air cleaners. Use braided-type bonding straps.

### 3.4 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
  - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
  - 2. Make connections with clean, bare metal at points of contact.
  - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
  - 4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
  - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically non-continuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturers published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.
- F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

**END OF SECTION**

## **SECTION 262726 - WIRING DEVICES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes the following: Single and duplex receptacles, including ground-fault circuit interrupters.
  - 1. Single and double-pole snap switches.
  - 2. Device wall plates.
  - 3. Floor service outlets.

#### **1.3 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: List of legends and description of materials and process used for pre-marking wall plates.
- C. Field quality-control test reports.

#### **1.4 QUALITY ASSURANCE**

- A. Source Limitations: Obtain each type of wiring device through one source from a single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

#### **1.5 COORDINATION**

- A. Receptacles for Owner-Furnished Equipment: Match plug configurations.
- B. Cord and Plug Sets: Match equipment requirements.

### **PART 2 - PRODUCTS**

#### **2.1 RECEPTACLES**

- A. Straight-Blade-Type Receptacles: Comply with NEMA WD 1, NEMA WD 6, DSCC W-C-596G, and UL 498.
- B. Straight-Blade and Locking Receptacles: Heavy-duty grade, 20 Amp.
- C. GFCI Receptacles: Straight blade, non-feed-through type, heavy-duty grade, with integral NEMA WD 6, Configuration 5-20R duplex receptacle; complying with

UL 498 and UL 943. Design units for installation in a 2-3/4-inch- deep outlet box without an adapter.

- D. Receptacles shall have separate hex-head grounding screw terminals.
- E. Special purpose receptacles to match NEMA designations of various manufacturers' plugs.

## 2.2 CORD AND PLUG SETS

- A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.
  - 1. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-jacket; with green-insulated grounding conductor and equipment rating ampacity plus a minimum of 30 percent.
  - 2. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

## 2.3 SWITCHES

- A. Single, Double-Pole, or 3 Way Switches: Comply with DSCC W-C-896F and UL 20.
- B. Snap Switches: Heavy-Duty grade, quiet type, 20 Amp.
- C. Switches shall have separate hex-head grounding screw terminals.

## 2.4 WALL PLATES

- A. Single and combination types to match corresponding wiring devices.
  - 1. Plate-Securing Screws: Metal with head color to match plate finish.
  - 2. Material for Finished Spaces: Brushed Stainless Steel.
  - 3. Material for Unfinished Spaces: Galvanized steel, with rolled edges to match box size.
  - 4. Material for Wet Locations: Cast aluminum with spring-loaded lift-cover and listed and labeled for use in "wet locations" and "rain-tight while in use".

## 2.5 FINISHES

- A. Color:
  - 1. Wiring Devices Connected to Normal Power System: Grey, unless otherwise indicated or required by NFPA 70.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install devices and assemblies' level, plumb, and square with building lines.
- B. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, and with grounding terminal of receptacles on top. Group adjacent switches under single, multi-gang wall plates.

- C. Remove wall plates and protect devices and assemblies during painting.
- D. Adjust locations of floor service outlets to suit arrangement of partitions and furnishings.

### 3.2 IDENTIFICATION

- A. Comply with Division 26 Section "Electrical Identification."
  - 1. Receptacles: Identify panelboard and circuit number from which served. Use hot stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

### 3.3 CONNECTIONS

- A. Ground equipment according to Division 26 Section "Grounding and Bonding."
- B. Connect wiring according to Division 26 Section "Conductors and Cables."
- C. Tighten electrical connectors and terminals according to manufacturers published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

### 3.4 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
  - 1. After installing wiring devices and after electrical circuitry has been energized, test for proper polarity, ground continuity, and compliance with requirements. Test GFCI receptacle operation with both local and remote fault simulations according to manufacturer's written instructions. Operation of the GFCI trip shall not interrupt power to any other receptacle on circuit unless otherwise noted.
- B. Remove malfunctioning units, replace with new units, and retest as specified above.

### **END OF SECTION**

## **SECTION 262813 - FUSES**

### **PART 1 - GENERAL**

#### **1.1 SUBMITTALS**

- A. Product Data: Catalog sheets, specifications and installation instructions.

#### **1.2 MAINTENANCE**

- A. Spare Parts:
  - 1. Six spare fuses of each size and category, including any accessories required for a complete installation.
  - 2. Special tools if required for installation or removal of fuses.

### **PART 2 - PRODUCTS**

#### **2.1 FUSEHOLDERS**

- A. Equipment provided shall be furnished with fuseholders to accommodate the fuses specified.

#### **2.2 FUSES RATED 600V OR LESS**

- A. Fuses for Safety Switches (Lighting and Heating Circuits):
  - 1. Cartridge Type (250 Volts): Single element, UL Class RK-1, 200,000 amperes R.M.S. symmetrical interrupting capacity:
    - a. Cooper Industries Inc./Bussmann Div., Type KTN-R.
    - b. Gould Inc./Circuit Protection Div. (Shawmut) Type A2K-R.
    - c. Littlefuse Inc. Type KLN-R.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install fuses, in identical sets, in readable orientation.
- B. Verify that fuse clips fit tightly on fuse.
- C. Provide minimum of 10% spare fuses to owner's on site rep.

### **END OF SECTION**